

Estimating the impact of schedule 3 consumer advertising

Final Report

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A report by the Centre for Health Economics Research and Evaluation

About CHERE

CHERE is an independent research unit within the University of Technology Sydney. It has been established since 1991, and has developed a strong reputation for excellence in research and teaching in health economics and health services research, and for providing timely, high quality policy advice and support. Its research program is policy-relevant and concerned with issues at the forefront of the sub-discipline.

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Table of contents

Estimating the impact of schedule 3 consumer advertising	i
1 Executive Summary	i
1.1 Key findings	ii
2 Introduction	1
2.1 Background and purpose for this report	1
2.2 Scheduling of medicines	1
2.3 Advertising of S3 products	2
2.3.1 The case for advertising of S3 medicines	3
2.3.2 The case against advertising of S3 medicines	3
2.4 The policy context for advertising of S3 medicines	4
2.5 Appropriate dispensing by pharmacists	5
2.6 Conceptual framework	5
2.7 Role of advertising	6
3 Method	7
3.1 Overview of the experiment	7
3.2 Consumer survey	9
3.2.1 Pharmacist/Pharmacy assistant survey	11
3.3 Design of the DCE	13
3.3.1 Development of attributes	13
3.3.2 Choice task	16
3.3.3 Experimental design	17
3.4 Statistical analysis	18
4 Results	20
4.1 Consumer	20
4.1.1 Sampling characteristics	20
4.1.2 General health behaviour question	21
4.1.3 Overall opinion about the advertisement	25
4.1.4 Mixed Logit models: forced choice analysis	27
4.1.5 Marginal willingness-to-pay	31
4.2 Pharmacists	32
4.2.1 Sampling characteristics	32
4.2.2 Overall opinion about the advertisement	33
4.2.3 Mixed Logit models: Opt-Out choice analysis	34
4.2.4 Marginal willingness-to-pay	38
4.3 Pharmacy assistant	39
4.3.1 Sampling characteristics	39
4.3.2 Overall opinion about the advertisement	39
4.3.3 Mixed Logit models: Opt-Out choice analysis	40
4.3.4 Marginal willingness-to-pay of pharmacy assistants	43
5 Conclusions and discussion	44
Appendix I Screen shots from the mock ad	47
Appendix II Additional results	48

List of Tables

Table 1	Attributes and levels used in the consumer DCE.....	14
Table 2	Attributes and levels used in the pharmacist and pharmacy assistant DCE	15
Table 3	Characteristics of consumers.....	20
Table 4	Disaggregated analysis of the combination usage	25
Table 5	Mixed logit regression models by information conditions.....	28
Table 6	Mixed logit regression models with information conditions interaction term, stratified by the disease experience	29
Table 7	Opt-Out choice following the DCE choice sets.....	31
Table 8	Characteristics of pharmacists	33
Table 9	Mixed logit model results by advertisement treatment groups - Pharmacists.....	36
Table 10	Mixed logit regression models with information conditions interaction term – Pharmacist.....	37
Table 11	Characteristics of pharmacy assistants	39
Table 12	Mixed logit model results by advertisement treatment groups – Pharmacy Assistant.....	41
Table 13	Mixed logit regression models with information conditions interaction term – Pharmacy Assistant	42

List of figures

Figure 1	Consumer survey structure	6
Figure 2	Cold sore symptom description	8
Figure 3	Consumer survey structure	11
Figure 4	Pharmacist/Pharmacy Assistant survey structure.....	12
Figure 5	Sample choice set of consumer DCE	16
Figure 6	Sample choice set of pharmacist DCE	17
Figure 7	Sample choice set of pharmacy assistant DCE.....	17
Figure 8	Baseline health-seeking behaviour question by information condition	22
Figure 9	Consumer baseline health-seeking behaviour question, stratified by information condition and cold sore experience	23
Figure 10	Preference for the treatment of experienced cold sore sufferers, stratified by information condition	24
Figure 11	Agree or disagree questions – Consumer	26
Figure 12	Marginal willingness-to-pay of consumers by information conditions	32
Figure 13	Agree or disagree questions – Pharmacists.....	34
Figure 14	Marginal willingness-to-pay of pharmacists.....	38
Figure 15	Agree or disagree questions-Pharmacy assistants	40
Figure 16	Marginal willingness-to-pay of pharmacy assistants.....	43
Figure 17	Baseline health-seeking behaviour question, stratified by disease experience	48
Figure 18	Baseline health-seeking behaviour question, stratified by randomised group	49
Figure 19	Agree and disagree questions subgroup analysis, stratified by disease experience	50
Figure 20	Brand awareness of experienced sufferers.....	51

Glossary of Abbreviations

Abbreviation	Meaning
ASMI	Australian Self Medication Industry
CHERE	Centre for Health Economics Research and Evaluation
CI	Confidence interval
Coef	Coefficient
DCE	Discrete choice experiment
GP	General practitioner
S3	Schedule 3
SD	Standard deviation
MIXL	Mixed logit
WTP	Willingness-to-pay

1 Executive Summary

The Australian Self Medication Industry (ASMI) commissioned the Centre for Health Economics Research and Evaluation (CHERE), University of Technology Sydney to undertake a research project with the aim to evaluate the impact of advertising of Pharmacist Only (Schedule 3, S3) medicines on the choice and behaviour of consumers.

S3 medicines are used to treat medical conditions where the consumer is able to self-identify ailments and symptoms, but verification and counselling by a pharmacist is required. This category plays an important role in down-scheduling medicines because it allows regulators to move a product away from prescription only (therefore requiring a GP visit), but still maintain a level of control in dispensing (requirement of a consultation with a pharmacist). Examples of S3 medicines include: famciclovir for treatment of cold sores, fluconazole for the treatment of vaginal candidiasis, and short-acting beta-agonists for bronchospasm. There are currently only a limited number of products available in the S3 category, this is mainly because the current advertising rules disincentives manufacturers from down-scheduling products.

In general, there is limited consumer awareness of S3 medicines and the role of the pharmacist in provision of these medicines. Advertising may be an effective way to increase the awareness of S3 medicines, but its benefit and risk have not been fully evaluated. Given the debate over the regulation of advertising for S3 medicines, it is vitally important to ensure decision-making about advertising is supported by robust evidence. To date, there has been limited evaluation of the impact of advertising for both consumers and providers (pharmacists) and there is very limited experience of the impact of advertising for “pharmacy only” medicines.

This report presents results from a series of surveys and discrete choice experiments (DCEs) for a policy-relevant case study of advertising of a pharmacist only product, using a realistic hypothetical information style advertisement. The DCEs were designed to investigate the impact of advertising on the behaviour and preferences of consumers, pharmacists as well as pharmacy assistants through a controlled stated preference experiment. This approach has been demonstrated in the past to be particularly useful to examine the likely effects of policies that have not been put into place, thereby providing important information to guide the design of such policies.

The context for the DCE was the treatment of a cold sore, a minor ailment that can be managed by self-medication. A mock TV-style advertisement was produced by the ASMI for the proposed S3 communication model with a hypothetical brand (Brand FAM) in a real S3 category (cold sore treatment). The mock advertisement was 30 seconds long and contained three components: disease state information, importance of pharmacist, and product information and brand awareness. The choice experiments were designed to reflect realistically the exchange of information and the choices that are likely to be made in a typical health care seeking or health service provision scenario. Respondents were asked to consider a series of hypothetical scenarios and choose their preferred medicine to purchase (for the consumer DCE) or recommend (for the pharmacist or pharmacy assistant DCEs). The mock advertisement was embedded into the survey and respondents were

randomised to one of two information conditions; either (1) ‘no additional information (i.e. control)’ or (2) the ‘mock advertisement’. In addition to the DCE choice task, the respondents were also asked a series of attitudinal and demographic questions.

1.1 Key findings

In total, 1295 consumers, 501 pharmacists and 500 pharmacy assistants participated in the study between May-July 2016. The consumer respondents were stratified in terms of whether they were experienced cold sore sufferers or not. The main findings of this report are:

- Consumers, both experienced and inexperienced, preferred more effective and lower cost products, controlling for other factors and this was observed under both information conditions (advertisement and no advertisement). The pharmacist’s recommendation had a positive and significant impact on the consumers’ choice of preferred product.
- Availability (behind counter or front of pharmacy) was not a significant driver of consumer choice of product, suggesting that consumers are comfortable talking to pharmacists about their disease management.
- After viewing the advertisement, consumers were more likely to report that they would go to pharmacy and less likely to report that they would seek treatment from a GP for cold sore management. These findings suggest the advertisement raised awareness of the pharmacy services and this may lead to a reduction in GP consultations for this health condition.
- The advertisement increased awareness of both the advertised product (Brand Fam) and generic anti-viral tablets. Consumers were more likely to choose the product after watching the advertisement and interestingly, the advertisement also increased the probability of choosing pharmacy-brand antiviral tablets (i.e. the generic version of the product).
- The impact of the advertisement was largest amongst consumers who were not experienced cold sore sufferers. Experienced sufferers may already be aware of antiviral tablets (the product) or they may be more likely to choose a treatment with which they are already familiar.
- Pharmacists and pharmacy assistants made their recommendation mainly based on consumers’ characteristics. They were less likely to recommend a product under a scenario where it was inappropriate for the customer to use the medicine. In addition, pharmacists showed confidence in handling a direct request from consumers for a particular product, and this was not a significant factor in their recommendations.
- The advertisement did not have a significant impact on the recommendations made by pharmacy professionals. Most of them considered that it is a good idea to advertise certain pharmacist-only medicines to consumers and they believed that this

would promote consumers to seek advice from a pharmacy for the management of minor ailments.

Overall, the findings of the research suggest that S3 advertising could increase the awareness of consumers about therapeutic options and the availability of health care services that could be provided by a pharmacy, which could contribute to improved disease management. For pharmacist-only medicines for minor ailments that can be managed with self-medication, the advertisement has the potential to increase demand for pharmacy services and decrease demand for GP services, which may promote more efficient use of healthcare resources. The advertisement did not change consumers' preferences with regard to preferred product attributes. The evidence further suggests that advertising will not significantly influence the recommendations made by pharmacy professionals and the consumer's condition is the decisive factor in their decisions when providing services. The S3 advertisement is unlikely to lead to inappropriate use of medicine.

2 Introduction

2.1 Background and purpose for this report

This project aims to investigate whether there is a role for advertising in encouraging the safe and appropriate use of “pharmacist only” (or Schedule 3) medicines. Pharmacist only medicines are products that do not require a prescription but should only be dispensed after consultation with a health professional. Typically, they are medicines used for management of symptoms of chronic conditions or for treatment of recurring conditions that are self-limiting. The medicines are safe and consumers do not need to go to a doctor for advice on how to manage the condition. This saves time and out-of-pocket costs for consumers, reduces cost to the health system from unnecessary GP consultations and potentially allows for quicker resolution of the health problem. However, this can only occur if the consumer is aware of the availability of the product and the fact that it does not require a prescription. Restrictions on advertising of these products limit information available to consumers and the capacity of consumers to make informed health care choices. The information asymmetry in the health market means that consumers are unlikely to be aware of the options available without some form of promotion of these products.

This also impacts on the incentives for manufacturers to seek “down-scheduling” to “pharmacist only” status for medicines, even when this would be the most efficient way for the medicine to be provided. Since doctors may be less likely to recommend a non-prescription product and consumers may not be aware that they can buy it from a pharmacist without a prescription, advertising is one way to address this information asymmetry. However, there is a risk that such advertising could lead to misinformation and result in inappropriate utilisation. It is therefore important to understand how advertising of pharmacist only medicines will affect consumer and provider behaviour.

During this project we undertook a series of discrete choice experiments (DCEs) to evaluate the impact of advertising of pharmacist only products, specifically to answer:

- Does advertising raise awareness of pharmacy only medicines?
- Does advertising change the health seeking behaviour of consumers?
- Does the availability of advertising change the recommendations of pharmacists and Pharmacy Assistants about pharmacist only medicines (i.e. does it lead to inappropriate use)?

This project aims to inform policy about the benefits and risks of down-scheduling of medicines, and the benefits and risks of allowing advertising of these medicines.

2.2 Scheduling of medicines

Scheduling is a national classification system that controls how medicines are made available to the public. Eight schedules are available (S2-S9) including prescription only

medicines (Schedule 4 or S4), pharmacist only medicines (S3) and pharmacy medicines (S2). Most medicines are classified S4 and require a doctor's prescription. To gain S2 or S3 status, a medicine must be safe, with a low risk of harm and dependency, and the quality use of the medicine can be achieved by labelling and/or provision of other information. The key difference between S2 and S3 is that S3 medicines require a mandatory consultation with a pharmacist.

There is a well-controlled mechanism for down-scheduling appropriate medicines. Medicines can move progressively from S4 (prescription) to S3 to S2. For many commonly used medicines, requiring a prescription or listing them on the pharmaceutical benefits scheme (PBS) imposes unnecessary costs to the health system and potentially limits availability. Down-scheduling appropriate medicines reduces costs to the PBS and Medical Benefits Schedules (MBS) (e.g. avoids a GP consultation), and may also reduce patient out-of-pocket costs (MBS and PBS out-of-pocket contributions), but only if the consumer is aware that they can access these medicines directly from the pharmacy without a GP visit. Consequently, the potential benefits of access to pharmacist only (S3) medicines to individuals and the community may not be realised.

2.3 Advertising of S3 products

Pharmaceutical advertising can be defined as an effort (usually via popular media) made by a pharmaceutical company to promote its product directly to patients¹. The United States of America and New Zealand are the only countries that allow direct to consumer (DTC) advertising that includes product claims for a prescription drug. Most other countries do not allow DTC for prescription drugs, although Canada allows advertisements that mention either the product or indication, but not both².

In Australia, advertisements for therapeutic goods are subject to the requirements of the *Therapeutic Goods Act 1989*. This Act states that advertising to health professionals is permitted, but DTC advertising is not permitted for prescription-only medicines. For non-prescription medicines (over-the-counter) and complementary medicines, advertisements may be directed to consumers and to health professionals. However, the regulations prohibit the advertising to consumers of certain medicines included in the Schedule 3 Standard (Pharmacist-only medicines).

The rationale for restrictions on advertising relates to the information asymmetry in health care markets and perceived increased risks of consumers being inappropriately influenced to demand or use products sub-optimally. However, the evidence from countries where advertising is allowed is mixed, and there is a balance between the risks of inappropriate use and misinformation, and the benefit to consumers from having information and the ability to participate in health care decisions.

1 Abel GA, Penson RT, Joffe S, et al. Direct-to-consumer advertising in oncology. *Oncologist* 2006; 11: 217-226.

2 Silversides A. Abramson: Direct-to-consumer advertising will erode health care. *CMAJ* 2008; 178: 1126-1127.

2.3.1 The case for advertising of S3 medicines

Proponents of advertising of S3 medicines claim the current advertising restrictions are unjustified because they deliver no net public health benefit. In fact, they argue that the restrictions have a negative impact, since they constrain the ability to make consumers aware of treatments which are available without a prescription. Consequently, consumers continue to consult GPs for conditions that could be safely managed by pharmacists. The wider availability of safe, proven and affordable medicines has the potential to reduce health care costs and make a positive impact on public health by providing consumers with easier, more convenient and faster access to therapeutic products to treat conditions and maintain good health. The current arrangements disempower consumers because “they are not allowed to know” about these medicines. Proponents argue that advertising of S3 products will improve healthcare provider-patient communication, reduce under-treatment and non-compliance and improve the cost-effectiveness of drugs³.

