WHEN MEN WITH PROSTATE CANCER SEARCH THE INTERNET FOR PHYSICAL

ACTIVITY INFORMATION WHAT DO THEY FIND?

Charlotte Gelder

Student ID: 1682913

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Declaration

This thesis contains no material which has been accepted for the award of any other degree or diploma in any University, and, to the best of my knowledge, this thesis contains no materials previously published except where due reference is made.

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Acknowledgements

Abstract

This research investigated the types of websites Australian men with prostate cancer were likely to find when searching the Internet for information on physical activity (PA) and whether these websites were designed in a manner to promote behaviour change leading to participation in regular PA. An online questionnaire was created to identify words/phrases men with prostate cancer used to search the Internet for information on PA. Identified searches were undertaken by the researcher and subsequent websites located. Using empirical literature and findings of the online survey an Internet quality assessment tool was developed to measure the quality of websites in relation to: 1) design; 2) credibility and accountability; 3) participation; 4) usability; 5) relevance; 6) accuracy, and; 7) use of behaviour change techniques. The tool was used to measure the quality of 56 websites, resulting in websites receiving a quality grading of gold, silver or bronze. The research concluded none of the websites obtained gold standard. This study supports previous literature with concerns about the credibility and accountability of information provided on health promotion websites. Few websites provided practical guidance on ways to change behaviour to encourage regular PA. This research identifies men's Internet search behaviour, provides details of quality websites which can be used by health professionals to communicate the best quality PA websites to patients. The research can be used by health care professionals, health researchers and web designers to facilitate the development of gold standard websites.

Introduction

Prostate Cancer is a Problem

In 2016 the Australian Institute of Health and Welfare (AIHW) reported that at the end of 2010 there were 168,903 Australian males living with a diagnosis of prostate cancer in the previous 29 years and the five-year relative survival rate from prostate cancer had improved from 58% (1983-1987) to 94% (2008-2012). Add this to the AIHW estimates that there will be 18,138 new cases of prostate cancer diagnosed in 2016, and it can be seen that the Australian prostate cancer survivor population is growing (Australian Institute of Health and Welfare, 2016).

The significant increase in relative survival rates in this population is positive news. However, it should be remembered a diagnosis of prostate cancer can reduce a man's quality of life in many ways, including sexual dysfunction, urinary incontinence, bowel changes, fatigue, pain, hot flashes, body image changes and forced lifestyle changes, these in turn can lead to psychological distress (Roth, Weinberger, & Nelson, 2008). Therefore, it is important health researchers not only invest time in researching the benefits of medical advances in prostate cancer, but also investigate how quality of life markers could be improved for men with prostate cancer.

Increasing Quality of Life Using Physical Activity

Research in to the use of physical activity (PA) as a way to increase relative survival rates and improve quality of life for men with prostate cancer is showing promising results. A recent prospective observational cohort study of over 2,700 men with non-metastatic prostate cancer concluded, men who participated in at least three hours per week of vigorous activity had nearly a 50% reduction in all-cause mortality and a 60% reduction in prostate cancer specific deaths, compared to those who did less than one hour of PA a week (Kenfield, Stampfer, Giovannucci, & Chan, 2011). A study of 4,623 men diagnosed with localised

prostate cancer between 1997-2002, and followed until 2012, found higher levels of PA were associated with reduced rates of overall and prostate cancer specific mortality (Bonn et al., 2015).

An evaluation of scientific evidence gathered by the American Cancer Society (ACS) for the publication of its "nutrition and physical activity guidelines for cancer survivors" concluded that even though randomised control trials are needed to gauge a direct effect of post diagnosis PA on the progression of cancer, there is already sufficient evidence to suggest participating in regular PA has a substantial positive impact on reducing disease recurrence and improving survival rates. The ACS therefore recommends cancer survivors adopt a physically active lifestyle (Rock et al., 2012).

Literature reviews undertaken by the ACS and American College of Sports Medicine (ACSM) not only show PA improves cancer survival rates it also reduced levels of fatigue, anxiety and depression and increases aerobic fitness, functional performance, muscle strength, body composition, self-esteem and happiness, all of which contribute to an improved quality of life (Rock et al., 2012; Schmitz et al., 2010).

Men with Prostate Cancer are not Participating in Physical Activity

Even though sport is often seen as a masculine activity men enjoy (Drummond, 2008), a concerning proportion of men with prostate cancer are not participating in regular PA. An Australian study of 356 men with prostate cancer concluded only 41.9% of men were meeting the National Physical Activity Guidelines of Australia (Chipperfield et al., 2013). A Canadian study of 253 men with prostate cancer found 43.0% were meeting the 2008 recommended PA Guidelines for Americans (Forbes, Blanchard, Mummery, & Courneya, 2014). A study of 509 men who had undergone a radical prostatectomy found 46.0% of the sample were meeting the weekly recommended level of PA of 150 minutes moderate intensity or 75 minutes of vigorous intensity aerobic exercise (Santa Mina et al., 2014). In a

study of 741 cancer survivors, only 23.0% were meeting the American Cancer Society's

recommendations for resistance training (Forbes, Blanchard, Mummery, & Courneya, 2015).

Research has shown there are a number of barriers for men with prostate cancer to

overcome before participating in regular PA. Such barriers include incontinence, co-

morbidities, lack of time, physical decline, fatigue, reduced motivation and lack of advice

from a health professional (Craike, Livingston, & Botti, 2011; Keogh, Patel, Macleod, &

Masters, 2014; Ottenbacher et al., 2013). Therefore interventions are required to help men

with prostate cancer overcome these barriers to participate in regular PA.

The Internet could be a Promising Tool to Promote Physical Activity

Even though studies suggest men are reluctant to seek advice from a health care

professional men are still interested in their health (Courtenay, 2000; Robertson, 2007).

Research suggests the Internet is a useful alternative source of information for men seeking

health advice, as it meets their dual needs of convenience and privacy (Pollard, 2007). With

84% of Australian men having access to the Internet (Australian Bureau of Statistics, 2016) it

is a promising medium in which to promote PA among men. However, it is important that

effective PA behaviour change techniques published on the Internet are easy to find, are

incorporated in to well-designed websites and such websites contain good quality information

to encourage behaviour change, e.g., by increasing levels of self-efficacy or engaging in

social support activities. If a website fails to do these things it is unlikely the intervention will

be effective (Brouwer et al., 2011).

Searching for Health Promotion Websites on the Internet

Even though the Internet appears to be a valuable source of health promotion for men

searching the Internet, it can be challenging to locate good quality health related websites.

Research shows the chances of men finding quality health promotion information on the

Internet is reduced due to poor education on how to search effectively for information on the

Internet combined with the complexity of how Internet search engines operate (Pollard, 2007).

A study of 312 males with a diagnosis of prostate cancer concluded that when searching for information on prostate cancer most men simply entered the words "prostate cancer" into a search engine (Pautler et al., 2001). This is likely to lead to websites that are not as relevant as they could be if the search had been more specific to their actual requirements, e.g., if looking for information for an appropriate diet for men with prostate cancer a more specific and therefore successful search could be "prostate cancer and diet".

Research relating to breast cancer analysed the top five cancer-related Internet searches ("breast cancer symptoms", "breast cancer care", "breast cancer stages", "breast cancer survival" and "breast cancer signs") and assessed 500 of the returned websites. The study found 42% of the returned webpages were not applicable to the search question entered and concluded broad Internet search terms produce less relevant results and end-users should be encouraged to use narrower search terms, or be directed to accurate cancer websites by a health professional (Quinn et al., 2012).

Research shows Google is generally the most utilised search engine for people searching the Internet for health promotion information (Pollard, 2007). The mechanisms behind the Google search engine are complex, with robot web crawlers using past crawling data and website site maps to locate webpages which are then indexed (Google, 2016). When an end-user enters a search term into Google Search the Google algorithm looks at the search query and uses over 200 signals to decide which of the indexed webpages and content are most relevant to answer the query and the results ranked in order by relevance (Google, 2016). A study in 2016 found when participants were asked how Google generates search results only 48% of people knew search results were based on Google's algorithm. This

suggests people are not well educated on how search engines work, and therefore do not undertake optimal searches (Daly & Scardamaglia, 2016).

A number of studies have sought to evaluate the quality of health websites found as a result of undertaking Internet searches (Eysenbach, Powell, Kuss, & Sa, 2002). The vast majority of Internet search criteria used in these studies have been developed by researchers assuming the role of the end-users, where researchers develop search strategies they believe reflect the way end-users would search the Internet. This approach could be influencing the type of websites being retrieved and evaluated. A systematic review of the quality of health websites found only three out of 79 studies used end-users in their studies to identify appropriate search criteria (Eysenbach et al., 2002). Another systematic review found only six out of 165 studies used end-users to generate Internet search criteria (Zhang, Sun, & Xie, 2015).

The Quality of Health Promotion Websites

Even if a person is able to negotiate their way through the complicated Internet search process and arrived at a website that looks to be of value, research has shown users still have concerns over the information the website provides. An online survey of 265 males investigating their views of online health information found participants had concerns around; the accuracy of information provided on the websites, when the information was last updated and the independence of the information (Pollard, 2007). Research for the Pew Research Center surveyed 500 end-users in relation to their Internet health searching behaviour and found participants had concerns around; companies appearing to be more concerned about selling a product rather than the accuracy of information, sources of information not being disclosed, unable to identify when information was last updated, and a lack of a "seal of approval" (Fox & Rainie, 2002).

A study of 312 men with prostate cancer found 43% of participants were concerned about the accuracy of the information provided via the Internet, and 31% thought the reliability of the information was dependent on the source (Pautler et al., 2001). An Australian survey of men with prostate cancer investigated their requirements of a prostate cancer website, revealed concerns about the quality of information provided and whether the content was up to date and relevant to Australian men. (Pinnock & Jones, 2003).

In 2002 a systematic review of 79 articles, evaluating nearly 6,000 health websites, investigating how website quality was evaluated by researchers, found the most frequent quality criteria measures used were accuracy, completeness, readability, design, disclosures and provision of references. Interestingly, none of the studies conducted comprehensive tests using quality criteria generated by consumers. The research concluded 70% of articles the quality of information provided on the website was problematic and only 9% of articles drew positive conclusions. Article authors criticised incompleteness or inaccuracy of information and the difficulty of finding high quality websites. The level of inaccuracy varied across medical domains: nutritional websites were between 45.5% and 88.9% inaccurate, compared to prostate cancer websites, which were only 4% inaccurate (Eysenbach et al., 2002).

In a 2015 systematic review of the quality of health websites found 55.2% of articles concluded the quality of health websites was problematic; content was incorrect, incomplete, basic, superficial and not useful, or website design was not appropriate or was inaccessible. Six percent of articles found a positive conclusion regarding website quality, the content was classified as correct or not dangerous and the design was attractive, easy to use and accessible. A total of 29 different pre-existing instruments (e.g. Health on Net (HON) seal code and Journal of American Medical Association (JAMA) benchmarks) were used in 67.9% of articles and 38.2% used criteria based on discussions amongst authors and/or by selecting a combination of criteria from pre-existing instruments (Zhang et al., 2015).

In an evaluation of 41 PA websites regarding quality, accuracy and consistency using the JAMA benchmarking tool; only 22% of websites were rated as high quality, and none were of high accuracy. Only 8% of websites accurately represented the ACSM recommendations for vigorous PA, while 40% of websites had correct recommendations for moderate PA. Educational websites and those with a ".net" domain address were found to be significantly higher in quality and accuracy (Bonnar-Kidd, Black, Mattson, & Coster, 2009).

In a 2002 qualitative study using a consumer focus group, in a laboratory setting, to identify the appraisal process of health promotion information on the Internet. Participants said they assessed the credibility of websites by looking for the source, a professional design, a scientific or official "feel", language used and ease of use. However, in the observational study conducted as part of this research no participants actually accessed the "about us" section of the websites, the websites' disclaimers or their disclosure statements (Eysenbach & Köhler, 2002).

Even though website credibility, accountability and accuracy are well researched in relation to the quality of health websites, a number of other aspects of website design are emerging as factors researchers should consider when investigating end-user website engagement to increase the likelihood of actual behaviour change, these areas include:

Website design. An individual's first impression of a company is often via its website. A first impression is made within a couple of seconds and dictates if an individual will stay on the website or move onto another (Robins & Holmes, 2008). In a small study, 20 participants were asked to look at 42 website stimuli and quickly judge the website's credibility. The stimuli had either low aesthetic treatment where the content was simply placed on the website without professional graphic design, or high aesthetic treatment where the content had a professional look and feel in the form of colour and graphics used. The

findings indicated websites with higher aesthetic treatment were judged as more credible (Robins & Holmes, 2008). A survey of 500 Internet users found participants judged website credibility based on its design, poor design resulted in participants tending not to trust the information on the website (Fox & Rainie, 2002).