Public awareness of S3 medicines may deliver significant benefits and improve access to medicines. The impacts are broad ranging and are summarised below:

- *Consumers*: increased awareness of therapeutic options, faster access and improved disease management;
- *Pharmacists*: promoting their professional role in managing conditions with S3 medicines;
- *Government*: promote the appropriate use of healthcare resources and reduce unnecessary GP consultations;
- *Manufacturer*: provide incentives to support applications for rescheduling of appropriate medicines from S4 to S3. The current advertising restrictions limit down-scheduling because manufacturers lack the incentives to switch from S4 to S3 given the lack of return on investment due to the inability to grow the S3 category.

2.3.2 The case against advertising of S3 medicines

The case against advertising of S3 medicines is largely based on the experience of DTC advertising of prescription drugs. Most research has found that DTC advertising results in increased demand for advertised drugs^{4,5,6}. In the USA, between 1995 and 2001, spending on DTC advertising grew from US\$375 million to over US\$2.7 billion per year, and represents nearly one third of the total expenditure on drug promotion in the USA. Over the same period, there was a corresponding increase in sales of prescription drugs; the 50 medicines with the highest advertising budgets accounted for most of the increase. In New

³ Atherly A, Rubin PH. The cost-effectiveness of direct-to-consumer advertising for prescription drugs. *Med Care Res Rev* 2009; 66: 639-657

⁴ Gilbody S, Wilson P, Watt I. Benefits and harms of direct to consumer advertising: a systematic review. *Qual Safety Health Care* 2005; 14: 246-250.

⁵ Mintzes B. Direct to consumer advertising is medicalising normal human experience. *BMJ* 2002; 324: 908-911

⁶ Norris P, Herxheimer A, Lexchin J, et al. *Drug Promotion: What We Know, What We Have Yet to Learn*. Geneva: World Health Organization and Health Action International, 2005.

Zealand, in 2001–02 four heavily advertised drugs accounted for almost a quarter of the increase in the dispensing of pharmaceuticals listed on the Pharmaceutical Schedule⁷.

There is no clear evidence regarding the health impacts of DTC advertising^{8,9}. Patients' requests for medicines are a powerful driver of prescribing decisions. In New Zealand, 69% of the GPs who responded to a survey reported that they had been under pressure from their patients to prescribe advertised medicines, even if they felt that these medicines offered little added benefit over drugs they would normally use¹⁰. Several studies have shown that DTC advertising commonly contains misleading, inaccurate or unbalanced information¹¹.

While there are arguments that advertising can be misleading and encourages inappropriate demand for medicines, it is also the case that the information provided in advertising can be readily monitored for accuracy and consistency with the product's approved uses. This is potentially in contrast to more indirect methods such as disease awareness campaigns that indirectly promote products, financial support for professional and patient organisations or sponsoring of journalists that may occur when advertising is not allowed. Improved understanding of the impacts of advertising of S3 medicines will inform policy about the development of strategies to provide consumers with unbiased, accurate and comprehensive information about their treatment options. This is an important policy issue when the aim is to balance quality use of medicines, provide consumer choice and facilitate efficient resource allocation in the health system. However, there is limited data to understand and quantify the impact of advertising on the utilisation and uptake of S3 medicines. There is currently no published evidence relating to the impact of advertising in pharmacy only medicines. All previous research has been based on post-marketing case studies using sales data in prescription medicines, and none of this relates to the Australian context.

2.4 The policy context for advertising of S3 medicines

The question of the role of advertising becomes more complex when the interplay with policy decisions about scheduling of drugs is taken into account. The scheduling system for medicines determines the level of regulatory control required to achieve a balance between safety, availability, appropriate use and access to affordable medicines. Decisions about whether drugs should be available as prescription only, pharmacist only, or over the counter are made largely based on safety, but they have implications for both access to

⁷ Vitry A. Is Australia free from direct-to-consumer advertising? *Australian Prescriber* 2004; 27: 4-6

⁸ Auton F. Direct-to-consumer-advertising (DTCA) of pharmaceuticals: An updated review of the literature and debate since 2003. *Econ Aff* 2006; 26: 24-32.

⁹ Mintzes B. *Direct-to-Consumer Advertising of Prescription Drugs in Canada: What are the Public Health Implications?* Ontario, Canada: Health Council of Canada, 2006.

¹⁰ Toop L, Richards D, Dowell T, et al. *Direct to consumer advertising of prescription drugs in New Zealand: for health or for profit? Report to the Minister of Health supporting the case for a ban on DTCA.* Dunedin: University of Otago, 2003.

¹¹ Mansfield PR. Banning all drug promotion is the best option pending major reforms. *J Bioeth Inq* 2005; 2: 75-81.

medicines and costs to consumers and to government. Medicines that are available without a prescription avoid the time and money costs of a GP visit, and may be available at a lower cost and with easier access for consumers. But consumers may not have the information to know that these medicines for common health problems are available. Without advertising, there is little incentive for manufacturers to reschedule medicines, because there is limited capacity to promote the product. Consequently, there is a potential role for advertising of pharmacist only (S3) products to inform consumers and enable them to make rational health care choices.

2.5 Appropriate dispensing by pharmacists

There has been one previous example of S3 advertising. With the slogan *“Lose Weight, Gain Life”*, Xenical is promoted as a treatment for those who are overweight and obese. When it first went on sale in Australia, Xenical was an S4 (prescription only) drug, but in October 2003 it was granted S3 status. Xenical became one of the few over-the-counter drugs in Australia that was marketed using DTC advertising. There are guidelines for pharmacists to follow when supplying Xenical. Pharmacists were supposed to assess the individual for suitability, including an assessment of height and weight (BMI), waist circumference, health status and age, and provision of counselling about specific issues including dosage, drug interactions, side effects, and diet and exercise.

CHOICE, the consumer advocacy group, tested whether Xenical was being dispensed appropriately, by sending a shadow shopper to 30 different pharmacies to buy Xenical. The shadow shopper was a 19 year-old girl with a normal BMI, no obesity co-morbidities and considered unsuitable for Xenical according to the Pharmaceutical Society of Australia (PSA) guidelines. During the experiment the shadow shopper was sold Xenical in 24 (80%) of the 30 pharmacies visited. Less than a third of pharmacies asked the shopper for her height and weight, and none asked the shopper her age (Xenical is not recommended to children under 18 years of age). This study highlighted the lack of adherence by many pharmacists to the PSA guidelines and the consequent inappropriate supply of the drug. This method, while raising concerns did not explore the role of advertising on the behaviour of consumers and pharmacists, or the extent to which the nature of the advertisement can influence consumer and pharmacist preferences and choices.

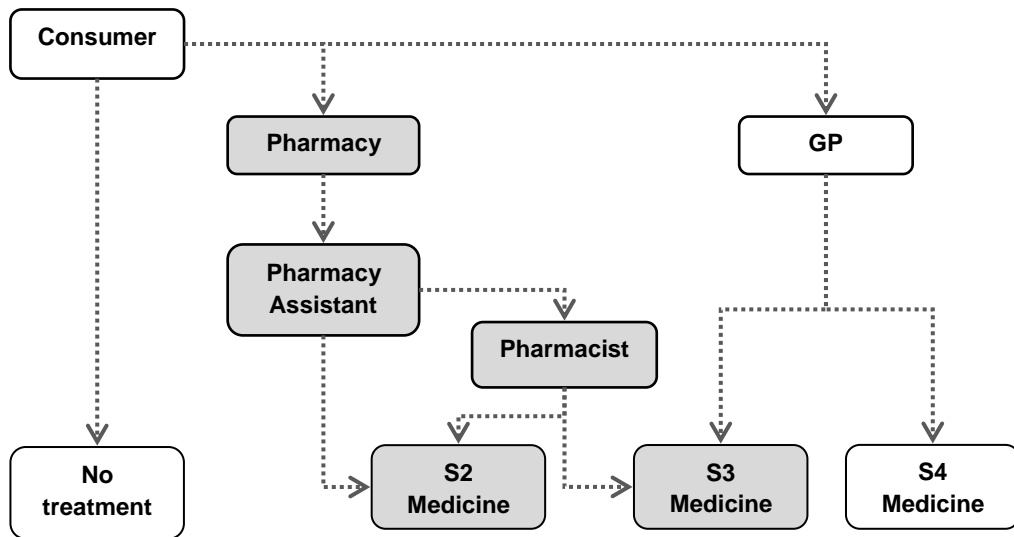
As a consequence of the Xenical story, any investigation into the suitability of advertising of S3 medicines needs to also consider appropriate dispensing by pharmacists (and therefore the impact of advertising on pharmacists' behaviour).

2.6 Conceptual framework

The decision to purchase a S3 medicine is the result of interaction between the consumer and the health care professionals. Consumers may have limited knowledge of the health problem and the options for treatment, depending on their prior experience and available information. Advertising is one possible source of information.

The figure below provides a simplified version of a consumer's decision pathway. A consumer faced with a health problem has three possible options: 1) visit a GP (and be prescribed an S4 medicine or be recommended an S2/3 medicine), 2) visit a pharmacy; and 3) do nothing/delay treatment (resolve naturally or symptoms worsen).

Figure 1 Consumer survey structure



The decision about which path the consumer will take will depend upon the time and financial costs as well as perceptions of the benefits of each pathway. This in turn will be influenced by the consumer's previous experience, and by information from a range of sources, including advice from health professionals, other consumers, or potentially from advertising. As is clear from the figure, the pathway to appropriate use of an S3 medicine may be directly to the pharmacy or via a GP, but relies on consumer awareness of these possible paths. The decision to consume an S3 product therefore depends on awareness of the product, the information and advice provided by health professionals and on consumer preferences and resource constraints.

2.7 Role of advertising

Advertising clearly impacts on the choice behaviour of consumers by providing additional information, but also has the potential to influence the behaviour of providers. Overall, it can be argued that advertising, particularly the information-based advertising investigated in this proposal, reduces the asymmetry of information between the consumer and provider. In this project we test the role of advertising and investigate whether it changes the decision-making of consumers and providers.

3 Method

The overall approach taken in this study was based on the use of discrete choice experiments. Choice experiments are widely used in marketing, environmental, transport, health and other areas of applied economics, and they are particularly valuable when revealed preference data is unavailable, or does not provide sufficient variability to allow for estimation of policy relevant impacts. In this context, the policy-relevant impact to be explored is the impact of advertising on uptake of non-prescription pharmaceutical products, for both consumers and providers. As these products are not currently advertised, it is not possible to use revealed preference (or market utilisation) data to measure this impact. The use of a choice experiment allows us to measure the factors that influence uptake, and then to test the effect of advertising. This approach has been demonstrated previously to be an effective way of testing the impact of different information on utilisation of health products, and particularly to explore this in the context of decisions that are made by health care consumers informed by expert advice and recommendations of health care providers¹².

Broadly, a discrete choice experiment involves presenting respondents with a series of hypothetical but realistic scenarios which describe possible products or programs in terms of their key attributes (for example price, convenience, effectiveness). Respondents are asked to choose their preferred product or program. By using principles of experimental design to control the presentation of attributes, the analyst can measure the impact of each attribute, both in terms of how the attribute is valued and in terms of how it affects uptake. In this study, this methodology is nested within a series of experiments in which the overall information provided to respondents is also controlled. Thus, respondents are randomised to see different levels of information and promotion of the products.

3.1 Overview of the experiment

We conducted DCEs in three separate but related populations in Australia:

- Consumers
- Pharmacists
- Pharmacy Assistants

In all three DCEs the respondents were faced with a minor health problem that can be managed by self-medication with a range of different products, with or without advice from a health professional (pharmacist or primary care provider). The combination of the three DCEs allowed us to understand how consumers make health care choices and how

¹² Knox, S.A., et al., The effect of adverse information and positive promotion on women's preferences for prescribed contraceptive products. *Soc Sci Med*, 2013. 83: p. 70-80.

this is influenced by interactions between the consumer (seeking health advice/care) and the provider (in this case a pharmacist making a recommendation) acting in an agency capacity.

The choice experiments were designed to reflect realistically the exchange of information and the choices that are likely to be made in a typical health care seeking or health service provision scenario. Respondents were asked to consider a series of hypothetical scenarios and choose their preferred medicine to purchase (for consumer) or recommend (for pharmacist or pharmacy assistant).

The approach was based on a specific case study of a minor health problem to provide a context for the choices presented in the DCE. The minor health problem presented was a cold sore (herpes simplex type 1). Cold sores are a common health problem with which most consumers are familiar. This meant that the sample of consumers could include individuals who are cold sore sufferers and those who are “naïve” to the condition and treatments. All respondents were presented with some basic information about cold sores and asked to imagine a cold sore vignette. The vignette employed in the survey to describe the cold sore symptom and treatment is provided in

Figure 2. Consumers were asked to imagine that they had early symptoms that could be a cold sore, whereas pharmacists and pharmacy assistants were provided with basic information about management of cold sores before completing the DCE task.

Figure 2 Cold sore symptoms description

About cold sores:

Cold sores are caused by the herpes simplex virus. Typical symptoms include:

- Itching, tingling or burning sensation which starts around mouth and lips;
- Tiny blisters appear soon after the above sensations;
- These blisters usually crust over in 2-3 days, but can become quite painful and interfere with eating and drinking;
- Cold sores generally resolve after 7-10 days without specific treatment, but can last up to six weeks depending on the severity of infection. Medication may help to reduce the severity of the symptoms and decrease the duration of a cold sore.

Treatment

- Antiviral creams or tablets: can reduce the duration and severity of attacks if taken at first symptoms;
- Lip balms or creams: relieve symptoms of cold sores but do not treat the virus

As described above, for this project the key policy variable of interest is the effect of advertising on decisions in relation to the product. Advertising is a form of information, and in this particular context, the emphasis was on an information-style advertisement that informed about the availability of a new product. Therefore, the choice experiment included embedded information in the form of a “mock advertisement”. The ‘mock ad’ was produced by ASMI for the proposed S3 communication model for a hypothetical brand (Brand FAM) of product in the S3 category (cold sore treatment). The mock advertisement is 30 seconds long and contains three components: disease state information, importance of pharmacist, and product information and brand awareness. This mock ad can be reviewed online: (https://www.youtube.com/watch?v=1YhzDp0_rWQ). Screen shots with key information from the ‘mock ad’ are presented in Appendix I.

In the discrete choice experiment, the mock advertisement was embedded into the survey at different points in the experiment to allow exploration of the impact of the advertisement on choices. Specifically, respondents were randomised to one of three information conditions:

- A control condition in which respondents did not see the advertisement at all before completing the survey or the choice experiment
- An information condition in which respondents saw the advertisement before completing questions in the survey, including both broad intentions about management of cold sores and the choice experiment
- An information condition in which respondents saw the advertisement before undertaking the choice experiment, but after questions about broad intentions about management of cold sores.

For the purposes of the analysis of the choice experiment, the two information conditions are analysed together and compared with the control condition on the basis that respondents saw the advertisement before completing the choice experiment questions.

In addition to the choice experiment, the respondents were also asked a series of attitudinal and demographic questions, including questions related to their health and health care experience and their opinions about the advertisement. The study was approved under University of Technology Human Research Ethics Committee Program, Approval No. 2015000135.

As noted above, separate experiments were conducted for consumers, pharmacists and pharmacy assistants. These are described in more detail below.