Website usability. How easy a website is for an end-user to use influences levels of engagement. To keep people engaged on a website it must be structured in an easy to use manner and the more intuitive a website is to use the longer an end-user will stay on the website to locate the required information (Danaher, McKay, & Seeley, 2005). Research in this area is still limited as it is hard to determine if people leave a site because they are unable to find the information they are looking for, or they actually found the information they were searching for and therefore had no reason to remain on the website.

End-user website participation. Historically websites were a platform for companies to provide information to individuals. However in today's society end-users like to interact with a company's website, enabling the end-user to communicate with the company and other individuals. This participation has become known as social media and comes in many forms, the most popular being Facebook, Twitter, chatrooms and blogs (Laranjo et al., 2015). A systematic review of 64 Internet based health promotion interventions found online peer support e.g., communication with other users via a chatroom, resulted in greater exposure time to the website intervention. The length of exposure time did not directly relate to actual behaviour change, but did enable participants to talk about their behaviour which could indirectly influence the promotion of behaviour change (Brouwer et al., 2011).

A systematic review of twelve studies (7,411 participants) investigating the influence of social networking sites on health behaviour change, covering the use of Facebook, Twitter and health specific social networking websites, concluded overall social networking

interventions appear to be effective at promoting health related behaviour changes (Laranjo et al., 2015). Another systematic review of 98 studies investigating the benefits of social media in health communication to improve health outcomes, suggest the benefits of social media include increased interaction with others, shared and tailored information, increased accessibility, peer/social/emotional support, public health surveillance and the potential to influence health policy (Moorhead et al., 2013).

Relevance to end-users. Research has suggested the more relevant the information provided to a specific group or individual the greater the level of engagement. In a systematic review of 46 articles, relating to factors influencing user engagement in Internet-based behavioural change interventions in adults with chronic disease; successful engagement in an intervention resulted from the ability of the intervention to address health concerns that were important and relevant to an individual and which had an individual approach (those that provided personally-tailored advice and feedback) (Schubart, Stuckey, Ganeshamoorthy, & Sciamanna, 2011). An investigation into the use of tailoring health messages to specific audiences found overall tailored messages stimulate greater cognitive activity than generic messages across multiple audiences (Kreuter & Wray, 2003). A 2007 study found men had concerns about health website information being inappropriate, i.e. the information needs of someone who is overweight are very different to someone who has just been diagnosed with an eating disorder, or information provided on websites can be either too technical or by contrast dumbed down too much (Pollard, 2007).

Wolin (2003) found the most effective ways to target men included: schema based, objective advertising messages; men prefer advertising showing socialisation in large groups and competitive behaviour; they associate more with masculine brands and didn't readily accept feminine brands and; an ideal male image is that of a leader.

When delivering online health messages, content should be delivered using gender and culturally sensitive models (Lohan, Aventin, Oliffe, Han, & Bottorff, 2015), e.g. if the health campaign is trying to target men with prostate cancer, then message content will be more effective if the message is presented by a man over 50 years of age and has a diagnosis of prostate cancer.

Campbell (2012) produced six 90-second videos on male preventative health topics, and concluded short educational video clips were an effective way of reaching men health promotion messages. In 2015 researchers created a short film of seven men with prostate cancer, with the aim of sharing stories of coping with prostate cancer, the research concluded a film showing relevant peers reflecting an authentic empathetic content could be useful in increasing men's self-efficacy in rehabilitation activities (Cockle-Hearne, Cooke, & Faithfull, 2015).

Increasing Levels of Physical Activity Using Behaviour Change Techniques

The way health messages are written affects the success of behaviour change. For example, there is growing evidence to suggest when targeting health change behaviours in men, gain-framed messages could be more effective than loss-framed messages (Rothman, Bartels, Wlaschin, & Salovey, 2006). A 2014 study looking at message framing and PA across gender and age, found the only significant difference in the effect of message framing was amongst older men, where gain-framed messages were more effective than loss-framed messages (Li, Cheng, & Fung, 2014). When participants were asked to watch video messages encouraging regular PA delivered in an eager or vigilant non-verbal style and framed as gains or losses, the eager and/or gain-framed messages were perceived as more effective by men (Jacks & Lancaster, 2015).

Numerous systematic reviews have shown the success of different behaviour change techniques in relation to increasing levels of PA in the adult population, including: barrier

identification (French, Olander, Chisholm, & Mc Sharry, 2014); action planning (Williams & French, 2011); feedback on performance (Krebs, Prochaska, & Rossi, 2010; O'Brien et al., 2015); use of rewards when working towards a goal and for successful goal achievement (French et al., 2014; Williams & French, 2011); instructions on how to perform a behaviour (Williams & French, 2011); model demonstrations (Campbell, 2012; French et al., 2014); information on where and when to perform a behaviour (Williams & French, 2011); prompts to perform the behaviour (Fry & Neff, 2009; Kelders, Kok, Ossebaard, & Van Gemert-Pijnen, 2012; Webb, Joseph, Yardley, & Michie, 2010); and planning social support (Brouwer et al., 2011; Kelders et al., 2012; Olander et al., 2013).

Despite this evidence, few health promotion websites appear to incorporate the use of behaviour change techniques in their websites. A review of 46 publicly available PA websites found 54.3% promoted the use of PA self-monitoring, 46.0% provided a mechanism to give feedback to end-users on their performance and 41.3% promoted the use of goal setting (Vandelanotte et al., 2014).

Summary

Research shows participating in regular PA to be highly beneficial for men with prostate cancer, yet there appear to be a number of barriers to engaging these men in regular PA. The Internet is a promising avenue in promoting the uptake of regular PA because it meets some of their masculine health seeking requirements. Previous research suggests there is a large volume of PA information available online, including some websites that incorporate evidence-based strategies. However it is unknown if men with a diagnosis of prostate cancer are able to locate these websites and whether the websites they do locate meet their needs in terms of design, credibility, accountability, participation, usability, relevance, accuracy and behaviour change techniques to encourage regular PA.

This research is an exploratory investigation to identify the websites men with prostate cancer are likely to find when searching the Internet for information on PA and whether these websites meet their needs.

Aim One – To explore how men with prostate cancer search the Internet for information on PA. Aim Two – Identify websites based on specified search criteria (drawn from Aim One) and assess them for quality (design, credibility, accountability, participation, usability, relevance, accuracy and behaviour change techniques to encourage regular PA) using a purpose-built evidence-based assessment tool developed for the study.

Research Setup

As the findings of aim one influence the development and execution of aim two the research will be conducted as two separate studies. Both studies will have separate method and result sections and the studies will be brought together through a single discussion.

Study One: Explore How Men Search the Internet for Information on PA and Developing Research Search Criteria

Using an online questionnaire, men with prostate cancer will be asked to detail how they would go about searching for information on the Internet relating to PA. The results of their search strategies will be used to identify the Internet searches that will be undertaken by the researcher in Study Two.

Study Two: Creating an Evidence-Based Quality Assessment Tool and Assessing Website Quality

A purpose-built evidence-based quality assessment tool will be developed and used to assess the quality of websites defined in Study One.

Implications of this Research

This research could help inform future Internet PA promotions targeting men with a diagnosis of prostate cancer, for example, helping to educate men on searching the Internet

for health information. If high quality websites are identified, those websites' addresses could be distributed to health professionals to share with patients. Alternatively, if website quality is poor the quality assessment tool developed for this study could be used by researchers to develop high quality websites for men with prostate cancer.

Study One: Explore How Men Search the Internet for Information on PA and Developing a Research Search Criteria

Method

Participants

Participant recruitment was undertaken using convenience sampling via a number of intermediaries including: the Freemasons Foundation Centre for Men's Health, Urologists in Sydney and Adelaide, the Prostate Cancer Foundation Australia Pathfinder programme and Cancer Council South Australia. Copies of communication with potential participants can be found in Appendix A: Communication with Participants.

A total of 47 participants expressed an interest in participating in the study. Of these, three were excluded from the study because they did not meet the eligibility criteria. The inclusion criteria for this study was: male, currently living in Australia, have a prior diagnosis of prostate cancer. Exclusion criteria was those with metastatic cancer and those receiving palliative care.

An overview of participant's demographic characteristics can be found in Table 1. The final data set comprised of 44 Australian males, with a diagnosis of localised prostate. Seventy-five percent of participants had been diagnosed with prostate cancer in the past 5 years. Over 85% had either finished prostate cancer treatment or were on active surveillance. Using an adapted version of the Godin-Shephard Leisure-Time Physical Activity questionnaire (GSLTPAQ) (Godin & Shephard, 1985), 48% of participants were meeting the Australian weekly guidelines of aerobic PA and 41% were meeting the weekly resistance

training guidelines (Hayes, Spence, Galvão, & Newton, 2009). Internet self-efficacy was

measured using an adapted version of Bandura (2006) general Internet self-efficacy scale and

found 79% of participants rated their Internet self-efficacy as high.

Table 1

Demographic characteristics of participants (N=44).

Variable	
Participants	
Mean age (years)	64.43
SD	(9.69)
Median age (years)	66
Age range	36-82
Marital status	
Married (%)	84.10
Other (%)	15.90
Highest level of education	
Postgraduate degree (%)	29.50
Bachelor degree (%)	22.70
Other post-school qualification (%)	22.70
High school completion (up to year 12) (%)	11.40
High school completion (up to year 10) (%)	13.60
Current employment status	
Retired (%)	54.50
Paid full-time employment (%)	25.00
Other (%)	20.50
State of residence	
New South Wales (NSW) (%)	59.10
Victoria (VIC) (%)	18.20
Queensland (QLD) (%)	11.40
Western Australia (WA) (%)	9.10
South Australia (SA) (%)	2.30
Area of residence	
Major city (%)	84.10
Regional (%)	15.90
Current stage of prostate cancer	
Finished prostate cancer treatment (%)	72.70
On active surveillance (%)	15.90
Other (%)	11.40
Treatment received	
Surgery (%)	47.62
Radiation therapy (%)	25.40
Active surveillance (%)	14.28
Hormone therapy (%)	7.94
Other (%)	4.76

Table 1 continued

Demographic characteristics of participants (N=44).

Variable	
Level of physical activity	
Mild aerobic	
Mean (SD) minutes per week	160(178.53)
Median	90
Moderate aerobic	
Mean (SD) minutes per week	128.63(136.37)
Median	95
Vigorous aerobic	
Mean (SD) minutes per week	94.32(193.94)
Median	0
Meeting PA guidelines[a] N (%)	21(47.73)
Resistance training	
0 sessions a week (%)	52.27
1 session a week (%)	6.18
2 or more sessions a week (%)	40.90
Leisure time Internet usage	
Less than 5 hours a week (%)	53.00
5 to 6 hours a week (%)	13.60
Over 6 hours a week (%)	36.40
Internet self-efficacy scale scores	
Mean (SD)	79.24(18.32)
Range	40 to 100
Median	83.33

[a] PA guidelines 150 minutes, 5 days a week (vigorous activity weighted by two)

Procedure

Sample size calculation. As this was an exploratory investigation it was difficult to determine how many participants would be required to obtain a complete range of Internet search strategies, therefore the researcher aimed to recruit as many participants as possible in the six-week recruitment time-frame.

Developing the online questionnaire. To ascertain how participants searched the Internet for information on PA an online Survey Monkey questionnaire was developed (Appendix B: Online Survey Monkey Questionnaire). The questionnaire contained four

sections: participant's demographic, prostate cancer history and treatment, Internet search habits in relation to PA and participant's PA behaviour and preferences.

The questionnaire questions, online functionality and face validity were tested using a convenience sample of eight people prior to distribution. The questionnaire was open to participants for six weeks.

The questionnaire and supporting communication were approved by the University of Adelaide, School of Psychology Human Research Ethics Subcommittee, approval number 16/44. Approval was also obtained from the Australian Prostate Cancer Research Registry.

When potential participants clicked on the link they were taken to an online information and consent form. Clicking on the link was counted as providing consent. Participants were then asked four screening questions to assess their eligibility to participate in the questionnaire.

Measures

Where possible, valid and reliable tools were selected to assess participant characteristics and behaviours. Due to the exploratory nature of this research some tools were created specifically for this research, the face validity of these tools were tested prior to inclusion in the questionnaire using a convenience sample.

Internet search behaviour. To identify the specific search strategies participants used to locate information relating to PA on the Internet, an eight-item tool was developed (Table 2).

Table 2

Internet search behaviour items.