3.2 Consumer survey

The sample of consumers was recruited from an online panel managed by a market research company (I-view). Recruitment and survey completion took place during May 2016. The sample was stratified to include 50% of respondents who had prior experience of

cold sores, due to the importance of disease experience to choices and preferences in relation to treatment. This sampling strategy provides equal groups of experienced cold sore sufferers and inexperienced sufferers. To achieve this, an initial question was used to identify respondents who had experienced cold sores (i.e. had personal understanding of the health condition) and respondents who had never had a cold sore. This allows us to compare the effect of the advertisement on demand in individuals with and without the health care condition.

The survey proceeded in stages. In the first stage (after the basic stratification question about cold sore experience), respondents were provided with the basic information vignette about cold sore treatment. Respondents were also asked to answer a baseline health-seeking behaviour question. Specifically, respondents were asked to imagine having cold sore symptoms and indicate the most likely choice they would make from the following options:

- Seeking treatment from GP
- Seeking treatment from a pharmacy
- Seeking treatment from a supermarket
- Using treatment that I had on hand
- No form of treatment

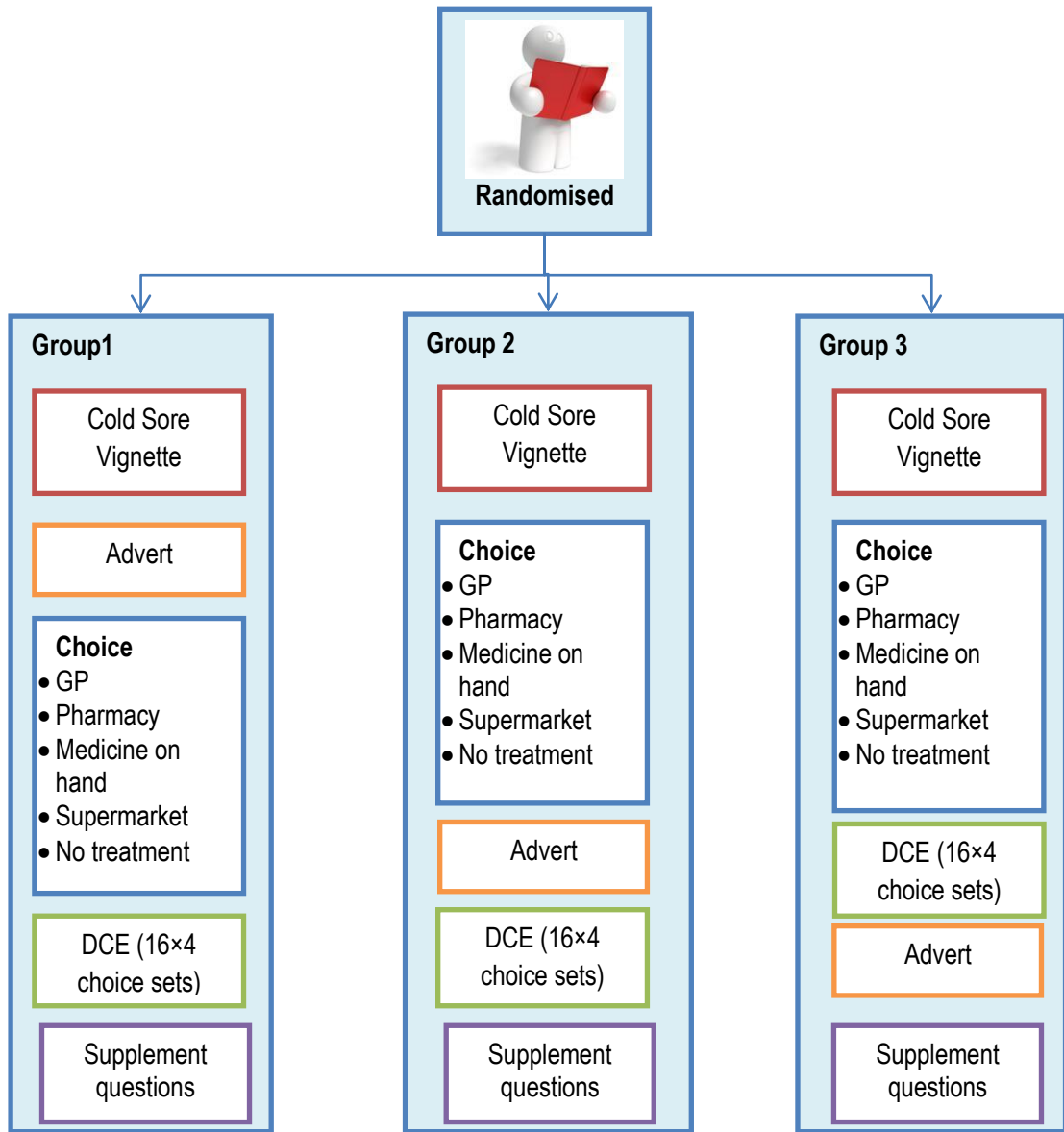
As noted above, in order to examine the impact of advertising on baseline health-seeking behaviour, respondents were randomised either to see the mock advertisement before or after answering this question

In stage 2, all respondents proceeded to undertake the choice experiment, but those who had not seen the advertisement at this stage were further randomised either to see the ad before or after completing the choice experiment.

In stage 3, all respondents completed demographic questions and some additional questions that specifically related to the content of the advertisement.

The survey structure and randomisation strategy of the consumer survey is shown in Figure 2. Participants were randomised to three information conditions, in which the advert video appeared in different places of the survey, and stratified on cold sore status. The targeted sample size was 400 for each randomised group.

Figure 3 Consumer survey structure



3.2.1 Pharmacist/Pharmacy assistant survey

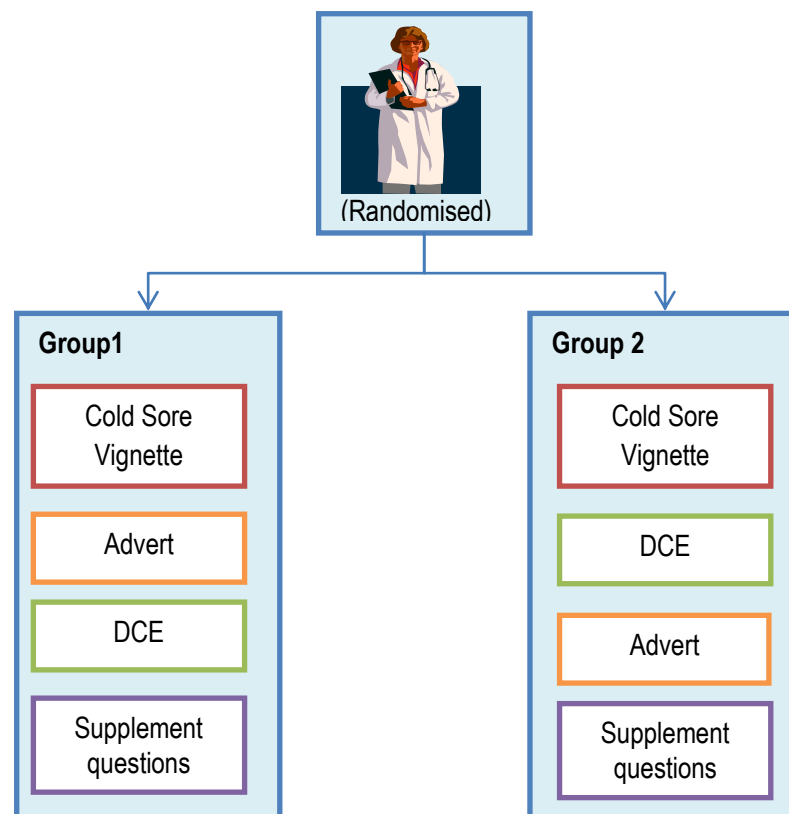
In the experiment for pharmacists and pharmacy assistants, the basic vignette included a relevant protocol for provision of pharmacist only medicines (S3 medicine) for cold sore management. The protocol was modified from the guidance to pharmacists to provide S3 medicine Famciclovir developed by Pharmaceutical Society of Australia¹³.

¹³ Pharmaceutical Society of Australia. Guidance for provision of a Pharmacist Only medicine Famciclovir. 2015. Accessed on 15 December 2015. <https://www.psa.org.au/practice-support-and-tools/guidelines-and-tools/pharmacist-only-medicine-s3-guidelines>.

As with the consumer survey, respondents were randomised either to see the advertisement before or after completing the choice experiment, but in contrast with the consumers, the providers were not asked about their general intentions in the first stage. The structure of the pharmacist and pharmacy assistant surveys is shown in Figure 2. Participants were randomised to two information conditions in terms of when they see the advertisement.

Pharmacists and pharmacy assistants were recruited through the e-newsletter 'Forefront' from the Pharmacy Guild of Australia and websites targeted to Australian pharmacy professionals. The targeted sample size was 200 for each randomised group. The pharmacist and pharmacy assistant survey has a Pharmacy Guild Survey Approval Certificate (No. 830).

Figure 4 Pharmacist/Pharmacy Assistant survey structure



3.3 Design of the DCE

3.3.1 Development of attributes

Candidate attributes were initially identified from a review of the literature and discussion with pharmacists and experts on pharmacy practice. The factors considered for inclusion are policy-relevant, plausible, actionable and capable of being traded off against each other¹⁴. The list of attributes and relevant levels were validated and augmented through focus groups with key stakeholders (ASMI, PSA, and industry representatives) to examine content and face validity. The wording of some attributes and the values of some levels were refined with the focus group findings. The attribute list was further examined in a focus group with a convenience sample of consumers to ensure the appropriateness of the wording and relevance to their choice of medicines.

The choice experiment was then piloted in a sample of 100 consumers to ensure that the wording used in the questionnaire was correct and could be understood by the target population. The comments for the study were generally positive and no specific issue was identified. The data set structure was reviewed and pilot data analysis using a conditional logit model was performed to ensure feasibility¹⁵. No changes in the attributes and/or levels were deemed necessary based on the results of this pilot study.

Table 1 presents the final set of attributes for the consumer choice experiment. These comprised a labelled product attribute (five levels) and five other attributes (availability, frequency and duration of use, effectiveness, price and pharmacy staff's recommendation for consumer DCE. Table 2 presents the final set of attributes for the pharmacist and pharmacy assistant DCE. In addition to the attributes in the consumer experiment, this included an additional context attribute, which described the hypothetical consumer seeking treatment for a cold sore. The purpose of this attribute was to explore the extent to which recommendations reflected appropriate use, in terms of quality use of medicines. The hypothetical consumer condition had four levels to represent four different consumer health care scenarios, specifically:

1. A situation in which an anti-viral tablet is appropriate
2. A situation in which an anti-viral tablet is appropriate, but the consumer may wish to try a cream first
3. A situation in which the anti-viral tablet is inappropriate, since the cold sore is beyond the stage when this treatment would be effective
4. A situation in which an anti-viral is inappropriate, and the consumer should be referred to a GP

¹⁴ Lancsar, E. and J. Louviere, Conducting discrete choice experiments to inform healthcare decision making: a user's guide. *Pharmacoeconomics*, 2008. 26(8): p. 661-77.

¹⁵ McFadden, 1974 D. McFadden Conditional logit analysis of qualitative choice behaviour P. Zarembka (Ed.), *Frontiers in Econometrics*, Academic Press, New York (1974).

In order to avoid unrealistic combinations of attributes, some attributes were nested¹⁶. In particular, the “Brand FAM” attribute was nested with pharmacist only medicine (level 1 of availability attribute) and lip balm was nested with a front of pharmacy product (level 2 of availability attribute) and with the least effective level of the effectiveness attribute.

Table 1 Attributes and levels used in the consumer DCE

Attribute	Level of attribute	
Product	1)	Brand FAM tablet
	2)	Pharmacy-brand antiviral tablet
	3)	Branded antiviral cream such as Zovirax
	4)	Pharmacy-brand antiviral cream
	5)	Lip balm (no antiviral ingredients), such as Blistex
Availability	1)	Pharmacist only medicine
	2)	Front of pharmacy product
Frequency and duration of use		
Tablet	1)	3 oral tablets, single dose
	2)	One oral tablet twice daily for 5 days
Cream	1)	Apply 4-5 times a day for 2 days to the affected area
	2)	Apply 4-5 times a day for 5 days to the affected area
Effectiveness	1)	Reduces the severity, heals cold sore in 2 days
	2)	Reduces the severity, heals cold sore in 5 days
	3)	Reduces the severity, heals cold sore in 10 days
	4)	Relieves the pain and itching, but does not reduce the duration or severity
Price	1)	\$5
	2)	\$15
	3)	\$25
	4)	\$35
Pharmacy staff's recommendation	1)	No recommendation (<i>blank</i>)
	2)	This is a suitable product for you
	3)	This is NOT a suitable product for you

¹⁶ D.A. Hensher, J.M. Rose, W.H. Green Applied Choice Analysis: A Primer Cambridge University Press, Cambridge, UK (2005).

Table 2 Attributes and levels used in the pharmacist and pharmacy assistant DCE

Attribute	Level of attribute
Consumer	1) Consumer A <ul style="list-style-type: none"> • Middle age (36-65 years) • First day of symptoms; itching, tingling or burning sensation of lips • Occasionally cold sores, 2-3 times in the past year • No other symptoms 2) Consumer B <ul style="list-style-type: none"> • Young Adult (18-35 years) • First day of symptoms; itching, tingling or burning sensation of lips • Never had a cold sore before • No other symptoms 3) Consumer C <ul style="list-style-type: none"> • Young adult (18-35 years old) • Visible blister which has crusted over. It has been present for 3 days • Occasionally cold sores, 2-3 times in the past year • No other symptoms 4) Consumer D <ul style="list-style-type: none"> • Over 65 years • Visible ulcers, which has been present for 3 days • Frequent cold sores, more than 3 times in the past year • Systemic symptoms and lesions on other parts of the body
Product	1) Brand FAM tablet 2) Pharmacy-brand antiviral tablet 3) Branded antiviral cream such as Zovirax 4) Pharmacy-brand antiviral cream 5) Lip balm (no antiviral ingredients), such as Blistex
Availability	1) Pharmacist only medicine 2) Front of pharmacy product
Frequency and duration of use	
Tablet	1) 3 oral tablets, single dose 2) One oral tablet twice daily for 5 days
Cream	1) Apply 4-5 times a day for 2 days to the affected area 2) Apply 4-5 times a day for 5 days to the affected area
Effectiveness	1) Reduces the severity, heals cold sore in 2 days 2) Reduces the severity, heals cold sore in 5 days 3) Reduces the severity, heals cold sore in 10 days 4) Relieves the pain and itching, but does not reduce the duration or severity
Price	1) \$5 2) \$15 3) \$25 4) \$35
Consumer's Request	1) No request (<i>blank</i>) 2) Customer directly requests this medicine

3.3.2 Choice task

Each respondent completed 16 choice tasks (or choice sets).

Figure 5 provides an example of a choice set from the consumer DCE. Each choice set presented two labelled product options. Each product option was described in terms of the other attributes. Respondents were first asked to choose which product they preferred, imposing a forced choice of the preferred product. Following the forced choice, a further question was asked for each choice set, which allowed the respondent to opt-out of choosing either or the products. Specifically, the respondent was asked if the two products described were the only available products, whether they would:

1. Choose your preferred product from the products above
2. Choose no treatment
3. Go elsewhere for a different treatment

Figure 5 Sample choice set of consumer DCE

	Treatment A	Treatment B
Product	Lip balm (no antiviral ingredients), such as Blistex	Pharmacy-brand antiviral tablet
Availability?	Front of pharmacy product	Front of pharmacy product
Frequency and duration of use	Apply 4-5 times a day for 2 days to the affected area	One oral tablet twice daily for 5 days
Effectiveness?	Relieves the pain and itching, but does not reduce the duration or severity	Reduces the severity, heals cold sore in 5 days
Price	\$5	\$25
Pharmacy staff's recommendation	Pharmacy staff advises this is NOT appropriate for you	Pharmacy staff advises this is a suitable product for you
Which of these two treatments do you prefer	Treatment A <input type="radio"/>	Treatment B <input type="radio"/>

Figure 6 and Figure 7 provide examples for the choice sets of pharmacists and pharmacy assistant DCE respectively. For this experiment, each choice set had two labelled product options and one opt-out option: ‘neither of the two products presented on the left’. This presentation of the opt-out option within each choice set differed from the consumer DCE, and was based on consultation with ASMI and expert focus groups including pharmacists. Allowing the pharmacist and pharmacy assistant to choose ‘neither’ of the hypothetical products is in accordance with respondent’s real-life decision context. The major difference between the pharmacist and pharmacy assistant choice sets was the wording of the choice option. Given that a pharmacy assistant does not directly recommend Schedule 3 products to consumers, the choice made by pharmacy assistants was whether to ‘*recommend the customer talk to a pharmacist about this product*’.

Figure 6 Sample choice set of pharmacist DCE

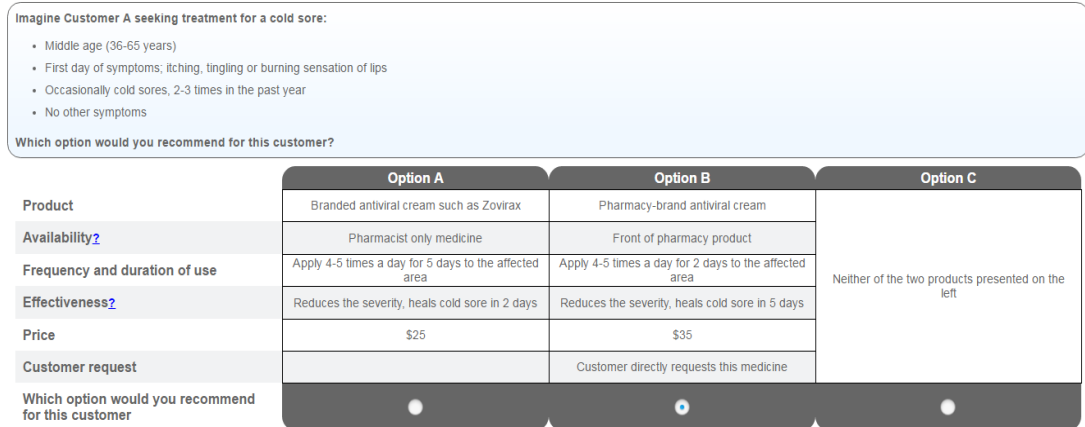
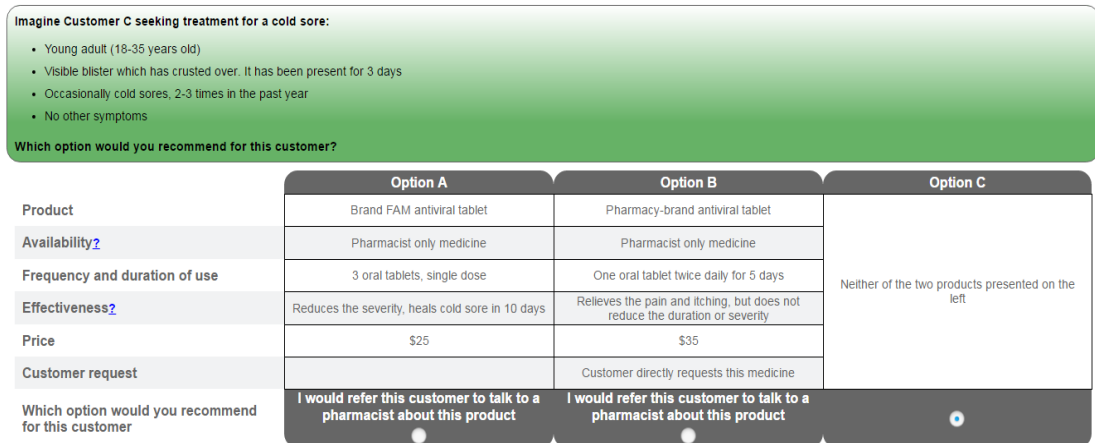


Figure 7 Sample choice set of pharmacy assistant DCE



3.3.3 Experimental design

The consumer DCE experiment was constructed from a 32-run orthogonal main effects plan (OMEP; equivalently fractional factorial design) with two 2-level factors, three 4-level factors and one 8-level factor. This design was obtained by taking the 32-run OMEP with 32 runs and an 8-levels factor from Kuhfeld (http://support.sas.com/techsup/technote/ts723_Designs.txt), removing the first three 4-level factors, collapsing the fourth and fifth factors so that they are binary, the third so that it is ternary and collapsing the 8-level factor so that it has 5 levels. Levels of brand FAM and no recommendation were oversampled. To achieve the over-sampling of brand FAM the 8-level factor (labelled "product") was collapsed in the ratio 3:2:1:1:1. To obtain the over-sampling on "no recommendation" one 4-level factor (labelled "pharmacy staff recommendation") was collapsed in the ratio 1:1:2.

We obtained the choice sets (which are of size 2) from this OMEP by adding, independently, each of two generators. This addition is carried out component-wise modulo Lk . The resulting shifted designs exhibit orthogonality and minimal level overlap. As we used two generators, we generated 64 choice sets of size 2 and the full set of 64 pairs is 97.9% efficient under the null hypothesis. These 64 choice sets were blocked into four versions each of 16 choice sets. The same versions were used across all information conditions and respondents were randomly allocated to a version within an information condition to ensure that the full design was balanced within each information condition.

The pharmacist and pharmacy assistant DCEs had an additional attribute which described the consumer who was seeking treatment. This attribute was common to both products in each choice set (thus it was fixed for each choice set). These attribute levels described four different consumers: two for whom the anti-viral tablet was appropriate and two for whom the anti-viral tablet would not be appropriate. To allow for the possibility of combining the results from each type of consumer in the most efficient way, we constructed 32 choice sets (efficiency 91% under the null) for each consumer, but used two different, yet equivalent generators for the two consumer types where the antiviral tablet was appropriate, and for the two consumer types where it was not. For a given consumer type, each set of 32 choice sets was divided into eight sets of four choice sets. These were then grouped to form eight versions of 16 choice sets so that each pharmacist saw four consumers from each of the four situations (in random order).

3.4 Statistical analysis

The analysis of discrete choice experiments follows random utility theory¹⁷. The utility (U) that individual i derives from alternative j (where $J=2$, hypothetical products scenarios) in choice set s is composed of a systematic component V_{isj} and a random component ε_{isj} :

$$U_{isj} = V_{isj} + \varepsilon_{isj} = X'_{isj} \beta_i + \varepsilon_{isj}$$

where X_{isj} is a $K \times 1$ vector of explanatory variables ($k = 1$ to K attribute levels) and β_i is a conformable vector of coefficients (effect of attributes on choice). Based on the data retrieved by a DCE, the systematic utility component (V_{isj}) can be estimated. This was estimated separately for the forced –choice data and the data that included an opt-out option. In the opt-out models, a constant term β_0 was included as the alternative specific constant for both option A and option B, as opposed to the opt-out and $V_{opt-out} = 0$.

All analyses were conducted in STATA (Version 14) using mixed-logit (MIXL) models (1000 Halton draws), to take preference heterogeneity into account but assumes that tastes

¹⁷ McFadden, D. and K. Train, Mixed MNL models for discrete response. *Journal of Applied Econometrics*, 2000. **15**: p. 447-470

in different attributes are independent¹⁸. The heterogeneity can be accounted for by allowing components of the attribute coefficients (β) to randomly vary over individuals but not over the repeated choices made by an individual by setting:

$$\beta_{ki} = \bar{\beta}_k + \omega_{ki} \quad k = 1, \dots, K$$

where $\bar{\beta}_k$ is the mean parameter vector for the population and ω_{ki} is the individual specific deviation from the mean. The ω_{ki} are assumed to follow standard normal distributions, independent of each other and of the ε_{isj} . This specification accounts for the dependence structure in unobserved utility among the repeated choices per respondent.

Sub-group analyses were conducted by interacting the information condition variable (seeing the advertisement before the choice experiment and the control condition, where the advertisement is not seen before the choice experiment) as well as the disease experience variable (experienced and first time cold sore sufferers) with the discrete choice experiment attributes. This assumes there is a homogeneous shift in the mean impact of the mandatory implementation attribute but the distribution remains the same.

Marginal willingness-to-pay (WPT) values were determined for all attribute estimates of the main analyses. In order to calculate the respondents' WTP, the negative of the cost attribute was used as a measure of the marginal utility of money. The WTP for an alternative attribute was calculated as the ratio of the attribute coefficient to an estimate of the marginal utility of cost¹⁹. The 95% confidence limits were calculated using the Delta method, which can be considered a special case of the well-known central limit theorem.

¹⁸ Lancaster K. A new approach to consumer theory. J Polit Economy 1966; 74: 132

¹⁹ Train KB. Discrete choice methods with simulation, 2nd edn. Cambridge University Press, Cambridge (2009)

4 Results

4.1 Consumer

4.1.1 Sampling characteristics

In total, 1295 consumers completed the survey. Overall, the consumer sample was reasonably representative of the Australian population with 49.5% female, weighted average age of 45.8 years. Regarding health status and medication status, the majority (84.54%) self-rated their health as good, very good or excellent with 55.8% taking prescription medicines. No statistically significant difference was observed across the randomised groups. We deliberately over-sampled cold sore sufferers to provide equal groups of experienced cold sore sufferers (have a cold sore) and inexperienced/new cold sore sufferers (i.e. had never had a cold sore). The detailed demographic and clinical characteristics of participants are presented in Table 3.

Table 3 Characteristics of consumers

Characteristics of Consumers	Group 1 (N=429)		Group 2 (N=434)		Group 3 (N=432)		P value
	n	%	n	%	n	%	
N=1295							
Gender							0.789
Male	208	48.5%	210	48.4%	218	50.5%	
Female	221	51.5%	224	51.6%	214	49.5%	
Age							0.317
18–24	45	10.5%	49	11.3%	52	12.1%	
25–34	82	19.1%	84	19.4%	86	20.0%	
35–44	82	19.1%	83	19.2%	79	18.3%	
45–54	76	17.7%	80	18.5%	70	16.2%	
55–64	60	14.0%	81	18.7%	62	14.4%	
65–74	42	9.8%	35	8.1%	50	11.6%	
75 +	42	9.8%	21	4.8%	32	7.4%	
Education							0.168
Year 12 and below	95	22.1%	117	27.3%	101	23.4%	
Certificate	77	17.9%	92	21.4%	82	19.0%	
Advanced diploma or diploma	87	20.3%	59	13.8%	74	17.1%	
Bachelor's degree	113	26.3%	110	25.6%	108	25.0%	
Post Graduate degree	49	11.4%	51	11.9%	64	14.8%	
Prefer not to answer	8	1.9%	5	1.2%	3	0.7%	
Household Income							0.065
Less than \$24,999	48	11.2%	40	9.2%	44	10.2%	
\$25,000 to \$49,999	90	21.0%	74	17.1%	102	23.6%	
\$50,000 to 99,999	138	32.2%	123	28.3%	134	31.0%	

\$100,000 to \$180,000	81	18.9%	114	26.3%	78	18.1%	
Above \$180,000	27	6.3%	23	5.3%	25	5.8%	
Prefer not to answer	45	10.5%	60	13.8%	49	11.3%	
Experienced cold Sore Suffer	212	49.4%	214	49.3%	215	49.8%	0.990
Current Medication							
Vitamin	233	54.3%	233	54.3%	256	59.3%	0.195
Prescription Medicine	240	55.9%	224	52.2%	230	53.2%	0.436
Concession card holder	168	39.2%	165	38.5%	176	40.7%	0.712
Comorbidities							
Deafness or severe hearing impairment	16	3.7%	25	5.8%	31	7.2%	0.085
Blindness or severe vision impairment	0	0.0%	12	2.8%	9	2.1%	0.004
A long-standing illness (eg. cancer, HIV, diabetes, chronic heart disease)	55	12.8%	61	14.1%	56	13.0%	0.842
A learning disability	7	1.6%	5	1.2%	6	1.4%	0.834
A mental health condition (eg. depression)	68	15.9%	74	17.1%	63	14.6%	0.610
A neurological condition (eg. Alzheimer's, Parkinson's)	9	2.1%	10	2.3%	13	3.0%	0.665
None of these	291	67.8%	294	67.7%	300	69.4%	0.855
General self-rated health status							
Excellent	37	8.6%	52	12.0%	39	9.0%	0.257
Very good	160	37.3%	160	36.9%	161	37.3%	
Good	169	39.4%	150	34.6%	167	38.7%	
Fair	56	13.1%	53	12.2%	51	11.8%	
Poor	7	1.6%	19	4.4%	14	3.2%	
Family with children at home	143	33.3%	164	37.8%	136	31.5%	

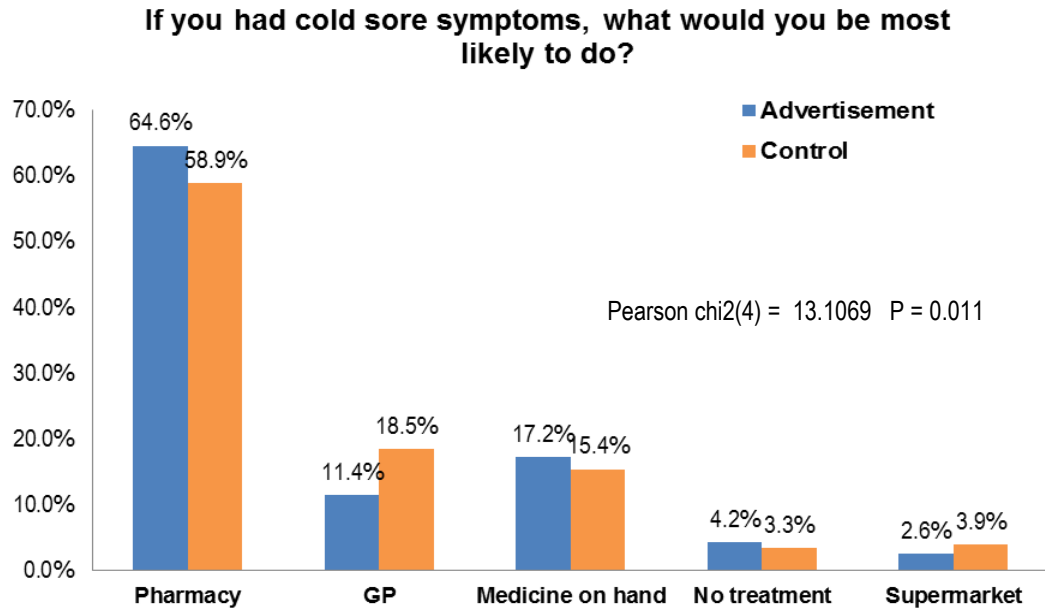
4.1.2 General health behaviour question

Health seeking behaviour

Figures 7 and 8 present the results for the baseline health-seeking behaviour question which was asked prior to completing the DCE task. After reading the cold sore information respondents were asked to imagine that they had cold sore symptoms and then answer what they would most likely do to manage the condition. As noted above, for this part of the study, participants were randomised to two information conditions according to whether they saw the advertisement before or after the health seeking behaviour question (advertisement vs. control), as presented in Figure 7. Respondents were also stratified by cold sore status, which is shown in Figure 8. In general, respondents who viewed the Brand Fam advertisement reported an increased likelihood of going to the pharmacy to seek help (absolute increase 5.7%). These participants were less likely to choose the option of seeing a GP (absolute reduction 7.1%) for cold sore management. These findings suggest the advertisement raised awareness of the role of the pharmacy and the options available, which could lead to a reduction in GP consultations for this health condition. Very few

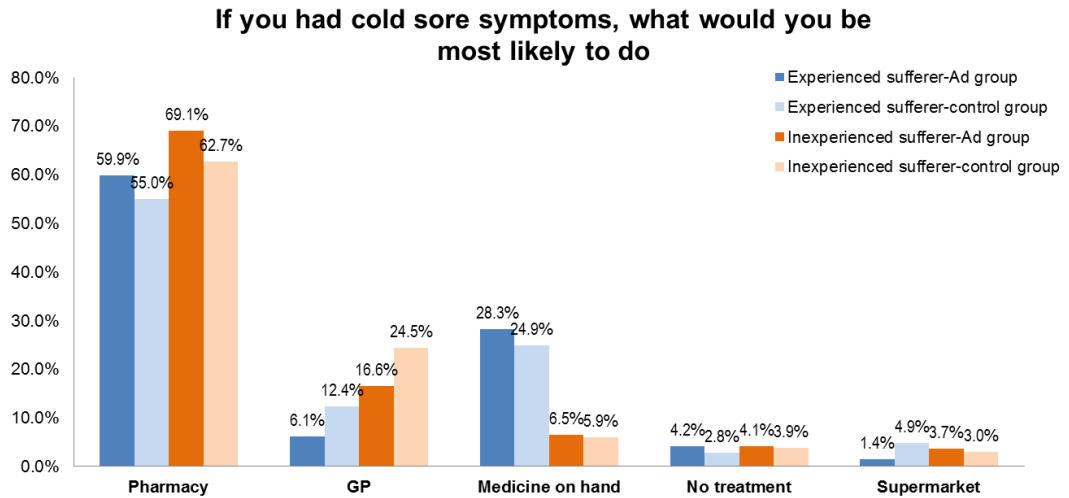
respondents chose the option of ‘no treatment’ or ‘treatment obtained from a supermarket’, indicating that most of them (>90%) would seek a treatment option for a cold sore.