Item	Item question	Response options
1	If you were to undertake a search on the Internet for information relating to EXERCISE or PHYSICAL ACTIVITY what search words/phrases would you enter into the search box? You can list more than one word/phrase	Participants could enter up to five different search criteria
2	On average when you undertake an Internet search using a search engine (e.g. Google) how many of the search result suggestions listed do you read and then click on the link provided to view a specific company/organisation's website?	Responses were rated on a 10-point scale from: "only the first suggested website" to "any website on the first five pages of the search results"
3	Do you ever click on the paid advertisements website links in the search results page?	Responses were rated on a 3-point scale: "yes", "no", "I don't know")
4	Have you ever typed in a specific website address into the address bar of the Internet to find information relating to prostate cancer?	Responses were rated "yes" or "no"
5	If yes to above question: Please supply the names or websites addresses of the prostate cancer company's / organisations?	Participants could enter up to five web addresses / company names
6	Have you ever typed in a specific website address into the address bar of the Internet to find information relating to exercise or physical activity?	Responses were rated "yes" or "no"
7	If yes to the above question: Please supply the names or website addresses of the exercise / physical activity companies / organisations?	Participants could enter up to five web addresses / company names
8	When you are on a specific organisation's website, on average how many pages within that website would you visit before moving on to view another website because you are unable to find what you are looking for?	Responses were rated on a 10-point scale: "one page" to "ten plus pages"

Data Analysis

Descriptive statistics were calculated for all survey variables in STATA version 11.2

(StataCorp, 2009).

To identify the most commonly used search words/phrases by participant's content analysis was undertaken to systematically interpret and code individual searches into groups which had similar themes (Mayring, 2000), e.g., a content analysis group identified as "a specific PA" could include searches undertaken by participants such as "running", "yoga" or "swimming". Responses to Table 2 item 1 were analysed using content analysis, and the groups with the greatest number of participant responses were identified.

Developing a strategy that would reasonably reflect how a man with prostate cancer might search the Internet. To simulate the most commonly used Internet searches undertaken by men with prostate cancer the search words/phrases within the content analysis groups with the greatest number of responses were reviewed. Any search word/phrase within these groups which were used by two or more participants were identified for further analysis. If an identified group only had one response per search word/phrase, an online random number generator programme was used to generate three random numbers to identify three searches within the group for further analysis.

To identify how many Internet search result suggestions a participant generally clicked on, a count of responses to Table 2 item 2 was taken. The researcher selected the category with the greatest number of responses.

To identify if participants ever clicked on paid advertisement links displayed in the search results pages, a count of responses was taken of the responses to Table 2 item 3.The category with the largest response rate was selected.

To identify specific web addresses participants had entered into the Internet in relation to prostate cancer and/or PA, all responses to Table 2 items 5 and 7 were reviewed and any web address with two or more responses were identified for further analysis.

To identify how many webpages within an organisation's website a participant generally clicked on, a count was made of the responses to Table 2 item 8. The researcher selected the category with the greatest number of responses.

Results

There were nine themes identified representing nine different categories of searching these are summarised in Table 3 with characteristics examples. Appendix C: Content Analysis of Internet Searches, details all searches identified by participants. A total of 145 search words/phrases were identified, of these 119 search terms were only suggested once. Twenty-six percent of responses used generic health and fitness words only and 21% searches detailed a specific PA. Five of the groups, a total of 54% of responses did not mention the words "prostate cancer" or "cancer" and no search included the words "men" or "man". Seventy percent of participants undertook three or more searches (Table 4).

Table 3

Content analysis of search words/phrases.

Group	Search theme	# responses per theme	% of men	Example search term used by participants
1	Generic health and fitness words only	38	26.21	"exercise", "fitness plan"
2	Search included the words exercise (or exercise related word) and prostate cancer	35	24.14	"prostate cancer exercise", "exercises for prostate"
3	Search specified a specific activity	21	14.48	"running", "swimming"
4	Search included terms relating to pre or post cancer treatment	19	13.10	"exercise post cancer surgery", "exercise pre surgery"
5	Search related to older age	9	6.21	"exercise age group 60-70", "seniors activity"
6	Generic cancer search no mention of prostate	7	4.82	"cancer", "exercise cancer"
7	Search included prostate cancer but no mention of exercise	5	3.45	"prostate cancer", "prostate cancer side effects
8	Searches relating to diet	6	4.14	"diet", "weight loss"
9	Local searches	5	3.45	"gyms in my area", "local gyms"

Table 4

Number of searches undertaken by participants.

Potential searches	# Participants
One search	6
Two searches	7
Three searches	12
Four searches	8
Five searches	11

Groups one to four of Table 3 had the largest number of responses and were selected for further analysis. Table 5 shows the specific search terms within groups one to four which were identified by the researcher as having two or more participant responses, Table 5 also details specific website addresses identified by two or more participants. The most common search word/phrase was "exercise" with seven responses (Table 5). The most popular web address used by participants in relation to prostate cancer was Prostate Cancer Foundation Australia with 13 responses, followed by the Cancer Council Australia (2 responses) and Andrology Australia (2 responses). Web addresses used by participants in relation to PA were varied and tended to focus on fitness facilities and physiotherapies, Appendix D: Specific Web addresses gives details of all web addresses suggested by participants.

Table 5

Final Internet search terms.

Group	Search term	# responses
1	Exercise	7
	Fitness	2
	Physical exercise	2
2	Exercise prostate cancer	5
	Physical activity prostate cancer	2
	Prostate cancer exercise	6
	Prostate cancer physical activity	2
	Prostate exercises	4
3	Gym	3
	Running	2
4[a]	Exercise after prostate cancer	1
	Exercise post prostate cancer surgery	1
	Incontinence physio rehab prostate cancer	1
Specific web addresses used by participants	Prostate Cancer Foundation Australia	13
	Cancer Council Australia	3
	Andrology Australia	2

[a] group 4 only had one response per search word/phrase so an online random number generator was used to select 3 search words/phrases.

Table 6 shows nearly 60% of participants did not click on paid advertisement links to websites returned in the search results. Seventy-nine percent of respondents would have viewed any websites suggested on the first page of the returned search results. Once within a company's website 50% of respondents would click to view up to three web pages before moving on to another search criteria if they had not found the information they were searching for.

Table 6

Searching the Internet (N=44).

	%
Clicked on paid advertisements	
Yes	36.40
No	56.80
I don't know	6.80
Internet search results links clicked on	
Any of the first five suggested websites	20.40
Any website on the first page of the search results	29.50
Any website on the first or second page of the search results	29.50
Any website on the first three pages of the search results	15.50
More than the first three pages of the search results	4.70
Web pages clicked on within an organisations website	
1 page	2.30
2 pages	15.90
3 pages	29.50
4 pages	25.00
5 pages	20.50
More than 5 pages	6.80

Summary of Final Search Strategy for Use in Study Two

Based on the results of how men search the Internet, the below Internet search strategy formed the search criteria to be undertaken by the researcher in Study Two: Internet search terms identified in Table 5; paid advertisement websites excluded; all website links on the first page of the returned Internet search engine results; and three web pages within each website assessed.

Study Two – Creating an Evidence-Based Quality Assessment Tool and Assessing Website Quality

Method

Measures

The online questionnaire used in Study One was also used to measure participants' PA preferences, motivations, barriers and website participation.

PA preferences, motivations and barriers. To identify the types of PA participants preferred to participate in; their motivations to undertake regular PA and perceived barriers to PA, three items were developed:

1) Which physical activities would participants most like to participate in? Response options were based on findings from (Booth, Bauman, Owen, & Gore, 1997); the researcher added other response options e.g. golf, football and lawn bowls. In total there were 18 response options and participants were able to select multiple responses.

2) What motivates a participant to participate in regular PA? Response options were based on previous research investigating the motivations of cancer survivors to undertake regular exercise (Craike et al., 2011; Newton & Galvão, 2008; Prostate Cancer Foundation, 2015). There were 11 multiple response options e.g. improve cardio fitness and increase muscle mass.

3) What were the barriers for participants to undertake regular PA? Response options were based on previous research investigating the barriers of cancer survivors to undertake regular PA (Craike et al., 2011; Keogh et al., 2014; Ottenbacher et al., 2013). There were 15 multiple response options e.g. lack of time and feeling old.

Website participation. To measure participants' preferred type of social media communication a single item was developed using preference of social media platforms that had been identified in a systematic review of 98 studies. These studies investigated the benefits of social media for health communication among the general public, patients, and health professionals (Laranjo et al., 2015; Moorhead et al., 2013). There were four multiple response options, e.g., Facebook or Twitter.

Procedure

Development and Pre-Testing of the Website Quality Assessment Tool

Literature review. To build the website quality assessment tool (tool) a literature review was undertaken to identify factors associated with website efficacy. As a result of this research "The Behavior Change Model for Internet Interventions" was selected as a suitable base model for the selection of quality criteria for the tool (Ritterband, Thorndike, Cox, Kovatchev, & Gonder-Frederick, 2009). The model identifies criteria that have been shown to be successful in engaging people in websites in order to facilitate positive behaviour change.

Researching the tool. The tool criteria for the study included: design, credibility/accountability, usability, accuracy, participation, relevance and behaviour change techniques. To develop items within each of these areas the researcher identified research frameworks that had previously been developed and used to measure the quality of health websites, or the outcomes of systematic reviews. Where there were gaps in the literature, responses to the online questionnaire were used as measures. A summary of the literature used to create tool items can be found in Appendix E: Literature Review for Website Criteria Selection.

Design, credibility, accountability and usability. To measure aspects of the design, credibility/accountability and usability of health websites, items were adapted from

previously developed frameworks by (Devine, Broderick, Harris, Wu, & Hilfiker, 2016; Eysenbach et al., 2002).

Website accuracy. Website accuracy was measured in relation to the guidelines on levels of PA published in the "Australian Association for Exercise and Sport Science Position Stand: Optimising Cancer Outcomes Through Exercise" (Hanif, Read, Goodacre, Chaudhry, & Gibbs, 2009).

Behaviour change techniques. To assess the use of behaviour change techniques used by a website, the researcher reviewed Michie et al. (2011) "Taxonomy of Behaviour Change Techniques to Help People Change their Physical Activity and Health Eating Behaviours (CALO-RE taxonomy)" and selected behaviour change techniques from the taxonomy which have proved through systematic reviews to be effective at changing health behaviour using the Internet (Campbell, 2012; French et al., 2014; Krebs et al., 2010; Morrison, 2015; Williams & French, 2011).

Participation and Relevance. Responses to the online questionnaire were used to develop assessment elements in relation to end-user Internet participation and how relevant a website was to men with prostate cancer. To identify how participants interact with a website, the researcher took the top four responses to the questionnaire question relating to participants' use of social media in the past month. To create an item relating to the types of PA participants prefer to undertake, the researcher used physical activities with five or more participant responses in the questionnaire. To identify participants' motivations to undertake PA the researcher took any motivation listed in the questionnaire with two or more participant responses. To identify participants' perceived barriers to undertaking PA the researcher took barriers listed in the questionnaire with two or more participant responses.

Creating and testing the tool. As a result of the literature review and questionnaire responses a tool was developed in Excel using a number of Likert scale responses: the higher the Likert scale response the greater the website's ability to meet the assessment criteria. The researcher tested the tool on ten test websites, during this testing phase it was identified not all website links clicked on, resulted in the return of a traditional website, i.e. some links returned a single page such as a link to a PDF document. The researcher decided to include these web addresses in the analysis as they provided PA advice, but such single pages would be assessed using a shortened version of the tool and only assessed using the landing page. A copy of the tool can be found in Appendix F: Website Quality Assessment Tool.

The final suitability and functionality of the tool was tested on three websites. The researcher undertook this testing along with two experienced independent health researchers. After testing, the researchers discussed issues that arose and the tool was amended.

Scoring the tool. The tool was designed to provide a score for each model criteria (e.g. accuracy) as well as an overall score. To calculate a criteria score responses to items relating to the particular model criteria were summed. To calculate the overall score the model criteria scores were summed. Higher scores equated to higher website quality, Table 7 shows the scoring system for the complete and shortened version of the tool. The total website quality score was then converted into a website grading of bronze, silver or gold, where websites thought to be the highest quality were graded as gold standard based on the overall scores (Table 8).

Table 7

Assessment score range for complete and shortened version of tool.

Model criteria	Score range full version of tool	Score range shortened version of tool
Design	0-6	0-6
Credibility & accountability	0-17	0-12
Participation	0-4	0-0
Usability	0-8	0-0
Relevance	0-6	0-6
Accuracy	0-6	0-6
Behaviour change technique	0-26	0-26
Total	0-73	0-56

Table 8

Website quality grading.