Figure 8 Baseline health-seeking behaviour question by information condition



The results are further disaggregated by both the information condition and disease experience in Figure 9. From these results it can be seen that the impact of the Brand Fam advertisement was similar for both the cold sore experienced group and the cold sore inexperienced group, with the advertisement increasing awareness about pharmacy services available for cold sore management and reducing demand for GP services. Participants who had cold sore experience are more likely to seek help from a pharmacy and less likely to see a GP compared with inexperienced sufferers. In addition, experienced sufferers have a much higher probability of reporting they would ‘use a medicine on hand’ (>20% vs <10%) and after watching the advertisement the rate among experienced sufferers is slightly reduced (28.3% vs 24.9%). Additional results of disaggregated analyses by disease experience and randomised group are presented in Appendix II.

Figure 9 Consumer baseline health-seeking behaviour question, stratified by information condition and cold sore experience

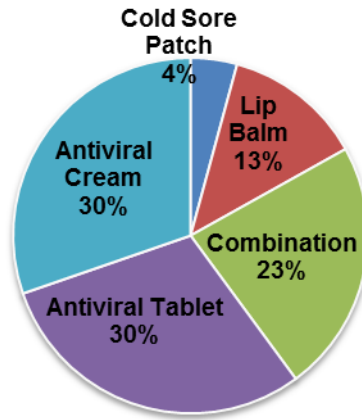


General product preferences

After completing the DCE choice task, experienced cold sore respondents (only) were also asked about their general preferences for cold sore treatments. Again, participants were randomised to see the advertisement before or after answering this question. Figure 10 presents the preferred cold core treatment options for experienced cold sore sufferers. In general, antiviral treatments are the preferred regimen (>60%), a fifth of respondents stated they used a combination of therapies and only a small proportion stated they used cold sore patches (4%). Respondents that viewed the advertisement were more likely to choose antiviral tablets than the control group (30% versus 20%). This increase was largely due to substitution from antiviral creams. The proportion of respondents that chose antiviral treatments was relatively consistent between both groups (60% versus 65%).

Figure 10 Preference for the treatment of experienced cold sore sufferers, stratified by information condition

**In general, sufferers would prefer to use:
Advertisement treated group**



**In general, sufferers would prefer to use:
Control group**

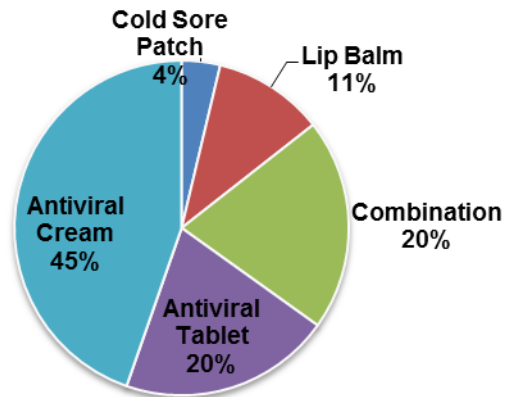


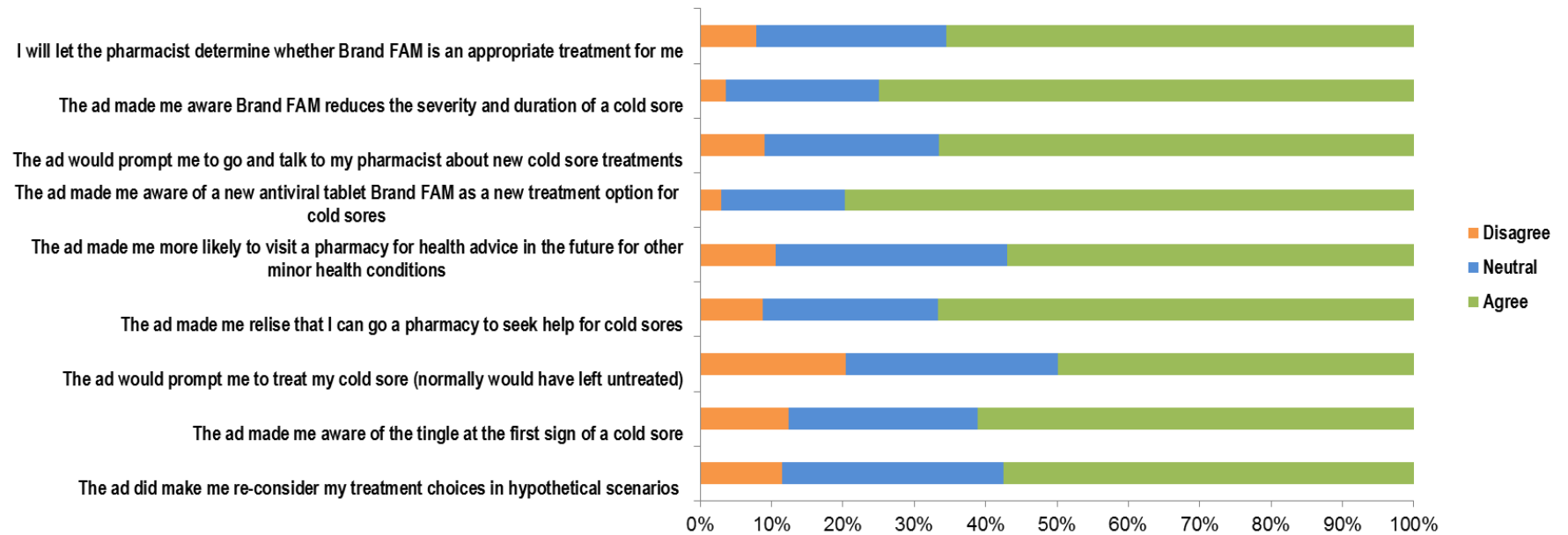
Table 4 Disaggregated analysis of the combination usage

	Advertisement group		Control group	
Total number of experienced sufferers	426		215	
Prefer combination medication	98	23.0%	44	20.5%
Two antiviral combination	73/98	74.5%	24/44	54.5%
Number of combined medicines				
2	75/98	76.5%	40/44	80.4%
3	19/98	19.4%	3/44	15.4%
4	4/98	4.1%	1/44	3.5%

4.1.3 Overall opinion about the advertisement

The final section of the survey (which was completed after the DCE for all participants) asked the participant to recall the advertisement and indicate how strongly they agree or disagree with a set of opinion statements about the advertisement. These results are presented in Figure 11. The results suggest that the advertisement raised awareness of Brand Fam as a new treatment option, as well as raising awareness that a pharmacy can provide treatment for cold sores. Over half of respondents said that the advertisement made them reconsider their treatment options. Most of the responses indicated that respondents would let the pharmacist determine whether Brand Fam is an appropriate treatment for them. The subgroup analyses by disease experiences are provided in Appendix II.

Figure 11 Agree or disagree questions – Consumer



4.1.4 Mixed Logit models: forced choice analysis

The results of the mixed logit regression analyses, stratified by information condition are presented in Table 5. In mixed logit analysis, for each attribute the average effect (the mean coefficient) and the variability (standard deviation) are estimated. This provides information on preference heterogeneity within the sample. The mean coefficients (Coef.) and the standard deviation coefficients (SD) are listed with relevant p value. The magnitude of the estimated standard deviations of each coefficient is indicative of the amount of preference heterogeneity for each specific attribute across respondents. A statistically significant standard deviation suggests considerable respondent heterogeneity.

Consistent with prior expectations, the coefficients for the cost attribute were significant and negative, that is, all other things being equal, respondents preferred lower cost options to manage cold sore symptoms. From the overall size and significance of the mean coefficients, it is evident that the most important factors for respondents when choosing a cold sore treatment are the effectiveness of the treatment and the pharmacy staff's recommendation. Frequency of administration was significant but less important. Availability (S3 medicine or not) was not statistically significant, suggesting that on average this did not influence choices, although the statistically significant coefficient on the standard deviation indicates that there is preference heterogeneity. Most of the coefficient distributions have significant standard deviations, suggesting the existence of heterogeneity in consumers' preferences over all attributes.

In the control group, the most preferred treatment option was the branded antiviral cream, followed by Brand Fam. Pharmacy-brand antiviral cream was preferred to lip balm, but respondents were largely indifferent between Pharmacy-brand antiviral tablets and lip balm. In the advertisement group, the preferred treatment option was Brand Fam, followed by the branded antiviral cream. In this group, both Pharmacy-brand products were preferred to lip balm. These results suggest that the advertisement increased the likelihood of respondents choosing Brand Fam and Pharmacy-brand antiviral tablet (i.e. it has raised awareness of the antiviral tablet treatment category).

Table 5 Mixed logit regression models by information conditions

Consumer	Advertisement Group				Control Group			
	Coef.	P	SD	P	Coef.	P	SD	P
Brand (Base: Lip Balm)								
Brand FAM	0.996	<0.001	1.020	<0.001	0.575	<0.001	0.995	<0.001
Pharmacist-brand antiviral tablet	0.419	<0.001	0.539	<0.001	-0.010	0.926	0.277	0.398
Branded antiviral cream	0.727	<0.001	0.268	0.12	0.868	<0.001	0.862	<0.001
Pharmacy-brand antiviral cream	0.325	<0.001	-0.271	0.171	0.273	0.016	0.402	0.069
Availability (Base: front pharmacy)								
Pharmacist only (S3)	0.070	0.127	-0.236	0.015	0.114	0.099	0.376	0.001
Frequency (Base: more frequent)								
Less frequent	0.176	<0.001	0.007	0.959	0.111	0.018	0.050	0.836
Effectiveness (Base: Least effective-relive symptom but not reduce duration or severity)								
Most effective	1.836	<0.001	1.301	<0.001	1.939	<0.001	1.147	<0.001
2nd most effective	0.923	<0.001	-0.725	<0.001	1.146	<0.001	-0.644	<0.001
3rd most effective	0.675	<0.001	-0.297	0.054	0.717	<0.001	-0.324	0.11
Recommendation (Base: No recommendation)								
Recommend to use	0.145	0.002	0.757	<0.001	0.257	<0.001	0.872	<0.001
Recommend not to use	-1.933	<0.001	1.879	<0.001	-1.791	<0.001	2.005	<0.001
Price	-0.760	<0.001	0.798	<0.001	-0.850	<0.001	0.907	<0.001
Number of observations	27,616				13,824			
Number of individuals	863				432			
Log-likelihood	-6383.367				-3164.0157			
AIC	12814.73				6376.031			
BIC	13012.16				6556.851			

P<0.05 is bolded

To evaluate the impact of the advertisement on choices, a model for the whole sample was estimated with an interaction term for the information condition (advertisement vs. control) included. This term was interacted with all the attributes. Effectively, this model is the same as the separate models for the two groups, but allows us to see how the advertisement impacts on each attribute. These models were estimated separately for the cold sore experienced and the cold sore inexperienced groups. These mixed logit regression analyses including interaction term, with and without stratification by disease experience, are presented in Table 6. The results indicate that consumer preferences for product attributes vary with information conditions, with significant positive coefficients indicating a preference for Brand Fam and Pharmacy-brand antiviral tablet for the advertisement group compared with the control group. This confirms observations from the stratified analyses in Table 5. Interestingly, the impact of the advertisement is less pronounced for the experienced cold sore group than for the inexperienced cold sore group. However, the preference for choosing the most effective treatment increased with the advertisement.

Table 6 Mixed logit regression models with information conditions interaction term, stratified by disease experience

Consumer Interaction	Total				Experienced sufferers				Inexperienced sufferers			
	Coef.	P	SD	P	Coef.	P	SD	P	Coef.	P	SD	P
Brand (Base: Lip Balm)												
brand1: Brand FAM	0.554	<0.001	0.957	<0.001	0.622	0.001	1.227	<0.001	0.504	0.002	0.723	<0.001
Group*Brand1	0.473	0.001			0.350	0.119			0.616	0.002		
brand2: Pharmacist-brand antiviral tablet	0.012	0.915	0.538	<0.001	0.218	0.172	-0.554	0.001	-0.242	0.116	-0.401	0.030
Group*Brand2	0.430	0.002			0.141	0.474			0.800	<0.001		
brand3: Branded antiviral cream	0.827	<0.001	0.546	<0.001	1.109	<0.001	-0.497	<0.001	0.592	<0.001	0.481	<0.001
Group*Brand3	-0.077	0.542			-0.247	0.180			0.077	0.661		
brand4: Pharmacy-brand antiviral cream	0.279	0.011	-0.351	0.005	0.422	0.007	0.263	0.177	0.208	0.176	-0.405	0.009
Group*Brand4	0.038	0.775			-0.033	0.865			0.075	0.687		
Availability (Base: front pharmacy)												
Pharmacist only (S3)	0.111	0.101	0.353	<0.001	0.063	0.507	-0.270	0.048	0.170	0.078	0.341	0.001
Group*avail	-0.041	0.62			-0.072	0.538			-0.037	0.752		
Frequency (Base: more frequent)												
freq1: less frequent	0.126	0.005	0.038	0.750	0.095	0.146	-0.177	0.090	0.131	0.036	0.040	0.706
Group*freq1	0.049	0.374			0.078	0.335			0.040	0.596		
Effectiveness (Base: Least effective-relive symptom but not reduce duration or severity)												
effec1: most effective	1.861	<0.001	1.297	<0.001	1.826	<0.001	1.340	<0.001	1.863	<0.001	1.276	<0.001
Group*effec1	0.017	0.905			0.081	0.687			0.024	0.897		
effec2: 2nd most effective	1.104	<0.001	0.687	<0.001	0.975	<0.001	0.757	<0.001	1.158	<0.001	0.625	<0.001
Group*effec2	-0.159	0.139			0.042	0.787			-0.276	0.061		
effec3: 3rd most effective	0.677	<0.001	-0.102	0.621	0.387	0.002	0.320	0.122	0.966	<0.001	0.139	0.416
Group*effec3	0.024	0.823			0.317	0.042			-0.282	0.059		
Recommendation (Base: Not suitable)												

Consumer Interaction	Total				Experienced sufferers				Inexperienced sufferers			
	Coef.	P	SD	P	Coef.	P	SD	P	Coef.	P	SD	P
rec2: recommend to use	0.267	<0.001	0.792	<0.001	0.281	0.005	0.836	<0.001	0.264	0.007	0.805	<0.001
Group*rec2	-0.117	0.164			-0.152	0.214			-0.105	0.374		
rec3: recommend not to use	-1.726	<0.001	1.986	<0.001	-1.717	<0.001	1.885	<0.001	-1.913	<0.001	2.034	<0.001
Group*rec3	-0.227	0.101			-0.176	0.383			-0.070	0.735		
price (Continuous)	-0.845	<0.001	0.849	<0.001	-0.789	<0.001	0.922	<0.001	-0.855	<0.001	0.808	<0.001
Group*price	0.064	0.276			-0.122	0.159			0.171	0.031		
Number of observations	41,440				20,512				20,928			
Number of individuals	1295				641				654			
Log-likelihood	-9543.7624				-4676.8696				-4831.7618			
AIC	19159.52				9425.739				9735.524			
BIC	19470.28				9711.175				10021.68			

P<0.05 is bolded

As noted above, for each choice set respondents were presented with a “forced choice” between the two products and then asked a second question that allowed an opt-out. The results for the opt-out question are presented in Table 7. In total, 24.3% of the respondents chose an opt-out option (rather than their preferred product) with just over one third (9.8%) choosing ‘no treatment’ and the remainder (14.5%) choosing ‘go elsewhere for a different treatment’. Only 3.6% respondents always choose the Opt-Out options.

Table 7 Opt-Out choice following the DCE choice sets

	Total	Advertisement treated		Experienced Sufferer	
		Yes	No	Yes	No
Choose your preferred treatment above	75.7%	74.6%	76.3%	74.8%	76.7%
Choose no treatment	9.8%	9.2%	10.1%	10.2%	9.4%
Go elsewhere for a different treatment	14.5%	16.2%	13.6%	15.0%	14.0%
Total Opt-Out	24.3%	25.4%	23.7%	25.2%	23.3%

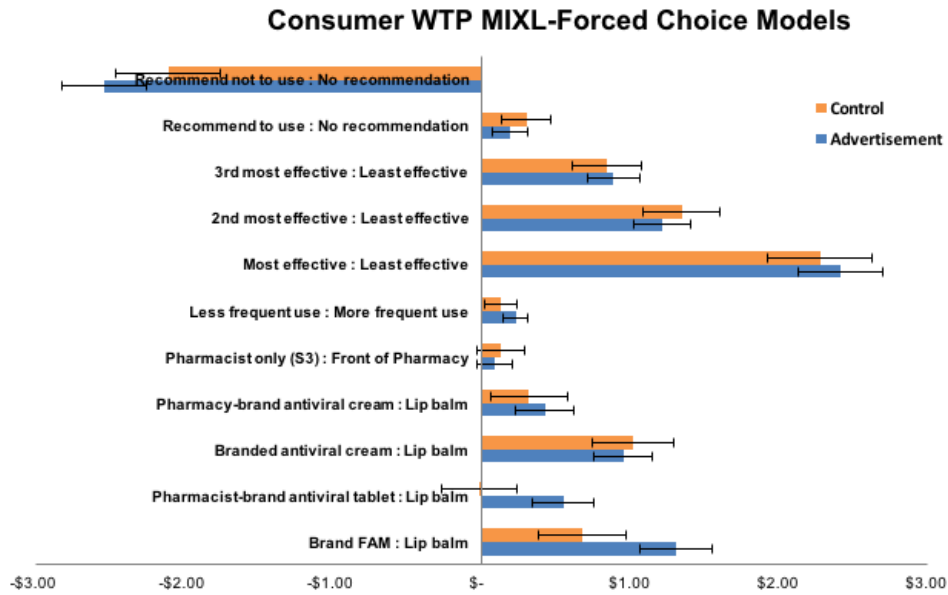
4.1.5 Marginal willingness-to-pay

To facilitate interpretation of the regression estimates the marginal WTP, calculated as the ratio of the estimated attribute level coefficient and the estimated price coefficient is presented in Figure 11. The marginal WTP is a common metric to compare effects across attributes and conditions. The calculated monetary values indicate the amount of money that respondents are willing to pay to attain another level compared to the base level. A positive value indicates a more preferred option while the negative value suggests a less preferred option.

Figure 12 presents the mean and 95% confidence intervals of the marginal WTP estimates stratified by advertisement vs control group. The relative importance of the attributes is consistent with the mixed logit regression analyses. The patterns of marginal WTP are similar across information conditions. Respondents are willing to pay most to switch from a least effective treatment to more effective option.

For these results, the lip balm is used as the base case, and therefore all results should be interpreted relative to the lip balm. As can be seen from Figure 11, the advertisement is significant in driving a switch from lip balm to both pharmacy-brand and advertised S3 (Brand Fam) antiviral tablets. In the advertisement group, the WTP for Brand Fam instead of lip balm was approximately \$1.31 (95%CI: \$1.07, \$1.55), while in the control group the WTP was estimated to be \$0.68 (95%CI: \$0.38, \$0.97). With respect to the switch from lip balm to Pharmacist-branded antiviral tablet, the advertisement group showed a WTP estimate of \$0.55 (95%CI: \$0.35, \$0.76) compared to a WTP estimate of nearly zero in the control group. Pharmacy staff’s recommendation plays an important role in consumers’ decision, especially the negative recommendation (‘recommend not to use’) which is associated with negative WTP values in both information groups.

Figure 12 Marginal willingness-to-pay of consumers by information conditions



4.2 Pharmacists

4.2.1 Sampling characteristics

In total 501 pharmacists completed the survey. Two hundred and fifty-one pharmacists were randomised to the group who watched the Brand Fam advertisement before commencing the DCE (the information condition), while the remainder were randomised to the control group. The characteristics of the pharmacist sample are presented in Table 8. 58.1% were female, the majority (85.1%) were aged 24-54, and over half of them speak a language other than English at home. Only 3% of respondents had less than one year of experience as a pharmacist. There were no significant differences in respondents’ characteristics across the advertisement group and the control group.

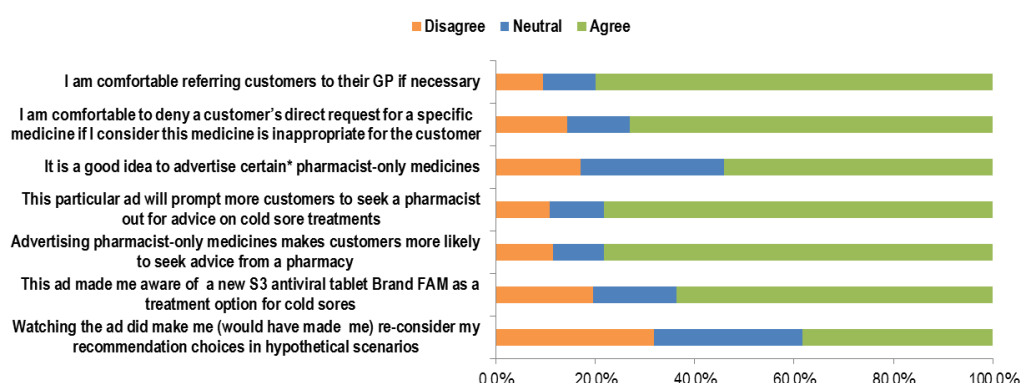
Table 8 Characteristics of pharmacists

Characteristics of pharmacists	Advertisement (N=250)		Control (N=251)		P value
	n	%	n	%	
Gender					0.294
Female	151	60.4%	140	55.8%	
Male	99	39.6%	111	44.2%	
Age					0.674
18–24	15	6.0%	17	6.8%	
25–34	102	40.8%	122	48.6%	
35–44	66	26.4%	57	22.7%	
45–54	44	17.6%	35	13.9%	
55–64	17	6.8%	16	6.4%	
65–74	3	1.2%	2	0.8%	
75 +	3	1.2%	2	0.8%	
Born in Australia	188	75.2%	190	75.7%	0.897
Speak second language at home	122	48.8%	139	55.4%	0.141
Length of experience					0.313
Less than a year	5	2.0%	15	6.0%	
1-5 years	81	32.4%	171	68.1%	
5-10 years	76	30.4%	154	61.4%	
over 10 years	88	35.2%	161	64.1%	
Owner of a pharmacy business	84	33.6%	96	38.2%	0.278

4.2.2 Overall opinion about the advertisement

As with the consumer sample, respondents in the pharmacist sample were asked a series of questions related to their perceptions of the advertisement at the end of the survey. The results are summarised in Figure 13. Most of the respondents reported confidence in handling customers' direct requests and reported that they would refer the customer to their GP if necessary. The advertisement raised awareness of Brand Fam as a new treatment option but the majority considered that their recommendations in the DCE choice sets were not affected by the advertisement. Most of the pharmacist participants agreed or strongly agreed that *'it is a good idea to advertise certain* pharmacist-only medicines'* and believed that the advertisement would promote consumer behaviour in seeking help from a pharmacist in pharmacy.

Figure 13 Agree or disagree questions – pharmacists



* Footnote for 'Certain' shown in the survey:

Limit to for S3 products that can be safely used for self-limiting conditions and minor ailments. This would exclude:

- 1) Substances that have a documented history of diversion for illegal use (e.g. PSE)
- 2) Substances that have a documented history of misuse or abuse (codeine)
- 3) Substances that are used prior to or as part of medical or surgical procedures or under direct medical supervision (e.g. pre-operative bowel preparations).
- 4) Substances with potential for harm or narrow therapeutic index, e.g. injectable substances (glucagon, adrenaline)
- 5) Substances used for indications that would fall under Sections 5(1) and 5(2) of the Therapeutic Goods Advertising Code, unless prior approval has been obtained from the TGACC. Sponsors would require TGACC approval to advertise for angina, asthma, COPD, etc.

4.2.3 Mixed Logit models: Opt-Out choice analysis

Results of the mixed logit regression analyses for the pharmacist DCE, stratified by information condition are presented in Table 9. With regard to the raw choice percentages, on average over all choice sets, 71.4% respondents were willing to recommend one of the available products in the choice set to the hypothetical customers presented, and the opt out option was chosen in only 28.6% of responses. The reasons for choosing opt-out included 53.7% 'would refer this customer to a GP', 40.2% 'would consider a different medicine for this customer', and 6.1% 'don't consider this customer needs to be treated'.

Table 9 presents regression results for a main effects model, with separate models for the advertisement and control groups. From these results it can be seen that the most important attribute for pharmacists' preference when making a recommendation is the customer's characteristics. Pharmacists in this study were less likely to recommend a product if it was inappropriate for the hypothetical customer presented in the choice set. In both groups (advertisement and control), pharmacists demonstrated a preference for the Brand Fam and branded antiviral cream products relative to lip balm, and also preferred less frequent and more effective treatment.

Pharmacists' choices were not significantly affected by the attribute '*consumer request*'. The mean coefficient estimate of the attribute '*consumer request*' is not statistically significant, suggesting that pharmacists' decisions on recommendation were not driven by whether a patient directly requests a specific product or not.

In the advertisement group, the mean coefficient estimates of the attributes price and availability of product are not statistically significant, suggesting pharmacists' choices were not affected by price. In terms of availability, the results differed across the advertisement and control groups, with the control group being statistically significantly more likely to recommend the S3 product relative to a front of pharmacy product. However, in the regression models which directly compared across the groups for each attribute, by defining an interaction term for the advertisement there is no significant change of preference for all attributes between advertisement and control group (Table 10).

Table 9 Mixed logit model results by advertisement treatment groups - pharmacists

Pharmacist	Advertisement group				Control group			
	Coef.	P	SD	P	Coef.	P	SD	P
Customer characteristics (Base: inappropriate to use)								
Appropriate to use medicine	3.348	<0.001	1.762	<0.001	3.360	<0.001	-1.739	<0.001
Brand (Base: Lip Balm)								
Brand FAM	0.628	<0.001	0.667	<0.001	0.678	<0.001	0.340	0.004
Pharmacist-brand antiviral tablet	0.230	0.054	0.443	0.004	0.382	0.001	0.500	<0.001
Branded antiviral cream	0.323	0.003	0.021	0.900	0.422	<0.001	-0.077	0.667
Pharmacy-brand antiviral cream	0.225	0.055	0.173	0.363	0.412	<0.001	0.092	0.584
Availability (Base: front pharmacy)								
Pharmacist only (S3)	0.080	0.308	-0.108	0.589	0.193	0.015	-0.373	<0.001
Frequency (Base: more frequent)								
Less frequent	0.266	0.001	0.017	0.865	0.254	0.001	0.028	0.797
Effectiveness (Base: Least effective-relive symptom but not reduce duration or severity)								
Most effective	0.387	<0.001	0.028	0.87	0.274	0.001	-0.122	0.533
2nd most effective	0.152	0.064	0.034	0.747	0.189	0.018	0.017	0.910
3rd most effective	-0.187	0.044	0.567	<0.001	-0.193	0.028	0.485	<0.001
Customer request (Base: No request)								
Customer directly requests this medicine	0.044	0.305	-0.010	0.893	0.073	0.077	0.012	0.933
Price	-0.036	0.220	0.239	<0.001	-0.069	0.025	0.305	<0.001
Opt-Out constant	0.662	0.042	2.874	<0.001	0.305	0.328	2.675	<0.001
Number of observations	12,000				12,048			
Number of individuals	250				251			
Log-likelihood	-3376.31				-3439.78			
AIC	6804.62				6931.57			
BIC	6996.83				7123.88			

P<0.05 is bolded

Table 10 Mixed logit regression models with information conditions interaction term – pharmacists