Grading	Complete assessment score	Shortened assessment score	Description
Gold	51-73	38-56	Website had the majority of features/functions to successfully target and engage men with prostate cancer to encourage PA participation
Silver	26-50	19-37	Website had a number of features/functions to target men with prostate cancer to encourage PA participation. However there is room for improvement
Bronze	0-25	0-18	The website had very few of the features/functions to target and engage men with prostate cancer to encourage PA participation

Conducting Internet Searches

The final Internet searches identified in Study One were undertaken by the researcher using the following method: Chrome Internet browser (Daly & Scardamaglia, 2016) and Google search engine (Daly & Scardamaglia, 2016; Pollard, 2007). To minimise the impact of Google's local search setup, Google search level settings were set to: any country, any time and all results set to verbatim. All searches were undertaken on the same computer, on the 29th June 2016; and after each individual search the search history was cleared.

Every landing page address identified by the search criteria was copied into the Excel tool. Once all webpages were in the tool, duplicate webpages were identified and excluded, and the remaining landing pages were assigned a category based on the type of website. The website categories were reviewed and categories not deemed to provide health promotion to the general public were excluded. The researcher viewed all remaining websites and on review excluded any website which were not free of charge or did not provide health related information. Table 9 shows the website category and whether the category was included or excluded from the analysis and whether the websites were assessed using the full version or shortened version of the tool.

Table 9

Website category included or excluded from analysis.

Category	Description of website	Included or excluded in final analysis	Assessed using complete tool or shortened version
Blogs	Website dedicated to blogs	Included	Shortened
Cancer organisations	Organisations dedicated to supporting cancer patients	Included	Full version
Fitness facilities	Gyms / other fitness facilities and activity groups	Excluded	N/A
Governments	.gov / or government labelled websites	Included	Full version
Journal articles	Academic journals targeted at research professionals	Excluded	N/A
Medical advice	Website provided medical advice	Included	Full version
Newspapers / radio / TV	Newspapers / radio stations / TV	Included	Shortened
Not related to health or PA	Website clearly not related to health or PA	Excluded	N/A
PDF	Single PDF document	Included	Shortened
Private companies providing a specific service	Private companies offering a specific health service / product e.g. physiotherapist / hospital / companies selling health products	Included	Full version
Private companies offering information only on health / PA	Information only websites providing information on health / PA e.g. online fitness magazines	Included	Full version

Table 9 continued

Website category included or excluded from analysis.

Category	Description of website	Included or excluded in final analysis	Assessed using complete tool or shortened version
Professional sites	Websites for advocates and professional associations	Included	Full version
University / Research organisation	Websites ending .edu or universities or research companies	Included	Full version
Website not available	Website not available	Excluded	N/A
Wikipedia / dictionaries	Wikipedia sites or online dictionaries	Included	Shortened
YouTube	Online video channels	Included	Shortened

To ensure consistency of web page selection of the three web pages within each website (websites being assessed using the full version of the tool), the landing page (the first web page the user lands on as a result of the Internet search) was assessed and the two remaining pages for assessment were identified by:

1) wording on the landing web page suggesting 'PA/exercise'; or if this could not be identified

2) wording on the landing web page suggesting 'health'; or if this could not be identified

3) the word "exercise" as typed into the website search functionality.

Results

Overview

A total of 135 websites were identified using the Internet search criteria defined as a result of Study One on how men search the Internet. After duplicate websites and websites not associated to health or targeted at the general population were excluded, 56 websites remained for analysis (Table 10).

The top five website categories returned were: private companies offering information on health only (e.g. fitness magazines), cancer organisations, websites providing medical advice, PDFs and Wikipedia/dictionary websites (Table 10).

Table 10

What men will find when searching the Internet using search criteria defined by Study One.

Websites	*N*	%
Total number of websites identified	135	-
Duplicate websites	36	-
Total number of websites excluded due to category or not relevant to health	43	-
Remaining websites for assessment	56	-
Remaining websites by category		
Blogs	3	5.36
Cancer organisations	9	16.07
Governments	4	7.14
Medical advice	6	10.71
Newspapers / radio / TV	2	3.57
PDF	4	7.14
Private companies providing a specific service	2	3.57
Private companies offering information only on health / PA	10	17.86
Professional sites	3	5.36
University / Research organisation	4	7.14
Wikipedia / dictionaries	6	10.71
YouTube	3	5.36

No websites achieved a gold standard, 36 received silver and 20 received bronze. The grading of websites by category shows the overall highest scores were obtained by: government, medical advice and professional websites (Table 11).

Table 11

Number of websites per category receiving a grading of gold, silver or bronze.

Website category	# gold websites	# silver websites	# bronze websites
Blogs[a]	0	0	3
Cancer organisations	0	8	1
Governments	0	4	0
Medical advice	0	6	0
Newspapers / radio / TV[a]	0	0	2
PDF[a]	0	2	2
Private companies providing a specific service	0	2	0
Private companies offering information only on health	0	7	3
Professional sites	0	3	0
University / Research organisation	0	3	1
Wikipedia / dictionaries	0	0	6
YouTube[a]	0	1	2

[a] measured using shortened version of website quality assessment tool

Figure 1 displays an overview of quality scores for each website that underwent the full assessment tool. The maximum quality score available was 73, "Webmed" received the highest overall quality score of 49. The "Webmed" website performed well in: design, participation and usability, however fell short on: credibility/accountability, relevance, accuracy and use of behaviour change techniques. The lowest overall score was 20 and this was obtained the "University of California". This website performed well in design and relevance, but obtained low scores for credibility/accountability, usability, use of behaviour change techniques and received scores of zero for participation and accuracy. Overall most websites scored well in: design, participation and usability, but obtained lower scores for credibility/accountably, relevance accuracy and use of behaviour change techniques.

Quality scores for websites that underwent the shortened version of the tool are presented in Figure 2. The maximum quality score available was 56 and "Prostate Cancer Foundation America" obtained the highest overall score of 29. This website scored well on design, credibility/accountability, relevance and accuracy, but received a low score for the use of behaviour change techniques. "Reddit" obtained the lowest overall score of six out of 56, scoring poorly in all categories. In general the websites which underwent the shortened version of the tool performed well in design, but poorly in credibility/accountability, relevance, accuracy and behaviour change technique.

A complete copy of the website ranking and mean scores by website category can be located in Appendix G: Website Quality Assessment Scores.

Website Design

Figure 1 and Figure 2 demonstrates most websites scored well on design with 22 websites obtaining a maximum score of six. Nine of the 22 websites were cancer organisations and were located using searches that included words relating to "exercise" and "prostate cancer", or were specific addresses entered into the Internet by participants. The highest mean category design score was obtained by professional websites $M=5.67(0.58)$, and blogs tended to score poorly in relation to website design.

Figure1

Website quality scores using the complete quality assessment tool (website quality score range 0-73).
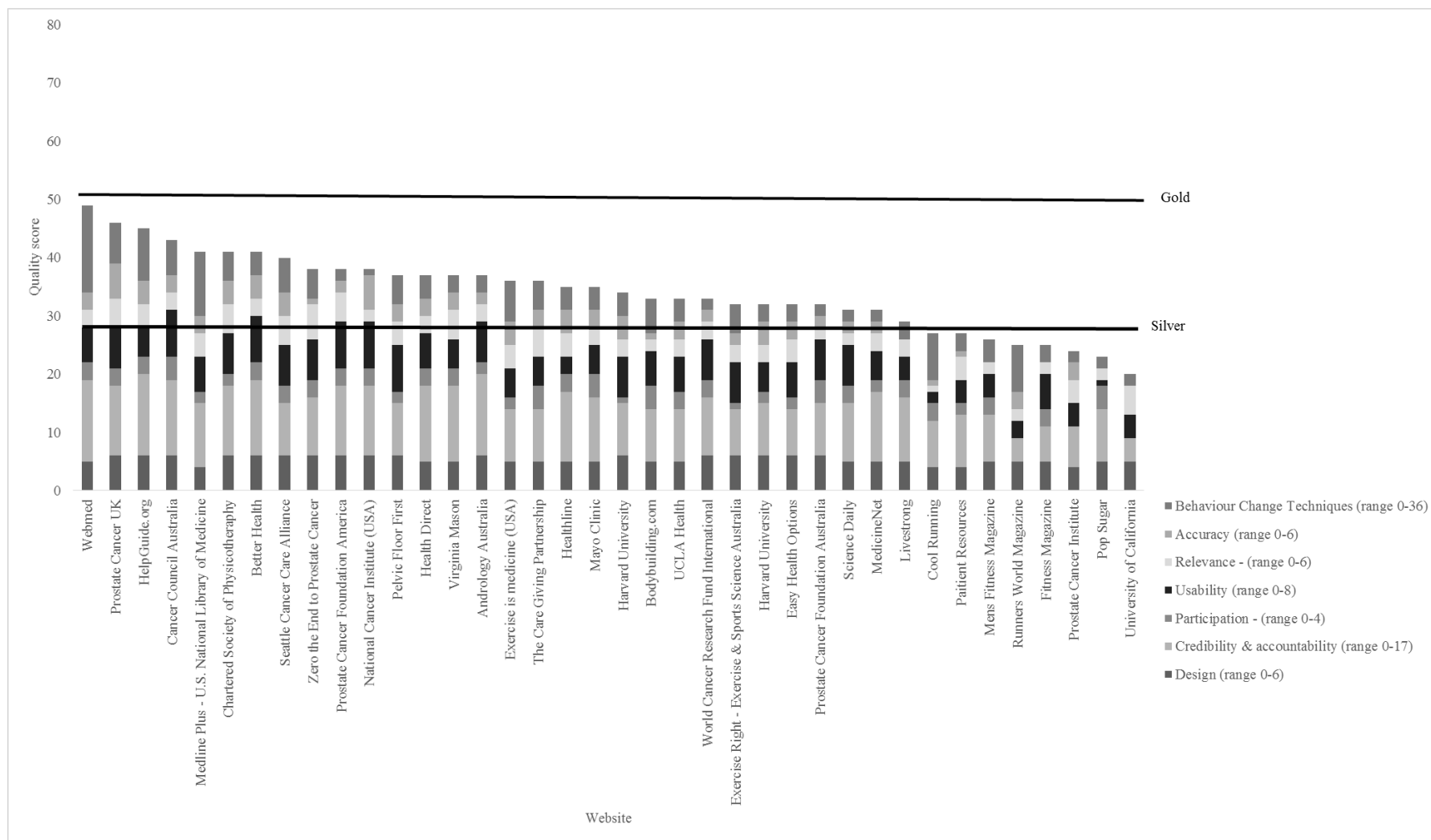
Figure 2

Website quality scores using the shortened quality assessment tool (website quality score range 0-56).
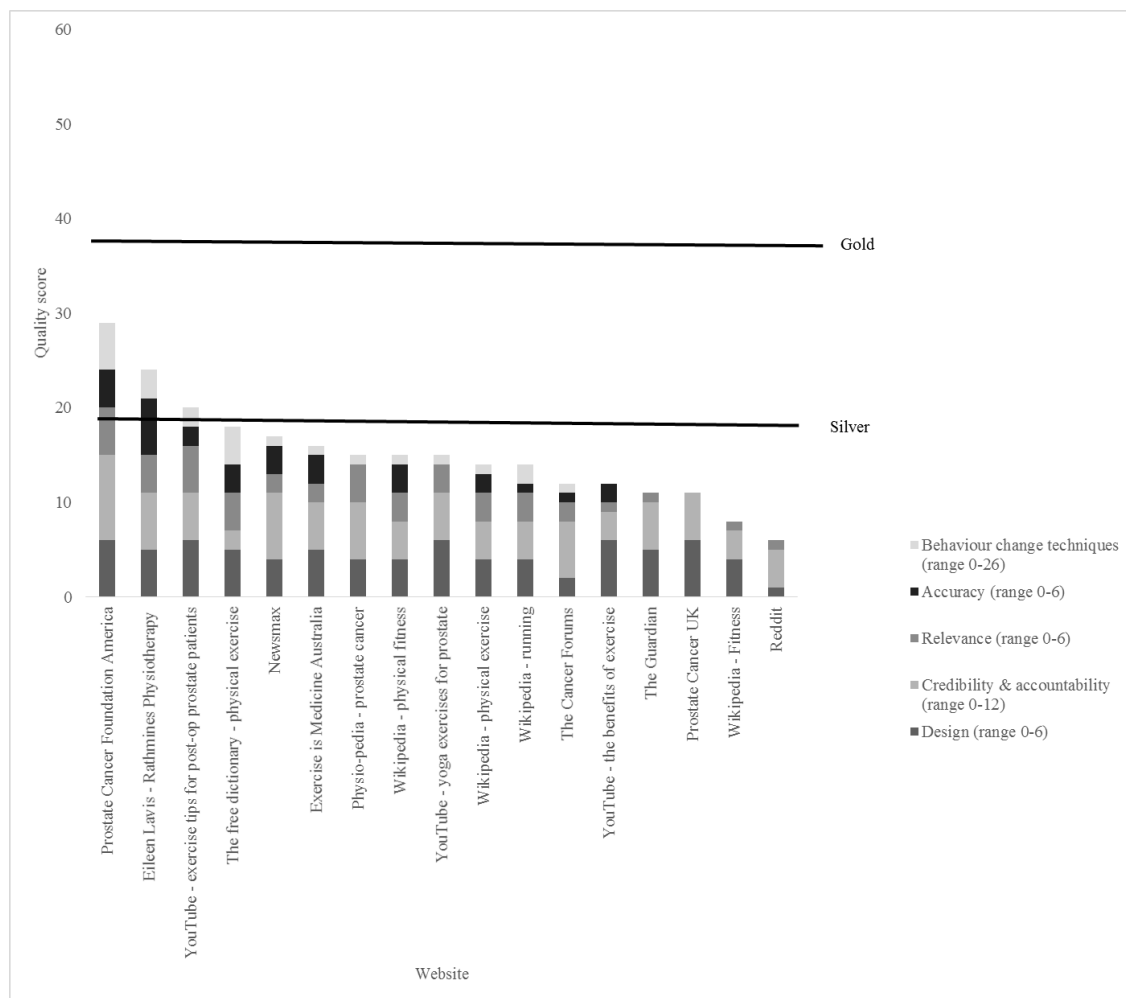
Website Credibility and Accountability

Website credibility and accountability are areas of concern (Figure 1 and Figure 2). Websites that underwent the full assessment had the potential to score a total of 17 points. However the top three websites only scored 14 points each ("Webmed", "HelpGuide.org" and "Andrology Australia"), all three of these websites fell into the medical advice category. The website category with the highest mean credibility and accountability score was Government M=12.25(0.96). The lowest scoring websites were "Runners World" and the "University of California", both only obtaining four points. When reviewing Figure 2 in relation to the websites that underwent the shortened version of the tool, a PDF by the "American Prostate Cancer Foundation" obtained the highest score, receiving nine out of 12 points. The top scoring websites in relation to credibility and accountability tended to be located using more generic exercise search terms, or web addresses entered directly by participants.

Website Participation

Overall website participation scored highly with six websites obtaining the maximum sore of four (Figure 1). Two of these websites were cancer organisations ("Cancer Council Australia" and ""Prostate Cancer Foundation Australia"), both of these were located using website addresses provided by participants. The category with the highest mean participation score M=3.50(0.70) was obtained by private companies offering specific services. Facebook and Twitter were the most commonly used forms of website participation.

Website Usability

In general website usability was high with 15 websites either receiving a score of seven or eight out of eight (Figure 1). The most usable websites were developed by governments M=7.00(1.15) and cancer organisations M=6.56(1.51). The most user-friendly websites were generally located using a search term that included the use of the word

"prostate" or "cancer". Private companies providing health information only (e.g. health magazines) took the bottom three positions for website usability ("Popsugar", "Cool Running" and "Runners World").

Website Relevance

As demonstrated in Figure 1 and Figure 2, relevance scores were varied with full marks obtained by "Zero the End to Prostate Cancer", and a score of one for "Cool Running". Website categories that scored highly in relation to relevance were, cancer organisations $M=4.11(1.58)$, private companies providing a specific service $M=5.00(0.00)$ and professional websites $M=4.33(0.58)$. For the websites using the shortened version of the tool the "Prostate Cancer Foundation America" and a YouTube clip on post-operative prostate cancer exercises had the highest relevance scores of five out of six. The companies with the higher relevance scores were located by specific search phrases that included "prostate cancer" and/or "exercise".

Website Accuracy

Overall website accuracy was low with a mean score of $M=2.33(1.63)$ across all websites (Figure 1 and Figure 2). The most accurate websites were the "National Cancer Institute (USA)", "Prostate Cancer UK" and "Eileen Lavis - Rathmines Physiotherapy". The Government website category received the highest overall accuracy rating of $M=4.00(1.41)$, followed by professional websites $M=3.67(0.58)$. Eleven websites obtained a zero score of accuracy. These three websites were located using search terms which included "prostate cancer" and/or exercise related words.

Website Behaviour Change Techniques

As demonstrated in Figure 1 and Figure 2 websites scored poorly on the use of suitable behaviour change techniques. Websites that underwent the full assessment had the potential to obtain 27 points. "Webmed" obtained first place with a score of 14, followed by

"Medline Plus" with a score of 11. Medical advice websites obtained the highest mean behaviour change technique score of $M=6.17(4.96)$. Websites that underwent the shortened tool had the opportunity to obtain 26 points. However websites obtained a score ranging from zero to five, with "Prostate Cancer Foundation America" receiving the highest score of five and five websites scored zero. There were a total of 13 behaviour change techniques assessed in this study, the most common behaviour change techniques used were, acknowledging the relationship between behaviour and PA and the importance of social support. The higher behaviour change scores were obtained by using a generic exercise search phrase.

Discussion

Overview

This research was undertaken as two separate studies with each study answering a specific research aim. Study One sought to explore how men with prostate cancer search the Internet for PA information. Study Two aimed to develop a purpose built quality assessment tool based on literature reviews and questionnaire findings and undertake an assessment of the quality of websites identified in Study One. The findings of these two studies will be discussed individually with reference to previous literature and recommendations given on how these findings can be utilised for practical benefit. Limitations of the research and future areas of research will also be discussed, and a final conclusion drawn.

Findings from Study One

Even though there were only 44 eligible responses to the online questionnaire, the responses demonstrated a vast breadth of possible search terms used to search for PA information on the Internet. These 44 participants deployed a total of 145 searches. Of these, 119 were only suggested once, showing cognitive variation in how men search the Internet.

Content analysis of the search terms identified nine clear groups, of which five did not mention the words "prostate cancer" or "cancer". The most popular types of searches

revolved around generic health and fitness terms, with the search "exercise" having the most responses. Only 38% of responses included the word "prostate", and no searches included the word "men" or "man". The results of this study support previous literature relating to prostate and breast cancer where, even if people are searching for specific information, they tend to only undertake generic Internet searches (Pautler et al., 2001; Quinn et al., 2012). For example, men with prostate cancer are looking for information about increasing their levels of PA but they only type in the word "exercise" into the Internet search engine, they do not narrow the search down by adding the words "prostate cancer" or "men" to their search.

This study further supports research which concluded the vast majority of people undertake sub-optimum Internet searches when searching the Internet for health information (Eysenbach & Köhler, 2002). It also supports research findings that the majority of people undertaking Internet searches only review web page links on the first page of the returned Internet search engine results (Eysenbach & Köhler, 2002).

Findings from Study Two

Study One resulted in the identification of 135 web links for review. However, after duplicate websites, and websites were excluded because they were not freely available, did not provide health information, or because the health information provided was not targeted at the general population, this number was revised to 56 websites. This finding itself is of note as it demonstrates searching the Internet for health information can be problematic with only 41% of the participants' Internet search results promoting health to the general population.

Of the 56 websites assessed none obtained a gold rating. Mean total scores of each website category demonstrated government websites have the highest mean score, followed by medical advice websites, and professional websites.

Of the 38 websites that underwent the complete quality assessment "Webmed" obtained the highest rating, followed by "Prostate Cancer UK" and "Helpguide.org". Even though "Webmed" received the highest quality score it only met 67% of the quality assessment criteria.

"Webmed" was located using the search term "exercise", as were two other websites in the top ten ("Helpguid.org" and "Medline Plus"). Cancer organisations' websites that appeared in the top ten were located as a result of the use of more specific Internet search terms "exercise prostate cancer" (three websites) or "prostate cancer exercise" (one website). These findings suggest the more specific a search term is the more likely a person is to locate a website which is designed to meet their requirements.

Websites identified by participants entering a company's specific web address into the Internet were all Non Government Organisations (NGO). The popularity of these NGO websites could be as a result of health professionals directing participants to these specific websites and/or these types of organisations having direct contact with participants, therefore people perceive the websites as being more credible. Even though these NGO websites scored highly compared to other websites, all three organisations only received a silver rating. Considering men are potentially perceiving these websites as providing the best information, there is a need to improve the websites further in order to obtain a gold rating.

Website credibility and accountability across all website types included in the complete assessment were low. Medical advice and government websites received the highest mean scores. Websites could have scored a maximum of 17 points in relation to credibility and accountability. With maximum mean scores of 12, this study supports findings from previous research suggesting freely available websites' credibility and accountability are still

questionable (Eysenbach et al., 2002; Fox & Rainie, 2002; Pautler et al., 2001; Pinnock & Jones, 2003; Pollard, 2007; Zhang et al., 2015).

In this study, accuracy of PA guidelines were found to be questionable, with government websites being the most accurate. Private health information only companies (e.g. health magazines) performed poorly. This lack of accuracy supports previous findings relating to the accuracy of PA information on websites by (Bonnar-Kidd et al., 2009). Most websites suggested 30 minutes of exercise most days of the week, which falls in line with recommended guidelines, however many websites were incomplete as they did not acknowledge the importance of undertaking two resistance training sessions a week.

Design scores relating to whether websites were visually appealing tended to be high. Twenty-two websites obtained a maximum design score, seven of which were cancer organisations. Government websites obtaining the highest mean scores and private health information only websites the lowest scores. Previous research suggests the level of aesthetics in computerised systems affects post-use perceptions of the systems aesthetics and usability, however the degree of actual usability has no such effect (Tractinsky, Katz, & Ikar, 2000).

Participation scores tended to be higher: all website categories received a score of between 2 and 3.50 out of a possible four, the only exception was university/research websites that only obtained a mean score of 1.50. Very few websites had no social media platform, most sites had both Facebook and Twitter which supports research by (Laranjo et al., 2015).

Unfortunately this research show websites are not good at specifically targeting men with prostate cancer, with private companies offering specific services ranked highest in this category. Cancer organisations also scored well with four out of nine cancer organisations

scoring either five or six out of six. Some of the websites, especially those which fell into the category of private health information only websites, were very poor at targeting men with prostate cancer. This was particularly the case in relation to images used on websites, some of which could be considered inappropriate. This supports previous research which found men had concerns over information being inappropriate and they preferred messages to be delivered using gender and culturally sensitive models (Lohan et al., 2015; Pollard, 2007; Wolin, 2003). A selection of images from these websites can be found in Appendix H: Website Screenshots. The companies with the highest relevance scores were located using more specific searches which included the use of the words "prostate cancer" and/or "exercise".

The behaviour change techniques criteria makes for the most interesting findings. Websites had the potential to score a maximum of 26 points and the highest mean website category score was achieved by medical advice websites, with "Webmed" and "Helpguide.org" receiving the highest scores of 15 and 9 out of 26, respectively. The most frequently used technique was the acknowledgment of the relationship between behaviour and PA in the form of gain-framed messaging: the majority of websites clearly used language that implied if a person undertakes regular PA health benefits will be obtained. The other technique frequently used, at least in the language used, was the importance of social support in the form of family and friends. There were a total of 13 behaviour change techniques assessed in this study and few websites appeared to talk about many of the behaviour change techniques. Those websites which did acknowledge some of the techniques lacked practical information on how to undertake the behaviour change e.g., they did not give details on suitable fitness watches and health-related mobile phone applications, very few websites had the ability to self-monitor performance against set goals, and/or did not offer practical advice on how to start tracking performance. This finding supports previous research that despite a

large body of evidence to support the use of behaviour change techniques, many companies targeting healthy behaviours are not incorporating them in their websites (Vandelanotte et al., 2014). The highest behaviour change scores were obtained by using generic search phrases, with seven out of the top 10 rated behaviour change technique websites being located through either generic exercise or PA related searches. "Prostate Cancer UK" obtained the highest ranking for a cancer organisation obtaining 6th position and "Cancer Council Australia" came 9th. These finding suggest websites specifically targeting men with prostate cancer are not utilising behaviour change techniques to their full potential. Previous research has shown interventions which incorporated more behaviour change techniques have larger effects on promoting health behaviour change via the Internet (Brouwer et al., 2011).

Of the 18 websites which underwent the shortened version of the quality assessment, only three obtained a silver rating. The highest-ranked was a PDF produced by the "Prostate Cancer Association of America" which achieved a score of 29 out of 56. Second was a PDF PowerPoint presentation by "Eileen Lavis – Physiotherapist" (24 points) and third a YouTube video of exercise tips for post-op prostate patients (20 points). These findings show further concerns over the quality of health websites. The "Prostate Cancer Association of America", the first placed website using the shortened version of the tool, only obtained 52% of the quality assessment criteria. Interestingly even though these 18 websites were assessed on a shortened version of the quality assessment tool, results were similar to that of the websites which underwent the full assessment with concerns over credibility, accountability, relevance, accuracy and use of behaviour change techniques.