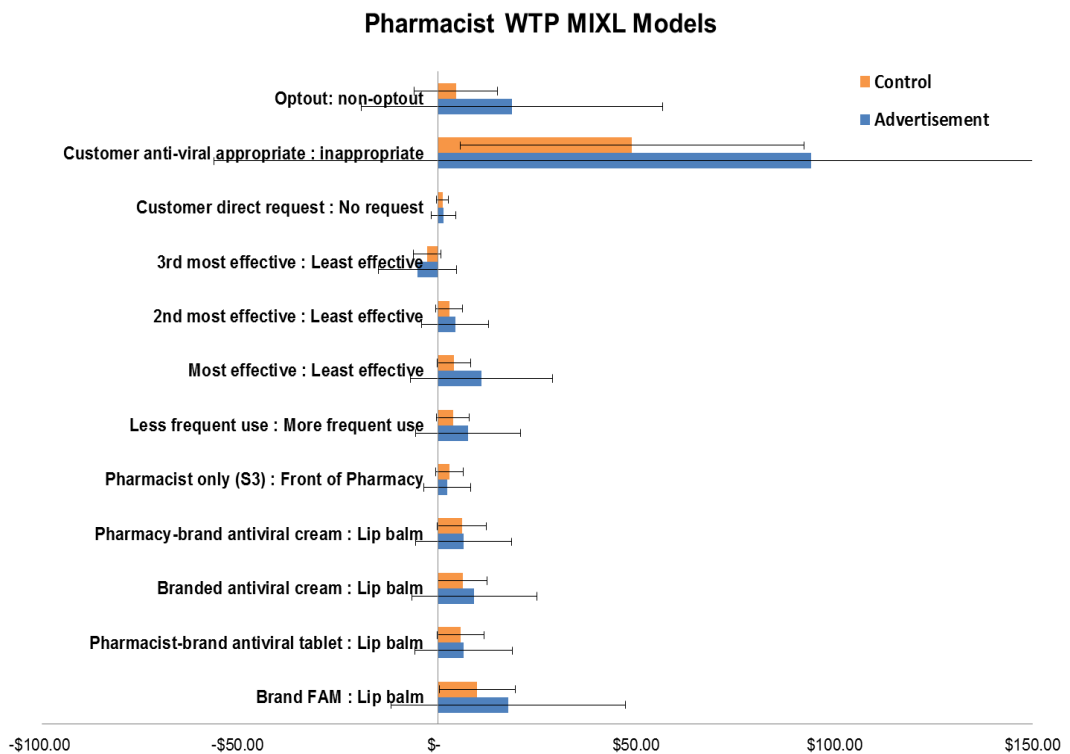
Pharmacists	Coefficient	P	SD	P
Customer characteristics (Base: inappropriate to use)				
custm1: appropriate to use anti-viral	3.296	<0.001	1.809	<0.001
Group*custm1	0.069	0.799		
Brand (Base: Lip Balm)				
brand1: Brand FAM	0.674	<0.001	0.496	<0.001
Group*Brand1	-0.044	0.814		
brand2: Pharmacist-brand antiviral tablet	0.369	0.002	0.500	<0.001
Group*Brand2	-0.140	0.403		
brand3: Branded antiviral cream	0.417	<0.001	-0.044	0.719
Group*Brand3	-0.090	0.55		
brand4: Pharmacy-brand antiviral cream	0.409	<0.001	0.048	0.723
Group*Brand4	-0.178	0.274		
Availability (Base: front pharmacy)				
Pharmacist only (S3)	0.196	0.012	0.324	<0.001
Group*Availability	-0.128	0.253		
Frequency (Base: more frequent)				
freq1: less frequent	0.248	0.002	0.005	0.952
Group*freq1	0.018	0.875		
Effectiveness (Base: Least effective – relieves symptom but does not reduce duration or severity)				
effec1: most effective	0.276	0.001	-0.050	0.713
Group*effec1	0.104	0.372		
effec2: 2nd most effective	0.190	0.017	-0.023	0.799
Group*effec2	-0.049	0.671		
effec3: 3rd most effective	-0.197	0.024	0.494	<0.001
Group*effec3	0.018	0.887		
Customer request (Base: No request)				
req: Customer directly requests this medicine	0.073	0.076	0.034	0.596
Group*req	-0.027	0.648		
Price	-0.075	0.011	0.276	<0.001
Group*price	0.040	0.34		
Opt-Out constant	0.355	0.254	2.760	<0.001
Group*Opt-Out	0.295	0.502		
Number of observations	24,048			
Number of individuals	501			
Log-likelihood	-6822.05			
AIC	13722.11			
BIC	14037.53			

P<0.05 is bolded

4.2.4 Marginal willingness-to-pay

Figure 14 presents the mean and 95% confidence intervals of the marginal WTP estimates of pharmacists, stratified by advertisement vs control group. For pharmacists, the willingness to pay should not be interpreted as a measure of individual preference, but as a monetary measure of the willingness to recommend the product. The relative importance of the attributes is consistent with the mixed logit regression analyses. The most important factor determining recommendations is the consumer presented in the choice set (specifically, whether or not they are suitable for the anti-viral tablet). The patterns of marginal WTP are similar across information conditions. The advertisement group has a tendency for a higher willingness to pay (recommend) more for Brand Fam, but not significantly different to the control group (\$17.66 vs \$9.87). Also, for more effective levels, the WTP values are relatively higher.

Figure 14 Marginal willingness-to-pay of pharmacists



4.3 Pharmacy assistant

4.3.1 Sampling characteristics

In total 500 pharmacy assistants completed the survey. Half were randomised to the group which watched the Brand Fam advertisement before commencing the DCE. The characteristics of the pharmacy assistant sample are presented in Table 11. 53.0% were female, and there was a fairly even age distribution. Over half of them spoke a language other than English at home. Only 2.2% of respondents indicated that they had less than a year's experience as a pharmacy assistant. The characteristics of respondents across randomised groups are similar.

Table 11 Characteristics of pharmacy assistants

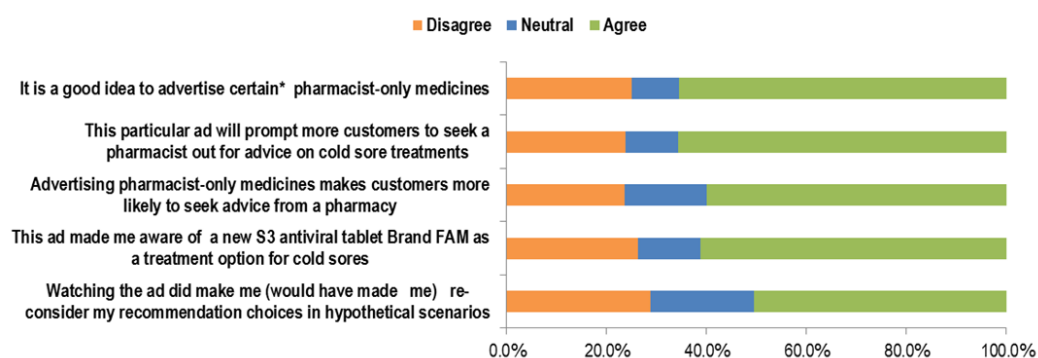
Characteristics of pharmacy assistants	Advertisement (N=250)		Control (N=250)		P value
	n	%	n	%	
Gender					0.929
Female	133	53.2%	132	52.8%	
Male	117	46.8%	118	47.2%	
Age					0.523
18–24	32	12.8%	31	12.4%	
25–34	93	37.2%	99	39.6%	
35–44	65	26.0%	59	23.6%	
45–54	23	9.2%	15	6.0%	
55–64	33	13.2%	43	17.2%	
65–74	4	1.6%	2	0.8%	
75 +	0	0.0%	1	0.4%	
Born in Australia	222	88.8%	226	90.4%	0.558
Speak second language at home	123	49.2%	133	53.2%	0.371
Length of experience					0.174
Less than a year	6	2.4%	5	2.0%	
1-5 years	95	38.0%	96	38.4%	
5-10 years	89	35.6%	70	28.0%	
over 10 years	60	24.0%	79	31.6%	

4.3.2 Overall opinion about the advertisement

As for the pharmacists, pharmacy assistants were asked attitudinal questions about the advertisement via a series of statements with agree/disagree responses. These results are summarised results in Figure 15. Pharmacy assistants generally hold similar

opinions about the advertisement to pharmacists, with the majority reporting that they considered that the advertisement would raise awareness of Brand Fam as a new therapy, and customers would be prompted to seek pharmacist out. Overall, they agreed or strongly agreed that *'it is a good idea to advertise certain* pharmacist-only medicines'*.

Figure 15 Agree or disagree questions-pharmacy assistants



4.3.3 Mixed Logit models: Opt-Out choice analysis

Results of the mixed logit regression analyses of the pharmacy assistant DCE, stratified by information conditions are presented in Table 12. Regarding the raw choice percentages on average over all choice sets, only 9.6% (768 out of 8000 choice sets) chose the opt-out option. The reasons for choosing opt-out included 60.7% *'would refer this customer to a pharmacist because she/he may need to be referred to a GP'*, 37.6% *'would consider an alternative medicine for this customer'*, and 1.7% *'don't consider this customer needs to be treated'*. The options for the reason of opt-out were phrased according to the duties and responsibilities of a pharmacy assistant.

In the main effects-only regression models (which are separately estimated for the advertisement and control groups), shown in Table 12, the most important attribute for pharmacy assistants when making recommendations is the consumer presented in the choice set. For hypothetical customers described as appropriate for antiviral treatment, pharmacy assistants are more likely to recommend a treatment or refer them to talk to a pharmacist for S3 medicines. In both groups, pharmacy assistants demonstrated a preference for all treatments with an active ingredient relative to the lip balm. The mean coefficient estimates of the price and availability of product attributes are not statistically significant, suggesting that pharmacy assistants were not influenced by these attributes when making recommendations.

While it is not possible to directly compare coefficients across the models, overall the regression results between advertisement and control groups are similar, suggesting a limited effect of the advertisement on changing pharmacy assistants' preferences. This conclusion is confirmed by the additional regression analysis that estimate a combined model including an interaction term for the information condition for each attribute, which are presented in Table 13.

Table 12 Mixed logit model results by advertisement treatment groups – pharmacy assistants

Pharmacy assistants	Advertisement group				Control group			
	Coef.	P	SD	P	Coef.	P	SD	P
Customer characteristics (Base: inappropriate to use)								
Appropriate to use medicine	3.001	<0.001	-1.541	<0.001	2.725	<0.001	-1.470	<0.001
Brand (Base: Lip Balm)								
Brand FAM	0.942	<0.001	0.455	<0.001	0.818	<0.001	0.345	0.001
Pharmacist-brand antiviral tablet	0.328	0.001	-0.014	0.937	0.283	0.006	-0.253	0.133
Branded antiviral cream	0.370	<0.001	-0.010	0.909	0.458	<0.001	-0.001	0.996
Pharmacy-brand antiviral cream	0.346	0.001	-0.001	0.99	0.344	0.001	0.034	0.815
Availability (Base: front pharmacy)								
Pharmacist only (S3)	-0.045	0.527	0.272	0.003	-0.074	0.28	-0.026	0.823
Frequency (Base: more frequent)								
Less frequent	0.120	0.114	0.000	0.998	0.045	0.551	-0.041	0.681
Effectiveness (Base: Least effective – relieves symptom but does not reduce duration or severity)								
Most effective	0.083	0.27	0.005	0.971	0.211	0.005	-0.018	0.856
2nd most effective	0.163	0.028	0.029	0.852	0.130	0.074	-0.009	0.949
3rd most effective	0.016	0.838	0.334	<0.001	-0.009	0.912	0.397	<0.001
Customer request (Base: No request)								
Customer directly requests this medicine	0.088	0.016	0.021	0.771	0.045	0.219	-0.017	0.843
Price	0.019	0.419	0.157	<0.001	0.027	0.222	0.135	0.001
Opt-Out constant	-2.668	<0.001	-3.302	<0.001	-3.424	<0.001	3.685	<0.001
Number of observations	12,000				12,000			
Number of individuals	250				250			
Log-likelihood	-3210.738				-3198.179			
AIC	6473.477				6448.358			
BIC	6665.686				6640.567			

P<0.05 is bolded

Table 13 Mixed logit regression models with information conditions interaction term – pharmacy assistants

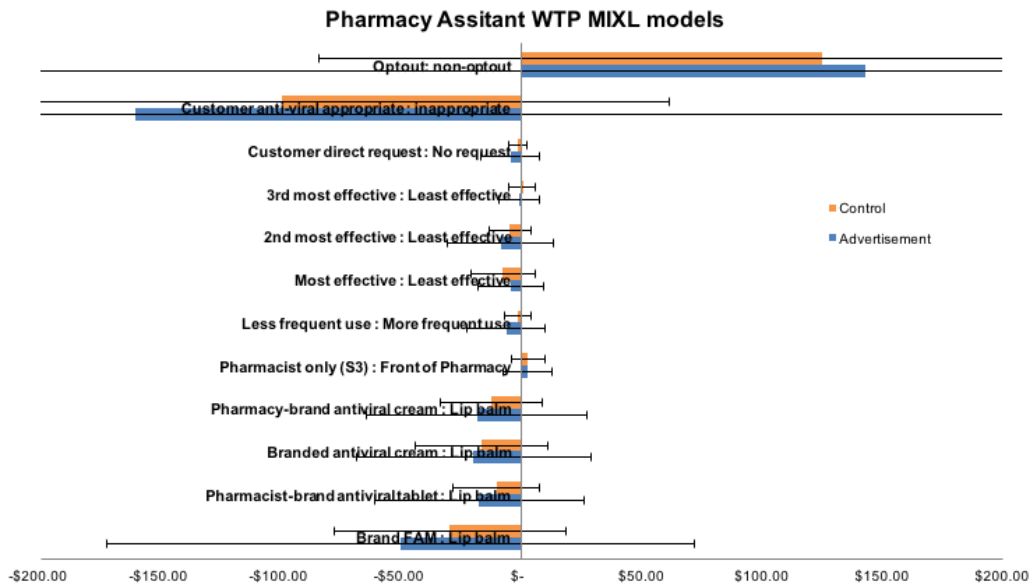
Pharmacy assistants	Coefficient	P	SD	P
Customer characteristics (Base: inappropriate to use)				
custm1: appropriate to use anti-viral	2.664	<0.001	1.478	<0.001
Group*custm1	0.342	0.329		
Brand (Base: Lip Balm)				
brand1: Brand FAM	0.824	<0.001	0.423	<0.001
Group*Brand1	0.114	0.500		
brand2: Pharmacist-brand antiviral tablet	0.284	0.005	0.074	0.709
Group*Brand2	0.045	0.753		
brand3: Branded antiviral cream	0.458	<0.001	0.014	0.834
Group*Brand3	-0.088	0.505		
brand4: Pharmacy-brand antiviral cream	0.339	0.001	0.009	0.912
Group*Brand4	0.005	0.974		
Availability (Base: front pharmacy)				
Pharmacist only (S3)	-0.075	0.274	-0.131	0.279
Group*Availability	0.033	0.731		
Frequency (Base: more frequent)				
freq1: less frequent	0.043	0.568	0.016	0.786
Group*freq1	0.078	0.463		
Effectiveness (Base: Least effective - relieves symptom but does not reduce duration or severity)				
effec1: most effective	0.211	0.005	0.014	0.859
Group*effec1	-0.122	0.249		
effec2: 2nd most effective	0.128	0.081	-0.038	0.692
Group*effec2	0.041	0.694		
effec3: 3rd most effective	-0.010	0.898	0.378	<0.001
Group*effec3	0.027	0.802		
Customer request (Base: No request)				
req: Customer directly requests this medicine	0.044	0.226	0.014	0.8
Group*req	0.041	0.422		
Price	0.025	0.259	0.140	<0.001
Group*price	-0.008	0.804		
Opt-out constant	-3.099	<0.001	3.546	<0.001
Group*Opt-out	0.170	0.734		
Number of observations	24,000			
Number of individuals	250			
Log-likelihood	-6415.462			
AIC	12908.92			
BIC	13224.27			

P<0.05 is bolded

4.3.4 Marginal willingness-to-pay of pharmacy assistants

Figure 16 presents the mean and 95% confidence intervals of the marginal WTP estimates of pharmacy assistants, stratified by advertisement and control group. As for the pharmacist results, the willingness to pay here reflects the impact of the price the consumer will be charged on the recommendation made by the pharmacy assistant. However, in this case caution should be applied in interpreting these results as the impact of price was not found to be significant in the analysis. Because the sign on the price coefficient was positive (but not significantly different from zero), the marginal willingness to pay results have opposite signs than for the pharmacists. The results shown here should be treated as indicative of the strength of preference for the other attributes rather than the impact of price. The relative importance of the attributes measured with WTP is consistent with the mixed logit regression results. The consumer type (specifically in terms of whether antiviral medicines are suitable) is the most important factor driving the choices of pharmacy assistants. The patterns of marginal WTP are similar across information conditions.

Figure 16 Marginal willingness-to-pay of pharmacy assistants



5 Conclusions and discussion

Given the debate over the regulation of advertising for ‘pharmacist only’ (Schedule 3) medicines, it is vitally important to ensure the decision making about advertising is supported by robust evidence. To date, there has been limited evaluation of the impact of advertising of medicines for both consumers and providers (pharmacists) and there is very limited experience of the impact of advertising for “pharmacy only” medicines. This report presents results from a series of surveys and discrete choice experiments (DCEs) for a policy relevant case study of advertising of pharmacist only medicines, using a realistic hypothetical information style advertisement. These DCEs were designed to investigate the impact of advertising of S3 medicines on the behaviour and preference of consumers, pharmacists as well as pharmacy assistants through a controlled stated preference experiment. This approach has been demonstrated in the past to be particularly useful to examine the likely effects of policies that have not been put into place, thereby providing important information to guide the design of such policies.

We found that an advertisement can influence consumers’ health-seeking behaviours as well as their choice of treatment. This is consistent with findings from other studies, which suggest that the provision of additional information, in an advertisement or other form, influences choices^{20,21}. After viewing the advertisement, consumers were more likely to report that they would go to a pharmacy and less likely to report that they would seek treatment from a GP for cold sore management. Given that ‘ask your pharmacist’ is one of the key messages contained in the video, it is indicated that the message was well perceived by participants. These findings suggest the advertisement raised awareness of the pharmacy services and this may lead to a reduction in GP consultation for this health condition.

Another piece of key information in the advertisement was about the new treatment, Brand Fam. Brand Fam was a preferred treatment option over lip balm with or without the advertisement. It was demonstrated that the advertisement increased the awareness of this product and of generic anti-viral tablets and therefore the consumers were more likely to choose Brand Fam after watching the advertisement. Interestingly, the advertisement also increased the probability of choosing a pharmacy brand antiviral tablet, the generic version of Brand Fam. The observed impact of the advertisement on preferences of treatment options was larger among inexperienced cold sore sufferers than experienced sufferers. Due to their experiences with cold sores, experienced sufferers may already have been well aware of the antiviral tablet advertised and this may account for the lack of impact of this information on their preferences, or they may be more likely to choose a treatment with which they are already familiar. Consumers, both experience and inexperienced, preferred more

²⁰ Knox, S.A., et al., The effect of adverse information and positive promotion on women's preferences for prescribed contraceptive products. *Soc Sci Med*, 2013. 83: p. 70-80

²¹ Singh, B.M., et al., Effect of advertising on awareness of symptoms of diabetes among the general public: the British Diabetic Association Study. *BMJ*, 1994. 308(6929): p. 632-6.

effective and lower cost products, controlling for other factors, this was observed under both information conditions (advertisement and no advertisement). Pharmacists' recommendation had a positive and significant impact on their choice as well. This suggests that the advertisement is unlikely to drive inappropriate demand for Brand Fam. It is notable that the availability (S3 vs front of pharmacy) was not a significant factor that contributed to the decision-making of consumers, suggesting that consumers are comfortable to talk to pharmacists about their disease management.

The decision to purchase is the result of an interaction between the consumer and the pharmacist/pharmacy assistant, often mediated by advice or information from a primary care provider. Recognising this potential dynamic, we also investigated the effect of a DTC advertisement on pharmacists as well as pharmacy assistant. The similar characteristics of product plus the characteristics of consumers were presented to the respondents in the DCEs and the respondents were randomised to the group with and without advertisement exposure. Dissimilar to consumers, the effect of the advertisement did not have a significant impact on the choices made by pharmacy professionals. Most of them considered that it is a good idea to advertise certain pharmacist-only medicines to consumers and they believed that this would encourage consumers to seek advice from a pharmacy for the management of cold sores, an example of a minor ailment.

From the DCE regression analyses, it can be seen that both pharmacists and pharmacy assistants made their recommendations mainly based on consumer's characteristics. They were less likely to recommend a product under a scenario where it was inappropriate for the hypothetical customer to use the medicine. In addition, pharmacists showed confidence in handling direct requests from consumers, which was not a significant factor in their decisions.

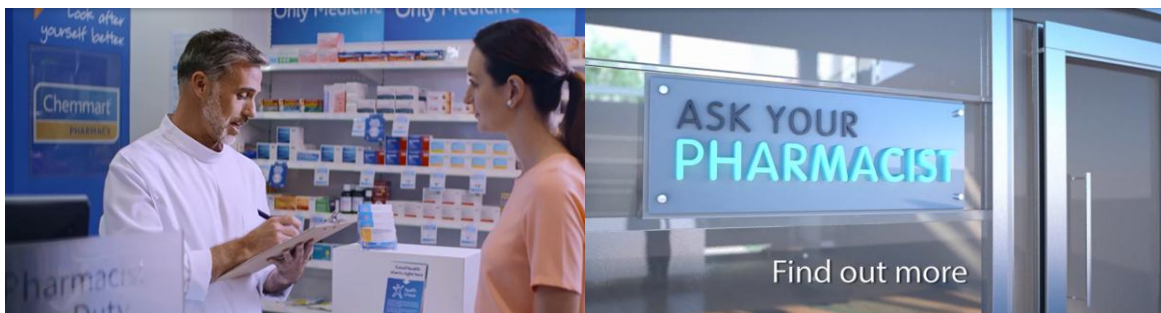
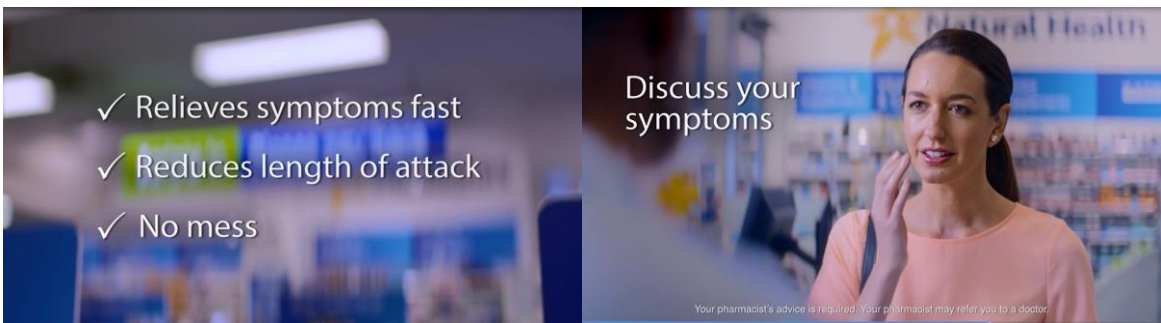
The results of this study should be interpreted with some caution, given a few methodological limitations. We only used one mock advertisement in this study. It is still inconclusive as to whether the characteristics of the message and how the message is framed would modify the effectiveness of the intervention²². Under different information contexts, the observed effects may vary.

Overall, we found that the advertising of S3 medicines could increase consumers' awareness of therapeutic options and the availability of services from a pharmacy, which could contribute to improved disease management. For pharmacist-only medicines and minor ailments that can be managed with self-medication, the increased demand from a pharmacy accompanied by the decreased demand from GP would promote the more efficient use of healthcare resources. The advertisement did not change consumers' preferences on which product attributes were important. The evidence further suggests that the advertisement would not significantly influence the recommendations made by pharmacy professionals and consumers' condition is the

²² Grilli, R., C. Ramsay, and S. Minozzi, Mass media interventions: effects on health services utilisation. *Cochrane Database Syst Rev*, 2002(1): p. CD000389.

decisive factor in their decisions when providing services. The S3 advertisement is unlikely to lead to inappropriate use of medicine. With more consumers aware of the availability of pharmacy and pharmacist-only medicines, it would be beneficial to promote the professional role pharmacists play in managing conditions that fall into the scope of pharmacist-only medicines.

Appendix I Screen shots from the mock ad



Appendix II Additional results

Figure 17 Baseline health-seeking behaviour question, stratified by disease experience

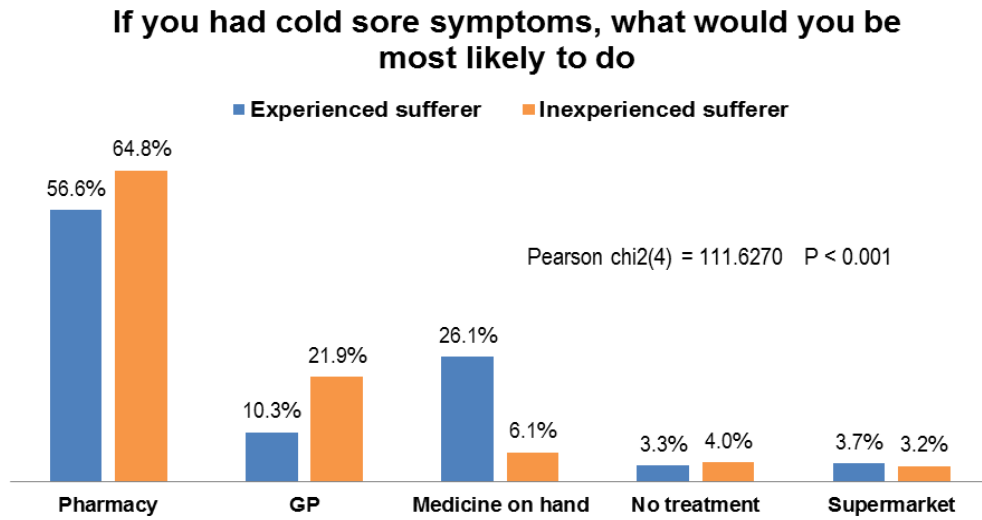


Figure 18 Baseline health-seeking behaviour question, stratified by randomised group

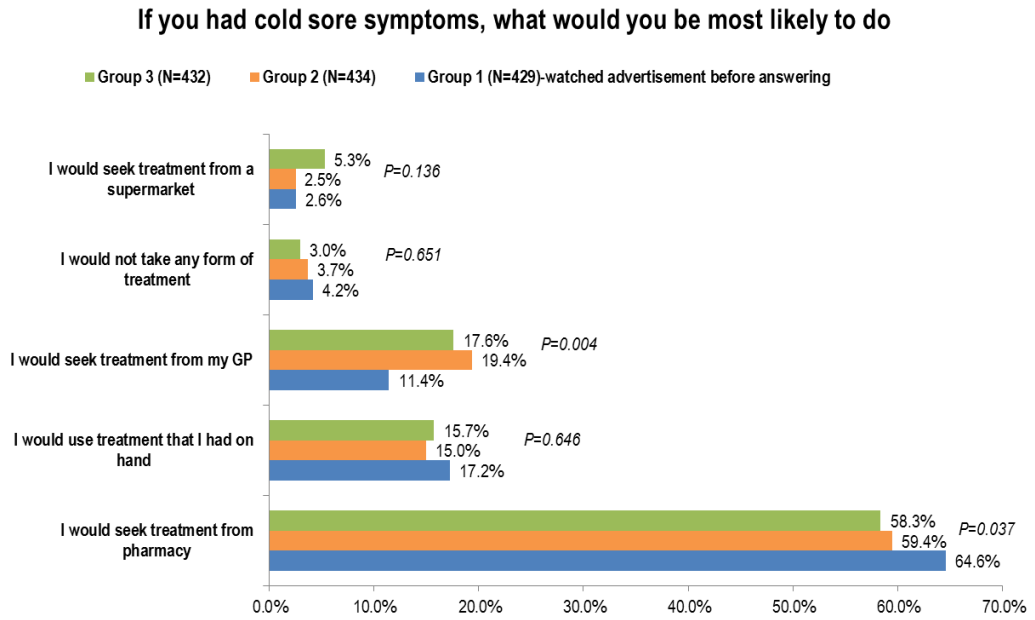


Figure 19 Agree and disagree questions subgroup analysis, stratified by disease experience

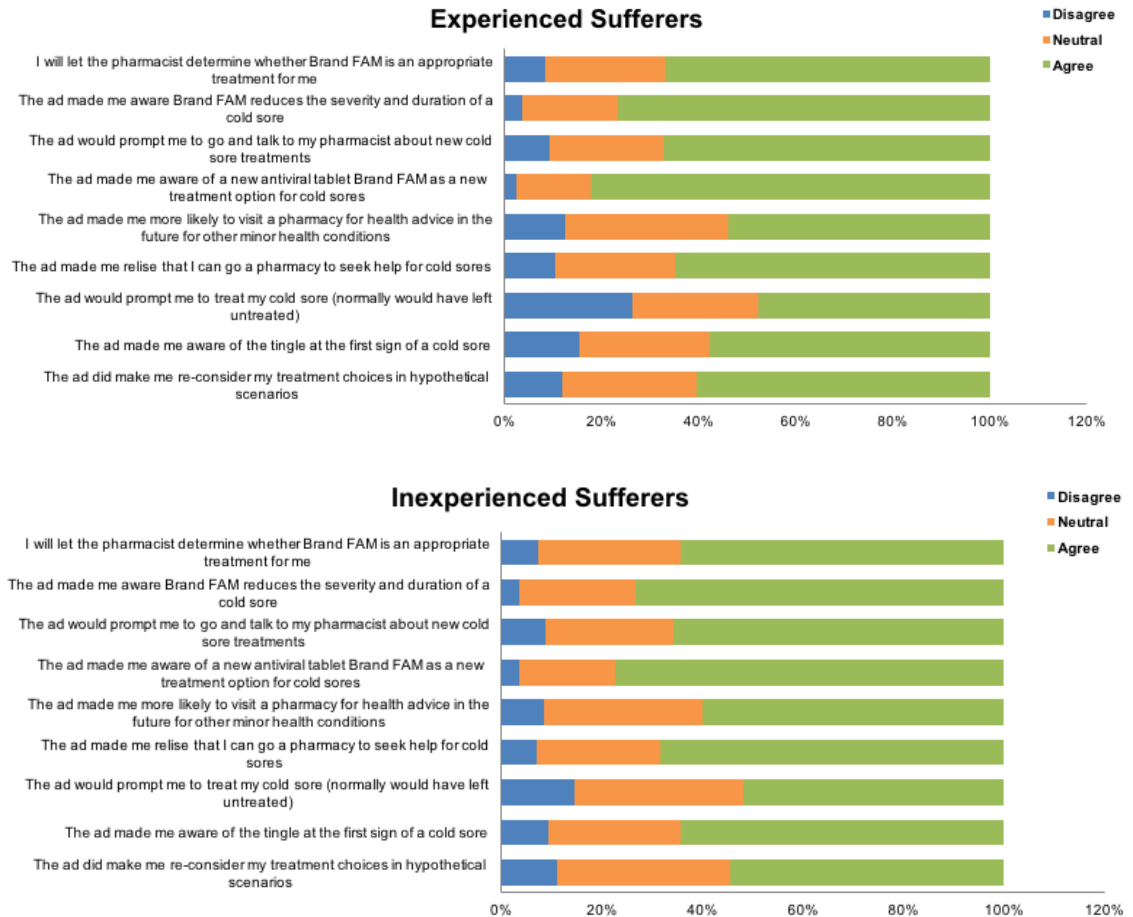


Figure 20 Brand awareness of experienced sufferers