In summary, the more specific a search was, the more relevant and accurate a website should be. "Webmed" received the highest score. "Prostate Cancer UK" was the most relevant and memorably website reviewed (in the researcher's view). "Helpguide.org" provided the best range of behaviour change techniques. "Andrology Australia" provided

good overall information for men's health. "Better Health" (operated by the Victorian government) was also informative and easy to use. Specific web addresses entered by men had high quality scores ("Prostate Cancer Foundation Australia", "Andrology Australia" and "Cancer Council Australia").

Even though cancer organisations and government websites rated highly in the overall quality scoring, information on these websites is still very scientific: they contain a lot of information summarising research studies about how successful PA is at increasing life-expectance and improving quality of life, but lack practical information on how to undertake behaviour change. For example there is a lack of instructions on how to undertake resistance training, actual details of when and where group activities take place or information on where to seek appropriate professional advice in relation to PA. All websites lacked interactive features e.g. use of text messaging, which have been shown to improve the effectiveness of Internet health based interventions (Brouwer et al., 2011; Webb et al., 2010).

What this Research Adds to the Literature

At the time of writing the researcher believes this is the first piece of research which engaged the help of men with prostate cancer to identify how they search the Internet for PA information. Previous research into Internet health search behaviours has been conducted by health researchers assuming the role of patients and such an approach could be distorting the websites located and subsequently assessed (Eysenbach et al., 2002; Zhang et al., 2015).

It is also thought this is the first time an empirically-based Internet quality assessment tool has been developed to investigate the quality of websites likely to be located by men with prostate cancer. Even though the tool was only used to assess 56 websites, it forms a good starting point for the assessment of other chronic-disease based websites and the tool

can be manipulated to suit the target audience and developed to include other items as research in certain model criteria areas evolves.

Practical Implications for this Research

Study One suggests the PA search criteria undertaken by men with prostate cancer is not optimal and men might, therefore, benefit from education around how to use search engines more effectively e.g. through the use of more specific search terms ("exercise prostate cancer"). However, education could be challenging due to the complexities and the ever-changing search algorithms developed by Internet search engine providers (e.g. Google) where individuals' searches are targeted at the location they are searching from e.g., searching from a computer in Adelaide could provide different search results to an individual searching the terms from a computer in Sydney.

A more feasible approach to help men with prostate cancer locate the best quality PA websites could be for health professionals (e.g. Urologists) to give patients the web address of the best quality rated websites, in this case "Webmed", "Prostate Cancer UK", "HelpGuide.org", or "Cancer Council Australia".

Pautler et al. (2001) found a rapidly increasing number of prostate cancer patients are resorting to searching for information about their health on the Internet and health care professionals should therefore be involved in the development of websites. The current research suggests there is still a long way to go for websites to achieve a gold standard rating but this presents a significant opportunity for cancer organisations, men's health websites, medical advice websites and government websites to work towards improving their websites in order to achieve a gold standard. The quality assessment tool could be shared with organisations whose websites were assessed as part of this research, as well as with other health promotion organisations, to help them review their websites and update where they identify gaps as a result of the assessment.

Of the 44 participants of this study 13 said they had used the "Prostate Cancer Foundation Australia" website, but this website only scored 32 out of 73 in this assessment. Another recommendation, especially when targeting an Australian audience, would be for health researchers to work with Prostate Cancer Foundation Australia to update their website to include the items suggested by the quality assessment tool and combine this with other previous health research which has been shown to be successful in promoting PA amongst cancer survivors.

Three participants said they would enter the word "gym" into the search engine and a total of 21 searches related to undertaking a specific physical activity (e.g. yoga), but none of these searches were included in the research because the resulting websites tended to promote a specific gym facility and provided no specific health information. Considering a number of people use the word "gym" thinking they may find information relating to PA, there could be a commercial opportunity for private companies such as health and fitness facilities to work with health researchers to develop their websites. By working with health researchers these commercial organisation could provide relevant online health information, as well as providing a suitable physical service offering such as the provision of personal trainers / exercise physiologist who specialise in cancer patients at their facility.

There is also a potential of sharing the most frequently used search terms with companies who are specifically targeting men with prostate cancer. This will enable companies to improve their Internet search engine organic search criteria and therefore reach more people when they are searching the Internet.

The research could help with the development of a Google filter/web application which could sit over the top of a prostate cancer organisation's website to bring up relevant websites based on what men searched, i.e. a man types in "exercise" within Prostate Cancer

Foundation Australia's website and the search only brings back external exercise websites the Prostate Cancer Foundation have assessed using the quality assessment tool, as being suitable exercise websites for men with prostate cancer.

Limitations and Future Research

This research only included a small number of participants; future research should engage a much larger sample size. A larger sample size would provide a clearer indication of the most commonly used Internet search words/phrases, as in this study 119 out of 145 searches were only suggested once. A greater sample size should increase the chances of obtaining multiple responses to the same search term and therefore the researcher could confidently select the most used search terms.

Overall the 44 participants rated their levels of self-efficacy of using the Internet to locate health information as high. Therefore this study does not necessarily cover the broader prostate cancer population i.e. those who did not see the study advertised because they do not use the Internet, or they did not participate because the only way to respond to the questionnaire was online and they did not have the confidence to complete the online questionnaire. Future research may benefit from allowing the use of paper-based questionnaires as well as online formats, or might increase sample size by using more urologists and Men's Shed type charities to recruit participants.

Even though the tool is comprehensive, as it covers seven Internet criteria and is based on previous research, it should be acknowledged previous research used to develop the quality assessment tool may have some flaws as quality items for measurement were selected by researchers and not by end-users of Internet health websites (Eysenbach et al., 2002; Zhang et al., 2015). A systematic review of the items used to measure credibility and accountability were objective measures developed by researchers. However, when observed in a laboratory environment with end-users, end-users were found not to search the website to

confirm the credibility of the company nor click on website disclaimers (Eysenbach & Köhler, 2002) suggesting the research environment may be different to real world application. To determine the validity of the quality assessment tool men with prostate cancer could be asked to view the websites assessed in this research to see how well the scores from the research correlate with men's perceptions of the websites, e.g., ask men to rate how useful they found the websites and see if the results of the research predict usefulness. This research could be undertaken by researchers engaging with The Pathfinder programme run by Prostate Cancer Foundation Australia or the Australian Men's Shed Foundation.

This research only reviewed three webpages of 38 websites. Even though the responses to the questionnaire suggested most participants only reviewed up to three webpages before moving onto another website, it is possible some websites did have the functionality being assessed but on another webpage that was not included in the assessment. Some websites might have received a lower score than if more webpages had been assessed per website. Although this research is indicative of how useful a website will be, to confirm the assessment scores achieved, future research may want to take the top quality websites identified in this research and conduct a more thorough review of the websites to ensure the functionality of the website was assessed fully.

This research tried to limit the impact of Google local searches by turning off local searches and deleting search history. But it should be acknowledged if this research was conducted on a different day and/or in a different location, different websites might have appeared in the search results. To try and replicate this research in the future, researchers should use the above mentioned Internet search setup to minimise the effects of changes to Internet search engines.

Even though this research covered seven model criteria areas, some of these areas still have limited research in the form of systemic reviews. The use of Internet based behaviour change techniques have obtained a lot of health research attention, but design, aesthetics and useability are only now gaining research attention. In many cases assessing these areas is difficult as measures of quality are subjective not objective, so even if a researcher is guided by website design research, the researcher still has to make a subjective decision on an item.

Conclusion

In conclusion, research shows the Internet is a tool used by men with prostate cancer to search for information. Even though these men are confident at using the Internet there is evidence to suggest their search strategies are suboptimal. Websites that appear to obtain overall higher quality ratings are those of cancer organisations, medical advice websites and government websites. However, it is not guaranteed men will find these types of websites easily, as cancer organisations, medical advice websites and government websites only make up 31.03% of returned searches. The more specific a search the more relevant and accurate a website is likely to be. The websites men with prostate cancer are likely to find appear to lack the ability specifically to target men with prostate cancer, as they do not provide a variety of different behaviour change techniques. If they do, the techniques relate to the use of gain-framed messages in the promotion of PA, and the importance of engaging in PA with friends and family. The higher quality websites give a lot of detail about the scientific evidence of the importance of PA at increasing life expectancy and improving quality of life, however they lack real world practical application in the form of interactivity and clear guidance on how to make the scientific findings work for them to actually increase their levels of PA.

So, when men with prostate cancer search the Internet for PA information what do they find? The answer is they do find websites which provide information on PA, but they have to do a lot of searching to find the information and, when they do find good quality

websites, the actual quality of the website does not meet gold standard. Therefore there is a need for health researchers, health care professionals, cancer organisations, NGOs and commercial companies to collaborate to design websites and provide practical online services to men with prostate cancer.

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Appendix A: Communication with Participants

Table A1

Intermediaries used to contact potential participants.

Intermediary	How potential participants were contacted
The Freemasons Foundation Centre for Men's Health	Information about the study and link to the questionnaire were distributed via e-mail
Urologists	Information letter including link to questionnaire were given to clients
Prostate Cancer Foundation Australia	Information about the study were published on the Prostate Cancer Foundation Pathfinder Programme website and people were invited to e-mail the researcher if they were interested in participating in the study. The researcher then e-mailed the potential participant a link to the questionnaire
Cancer Council South Australia	Information about the study and link to the questionnaire were posted on the Cancer Council South Australia's Facebook page

Communication with Participants via The Freemasons Foundation Centre for Men's Health

612612016   Seeking men with prostate cancer for on-line survey about exercise - Freemasons Foundation Centre for Men's Health

Skip to content

Freemasons Foundation Centre for Men's Health

NewsandEvents

Seeking men with prostate cancer for on-line survey about exercise

Ms Charlotte Gelder is undertaking research to examine whether Australian men with prostate cancer have access to well-designed websites, with quality content information to encourage regular exercise, as part of her Honours Psychological Science program at the University of Adelaide. The project is being funded by the Freemasons Foundation Centre for Men's Health.

Participation will involve completing a brief online survey at https://www.surveymonkey.com/r/internetuseandexercise.

We anticipate that this research will:

- Highlight the quality and accessibility of existing physical activity websites for men with a history of prostate cancer
- Provide insight into how men use the Internet to search for health information, which is important for improving the reach of online support services.

http://blogs.adelaide.edu.aulmens-healthl2016/05/3Olseeking-men-with-prostate-cancer-for-on-line-survey-about-exercise/

Communication with Participants via Urologists

Dear Sir

The University of Adelaide are currently conducting a study called:

"Do Australian men with prostate cancer have access to well-designed websites, with quality content information to encourage regular exercise?"

The research team is looking to recruit Australian men who would be interested in participating in an online survey that should take no longer than 15 to 20 minutes. In order to be eligible you need to meet the following criteria:

- have had a diagnosis of prostate cancer

- your cancer has not metastasised

- you are not currently receiving palliative treatment

The aim of the study is to investigate how men with prostate cancer search the internet for information on exercise and physical activity. As a result of these searches can men access high quality websites; targeted specifically to Australian men with prostate cancer; and encourage regular exercise / physical activity?

Research has shown that after a prostate cancer diagnosis the internet is a place to find information on improving health outcomes. However, people searching the internet find it hard to locate specific websites and when they do they question the reliability of the information.

Studies have shown that men with prostate cancer who participate in regular exercise / physical activity have improved health outcomes. Yet despite this evidence, only 42% of Australian men with a diagnosis of prostate cancer meet the National Physical Activity Guidelines for Australia.

This study will lead to the development of a tool to measure a website's ability to meet the needs of men with prostate cancer and encourage regular exercise. The study will also provide details on ways to educate men, with prostate cancer, on how to undertake effective internet searches.

This research is being conducted as part of an Honours Psychological Science research project, and is funded by the Freemasons Foundation Centre for Men's Health.

If you are interested in participating in this study and would like to know more please read the attached information sheet.

To participate in the study please click the below link, which will take you directly to the survey.

http://www.surveymonkey.com/r/intermetuseandexercise

Thank you in advance for your time.

Yours sincerely

Insert details of who is sending out message

**Communication with Participants via Prostate Cancer Foundation Australia
(Pathfinder Program)**

Do Australian men with prostate cancer have access to well-designed websites with quality content information to encourage physical exercise?

Dr Camille Short, Research Scientist at the Freemasons Foundation Centre for Men's Health, School of Medicine, at the University of Adelaide.

This research project aims to identify the physical activity websites that men with prostate cancer are likely to find online. Their quality and appropriateness for men with prostate cancer will be assessed. This information may then be used to inform referral practices to physical activity websites and/or the development of more appropriate services.

Who can participate?

- Australian residents who can read and write in English and have access to the internet
- Need to have a prior diagnosis with prostate cancer that has not metastasised (spread)
- Not appropriate for those undergoing palliative care

Ethics approval has been granted from the School of Psychology: Human Research Ethics Subcommittee of the University of Adelaide on 14 April 2016.

This study is currently recruiting participants

Dear ****,

Please find below the details of a research project that is currently recruiting participants. Participation in this study is entirely voluntary.

Study title
Do Australian men with prostate cancer have access to well-designed websites with quality content information to encourage physical exercise?

Lead investigator
Dr Camille Short, Research Scientist at the Freemasons Foundation Centre for Men's Health, School of Medicine, at the University of Adelaide.

Summary of project
This research project aims to identify the physical activity websites that men with prostate cancer are likely to find online. Their quality and appropriateness for men with prostate cancer will be assessed. This information may then be used to inform referral practices to physical activity websites and/or the development of more appropriate services.

- The first aim asks how men with prostate cancer would search the internet for information on exercise.

- The second will use this information to identify websites likely to be accessed and evaluate their quality.

Men volunteering for this study will be asked to complete an online survey which should take no more than 20 minutes. Topics included in the questions are prostate cancer diagnosis and treatment, internet use and level of physical activity.

Who is this study for?
- Australian residents who can read and write in English and have access to the internet
- Need to have a prior diagnosis with prostate cancer that has not metastasised (spread)
- Not appropriate for those undergoing palliative care

If you are interested in this study, please contact:
Name: Charlotte Gelder

Phone: 08 8298 6683

Email: charlotte.gelder@student.adelaide.edu.au

Ethics approval

Ethics approval has been granted from the School of Psychology: Human Research Ethics Subcommittee of the University of Adelaide on 14 April 2016.

Best wishes

Pathfinder representative name

Communication with Participants via Cancer Council South Australia (Facebook)

Appendix B: Online Survey Monkey Questionnaire

THE UNIVERSITY of ADELAIDE   **Internet Use and Exercise**

Welcome - Study Information

The University of Adelaide is looking for volunteers to participate in a study called:

"Do Australian men with prostate cancer have access to well-designed websites, with quality content information to encourage regular exercise?"

Why are we doing this study?
There is a growing body of evidence that participating in regular physical activity/exercise is very beneficial for men diagnosed with prostate cancer. It has been shown to increase heart-lung function, increase muscle strength, reduce fatigue, reduce anxiety and depression and improve overall quality of life. There is also growing evidence that regular activity can slow cancer progression.

However research has shown only 42% of Australian men with a diagnosis of prostate cancer are meeting the National Physical Activity Guidelines of Australia. Given this, our research team is interested in finding ways to encourage and support men with prostate cancer to participate in regular physical activity.

Evidence has shown that men are interested in their health, but are less likely than women to seek information from a health care professional. Some research suggests that the internet may be a promising source of information and support for men with prostate cancer, but little is known about how men with prostate cancer search the internet and what type of information they would be likely to find when and if they do.

Therefore, this study aims to explore how men with prostate cancer use the internet and in particular how they would search for activity information online if they were prompted to do so. We will then use this information to conduct an online search and examine the quality of the websites retrieved.

Desired outcomes of the study?

- Provide insight into the reach of existing good quality websites – are men with a history of prostate cancer likely to find them?
- Highlight the quality of physical activity websites prostate cancer survivors are likely to find.
- Help guide future development of high quality exercise / physical activity websites aimed at men with a history of prostate cancer.

Who is undertaking the study?
This study is being undertaken by Charlotte Gelder (Bachelor of Psychological Science), Dr Camille Short (PhD, Behavioural Science) and Professor Deborah Turnbull (PhD, Psychology) from the University of Adelaide.

Who can participate?

To be eligible for this study participants must be: male, over the age of 18, living in Australia, have a prior diagnosis of prostate cancer, excluding metastatic cancer and those receiving palliative care, able to read and write in English and have access to the internet.

To participate do I need to be currently undertaking regular exercise / physical activity?
No – we are interested to hear from men who currently participate in regular exercise, as well as men who find it hard to motivate themselves to participate in regular exercise.

Do I need to be confident at using the internet to participate in this study?
No – we are interested to hear from men who feel they are confident at sourcing information from the internet, as well as men who might lack experience and confidence in using the internet to find information.

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Study Information

How much time will it take to participate?
Completing the online survey should take no longer than 20 minutes.

What will I be asked to do?
Participants will be asked to complete an online survey, containing four sections:

- Demographic information
- Prostate cancer history and treatment
- Internet search habits in relation to physical activity/exercise
- Physical activity/ exercise behaviour and preferences

Will I receive anything for participating?
There is no financial incentive for participating in this study.

Are there any risks associated with participating in this study?
Due to the nature of this study minimal risk is expected for participants. You may feel burdened by the time taken to participate in the study (20 minutes).

What are the benefits for you in participating in this study?
A summary of the study findings will be provided to participants in November 2016.   These may help you to improve your knowledge about searching for information online. By participating in the study you will be helping us to improve the quality of online support directed at men with a diagnosis of prostate cancer.

Can I withdraw from the study?
Participation is entirely voluntary you are not obliged to participate and if you choose to participate you can withdraw at any time. You do not have to give a reason for withdrawing from the study and changing your mind will not affect your relationship with the researchers, other relevant research personnel, or with the universities and partner organisations conducting the research.

What will happen to my information?
Information will be stored anonymously. To make sure you are not identifiable from your email address your email address will never be included in the data file containing your responses to the survey. Data will be confidentially stored on password protected computers. Only the project's researchers will have access to this data. Data will be stored for a minimum of 5 years, as per the University's policy. We plan to publish the results in scientific journals and provide reports to interested parties. Participants will not be personally identifiable in these results, only aggregated data will be published.

Who do I contact if I have questions about the project?
Charlotte Gelder, Lead Researcher - charlotte.gelder@student.adelaide.edu.au or

Camille Short, Research Supervisor – camille.short@adelaide.edu.au

What if I have a complaint or any concerns?
This study has been approved by the Subcommittee for Human Research in the School of Psychology. If you wish to speak with an independent person regarding raising a concern or complaint about the project, you can contact the convener of the subcommittee for Human Research in the School of Psychology, Dr Paul Delfabbro, (08) 8 313 4936 or paul.delfabbro@adelaide.edu.au. Any complaint or concern will be treated in confidence and fully investigated. You will be informed of the outcome.

If I want to participate, what do I do?
If you would like to participate please click on the 'Next' button to complete the consent form and survey.

THE UNIVERSITY of ADELAIDE — **Internet Use and Exercise**

Consent Form

1) I have read the information sheet on the prior page and agree to participate in this research project:

Do Australian men with prostate cancer have access to well-designed websites, with quality content information to encourage regular exercise?

2) The information sheet, so far as it affects me, fully explained what is required of me for this research and I give my consent to participate in this research freely.

3) Although I understand that the purpose of this research project is to improve the quality of health promotion for men with prostate cancer, it has also been explained that my involvement may not be of any benefit to me.

4) I have been informed that, while information gained during the study may be published, I will not be identified and my personal results will not be divulged.

5) I understand that I am free to withdraw from the project at any time.

6) I am aware that by selecting 'Yes' to the below that I am agreeing to the above comments and provide my informed consent to participate.

* 1. I agree to participate in this study

◯ Yes

◯ No

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Survey Instructions

Please read the questions carefully and answer as you see fit, there are no right or wrong answers.

Most questions are multiple choice.

Please answer all the questions as best you can.

If you make a mistake just click the incorrectly selected option and select the correct option.

Some questions have guidelines to help answer the question, guidelines are displayed in blue text.

Once you have completed the survey select 'complete', your responses will be automatically sent to the research team.

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Pre Screening Questions

This pre-screening section is to check you meet the criteria to be able to participate in the study.

If you do not meet the criteria the research team would like to thank you for your interest and time.

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Pre Screening Questions

* 2. Do you currently live in Australia?

◯ Yes

◯ No

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Pre Screening Questions

* 3. Have you ever been diagnosed with prostate cancer?

◯ Yes

◯ No

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Pre Screening Questions

* 4. Has your prostate cancer metastasised?

◯ No

◯ Yes

Metastasised means that the cancer has spread from the part of the body where it started (the primary site) to other parts of the body.

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Pre Screening Questions

* 5. Are you currently receiving palliative care?

○ No

○ Yes

Palliative care is provided to patients who are terminally ill. The aim of palliative care is to prevent and reduce suffering and to improve the patient's quality of life.

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Section A

This section contains questions exploring background information about you. This section helps us understand the characteristics of the people participating in the study.

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Section A

* 6. What is your current age?

[⬍]

* 7. What is your current marital status? (tick the most relevant box)

○ Married, de facto, living with partner

○ Separated or divorced

○ Widowed

○ Never married

○ Prefer not to answer

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Section A

* **8. Which of the following best describes your current primary employment situation? (tick the most relevant box)**

◯ Paid full-time employment (min 35 hrs per week)

◯ Paid part-time employment (less than 35 hrs per week)

◯ Casual employment

◯ Self-employed

◯ Student

◯ Retired

◯ Unemployed / looking for work

◯ On leave with pay

◯ On leave without pay

◯ Prefer not to answer

◯ Other (please specify)

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Section A

* 9. What is your residential postcode?

* 10. What kind of area do you currently live in? (tick the most relevant box)

- ◯ Major city
- ◯ Regional
- ◯ Remote

* 11. What is your highest level of education? (tick the most relevant box)

- ◯ Post graduate degree
- ◯ Bachelor degree
- ◯ Other post-school qualification
- ◯ High school completion – up to year 12, or equivalent
- ◯ High school completion – up to year 10, or equivalent
- ◯ Less than high school completion

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Section B

This section contains questions about your prostate cancer diagnosis and treatment. We are asking you these questions because it will help us gain a better understanding of the relationship between prostate cancer, internet use and exercise / physical activity.

If answering any of these questions raises any concerns for you, you may like to consider discussing your concerns with your doctor or contacting the Cancer Council Helpline 13 11 20. The Cancer Council Helpline is a free, confidential telephone information and support service that is run by specially trained staff.

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Section B

* **12. What year were you first diagnosed with prostate cancer?**

[▲▼]

* **13. What is the current stage of your prostate cancer? (tick the most relevant box)**

○ Diagnosed with prostate cancer awaiting treatment

○ Diagnosed with prostate cancer on active surveillance / watch and wait (no cancer treatment undertaken)

○ Currently undergoing treatment for prostate cancer

○ Finished prostate cancer treatment

○ I don't know

* **14. Which of the below treatments / care have you received? (tick all relevant box)**

☐ Active surveillance (watchful waiting)

☐ Surgery

☐ Radiation therapy

☐ Hormone therapy

☐ Chemotherapy

☐ None of the above

☐ Other (please specify)

[   ]

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Section C

This section contains questions about how confident you are at using the internet and how you go about searching the internet for information relating to exercise / physical activity.

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Section C

∗ 15. On average how many hours per week do you spend using the internet in your leisure time? (tick the most relevant box)

- ◯ Do not use the internet
- ◯ Less than 30 minutes
- ◯ Up to 1 hour
- ◯ Up to 2 hours
- ◯ Up to 3 hours
- ◯ Up to 4 hours
- ◯ Up to 5 hours
- ◯ Up to 6 hours
- ◯ Over 6 hours

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Section C

* 16. Rate how confident you are at doing each of the activities listed below on a scale of 0 to 100, 0 being not at all certain and 100 being highly certain.

	Can't do at all - 0	10	20	30	40	Moderately certain I can do - 50	60	70	80	90	Highly certain I can do - 100
Finding information on the Internet	○	○	○	○	○	○	○	○	○	○	○
Using the Internet to look for physical activity information and services	○	○	○	○	○	○	○	○	○	○	○
Using the Internet to interact with others (e.g., social media sites)	○	○	○	○	○	○	○	○	○	○	○
Using an interactive website to help you increase your physical activity (e.g., a website that helps to set goals, log activity, track progress and provide advice)	○	○	○	○	○	○	○	○	○	○	○
Using an application on your mobile phone to help you increase your physical activity (e.g., an app that helps you set goals, log activity and track progress)	○	○	○	○	○	○	○	○	○	○	○
Using a fitness tracker (e.g., a fitbit or jawbone)	○	○	○	○	○	○	○	○	○	○	○

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Section C

* 17. Since your prostate cancer diagnosis, have you used the internet to seek information on (tick all relevant boxes)

☐ Prostate cancer treatment e.g. suitable treatment options

☐ Prostate cancer support e.g. men's shed support groups

☐ Exercise / physical activity e.g. suitable exercise for cancer survivors

☐ Nutrition / healthy eating / diet e.g. suitable foods to eat to increase health

☐ None of the above

☐ Other (please specify)

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Section C

* **18. What was your main aim of using the internet in relation to these searches? (tick the most relevant box)**

◯ Seeking general information to improve your knowledge

◯ Help in preparation for an appointment with a health care professional

◯ Seeking further information to support information already provided by a health care professional

◯ Other (please specify)

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Section C

In today's society people often search the internet for information. This is done through a search engine like Google, Bing or Yahoo, where you type key words / phases / questions into a 'search bar', and the engine retrieves relevant results for you.

For example, if you were looking to find information on 'buying a new car' you may enter something like "new car" into the search engine.

The search results will then be listed. If you don't find what you are looking for you can always conduct a new search and try different search terms.
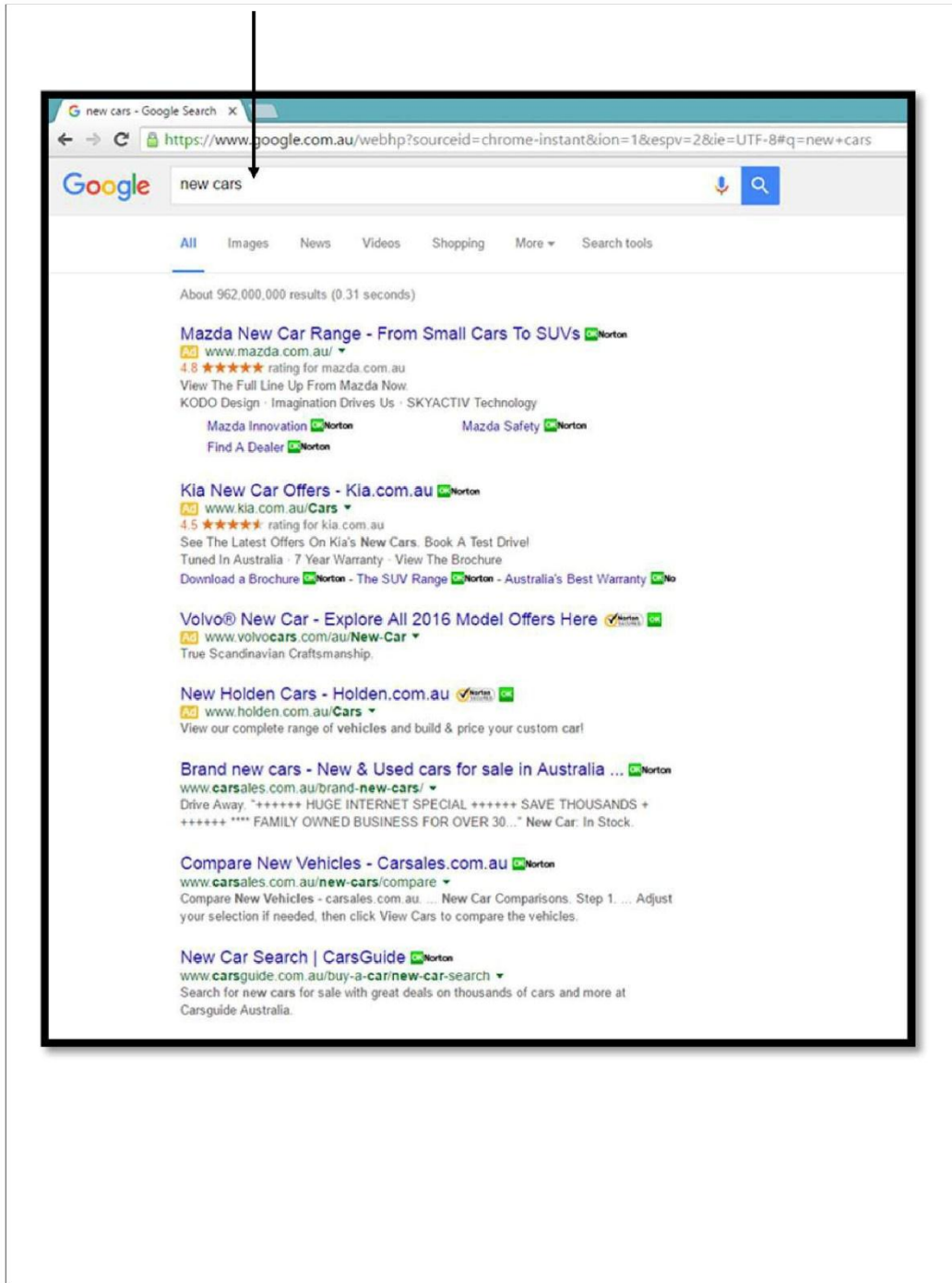
* 19. If you were to undertake a search on the internet for information relating to **EXERCISE** or **PHYSICAL ACTIVITY** what search words / phrases would you enter into the search box? You can list more than one word / phrase.

Search 1

Search 2

Search 3

Search 4

Search 5

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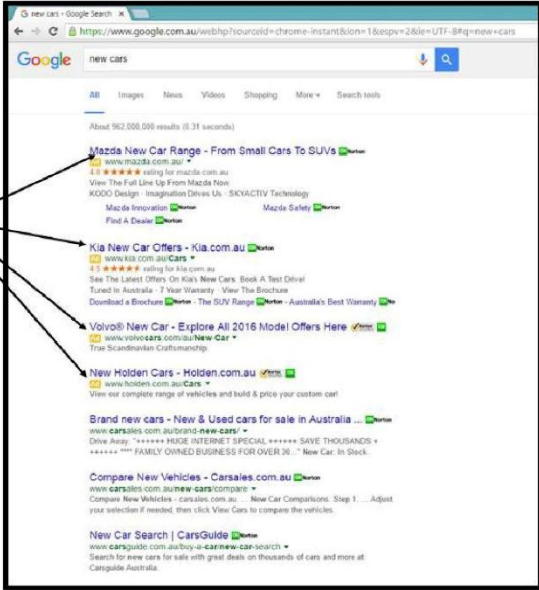
Section C

The arrows point to website suggestions as a result of the search you entered into the search bar.
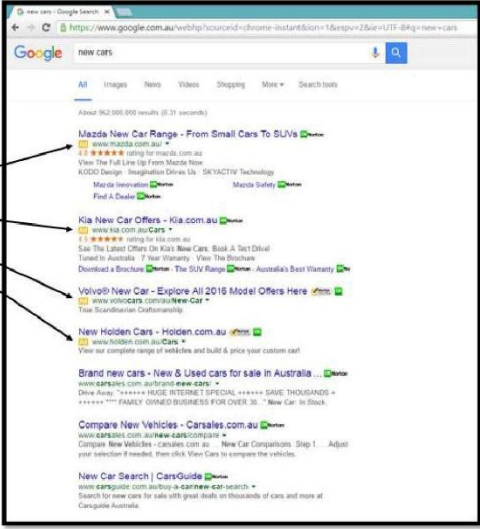
* **20. On average when you undertake an internet search using a search engine (e.g. Google) how many of the search result suggestions listed do you read and then click on the link provided to view a specific company / organisation's website? (tick the most relevant box)**

○ Only the 1st suggested website

○ The 1st & 2nd suggested websites

○ The 1st, 2nd or 3 suggested websites

○ Any of the first 4 suggested websites

○ Any of the first 5 suggested websites

○ Any website on the first page of the search results

○ Any website on the first or second page of the search results

○ Any website on the first three pages of search results

○ Any website on the first four pages of search results

○ Any website on the first five pages of search results

A paid advertisement website is usually displayed with 'Ad' at the front of the name of the website and appears at the top of the returned search results. The website appears near the top of the search results because the company have paid the search engine provider (e.g. Google) to have the website link near the top of the search results.

* 21. Do you ever click on the paid advertisements website links in the search results page? (tick the most relevant box)

○ Yes

○ No

○ I don't know

* 22. Did you know that the top search results were paid advertisements?

◯ Yes

◯ No
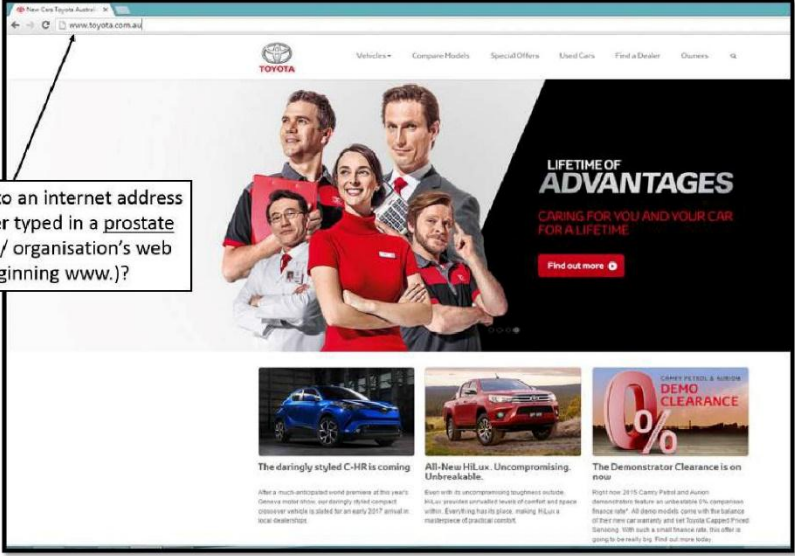
THE UNIVERSITY of ADELAIDE   **Internet Use and Exercise**

Section C

The arrow points to an internet address bar, have you ever typed in a prostate cancer company / organisation's web address (beginning www.)?

When you are on the internet do you ever enter an address beginning with 'www' to locate a specific company / organisation's website? For example, if you were searching for a new car you might enter:

www.toyota.com.au
www.honda.com.au
www.carsales.com.au
www.ancap.com.au <http://www.ancap.com.au>

* 23. Have you ever typed in a specific website address into the address bar of the internet to find information relating to prostate cancer?

○ Yes

○ No

THE UNIVERSITY of ADELAIDE Internet Use and Exercise

Section C

24. Please supply the names or website addresses of the <u>prostate cancer</u> company's / organisations?

Website 1

Website 2

Website 3

Website 4

Website 5

E.g., in relation to the new car example you could enter "www.toyota.com.au"

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Section C

* **25. Have you ever typed in a specific website address into the address bar of the internet to find information relating to <u>exercise</u> or <u>physical activity</u>?**

○ Yes

○ No

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Section C

26. Please supply the names or website addresses of the <u>exercise</u> / <u>physical activity</u> **companies / organisations?**

Website 1	
Website 2	
Website 3	
Website 4	
Website 5	

E.g., in relation to the new car example you could enter "www.toyota.com.au"

Internet Use and Exercise

Section C

Imagine this is the first page of a company's website you arrived at

If you wanted to find out about a specific vehicle you would need to click on the 'vehicle link'

Which would take you to this page

If you then wanted to find information on the Ascent car you would need to click on the 'Ascent link'

Which would take you to this page

If you can't find the information you are looking for how many links within a company's website would you click on before you stopped searching and moved on to another company's website?

Within an organisation's website there are a number of pages which contain information which might interest you. When you first enter a website you will find yourself on a page, but to find the information you are really interested in might mean you need to use your mouse to click on links within the page that will take you to another page within the site.

In this question we are trying to measure how well, or how long you spend on a specific company's website looking for information that interests you, or how quickly you leave the company's website because you are bored, or can't find the information you are looking for.

* 27. When you are on a specific organisation's website, on average how many pages within that website would you visit before moving on to view another website because you are unable to find what you are looking for? (tick the most relevant box)

○ 1 page (i.e. the first page you come to)

○ 2 pages

○ 3 pages

○ 4 pages

○ 5 pages

○ 6 pages

○ 7 pages

○ 8 pages

○ 9 pages

○ 10 plus pages

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Section C

* **28. In the past month which of the below social media applications have you used? (tick all relevant boxes)**

- [ ] Facebook
- [ ] Twitter
- [ ] Website blog / chatroom
- [ ] None of the above
- [ ] Other (please specify)

    [   ]

Internet Use and Exercise

THE UNIVERSITY of ADELAIDE

Section D

This section contains questions about your level of exercise / physical activity participation.

For the purposes of this study the recommend exercise / physical activity guidelines for adults are:

150 minutes a week of moderate-intensity, or 75 minutes a week of vigorous-intensity aerobic activity, preferably spread throughout the week.

Resistance training (muscle strengthening) activity which are moderate or high intensity, involving major muscle groups should be undertaken at least two time a week.

THE UNIVERSITY of ADELAIDE **Internet Use and Exercise**

Section D

* 29. Please rate your current confidence level of participating in regular exercise / physical activity (tick the most relevant box)

◯ Not at all confident

◯ Slightly confident

◯ Moderately confident

◯ Very confident

◯ Extremely confident

THE UNIVERSITY of ADELAIDE | **Internet Use and Exercise**

Section D

* 30. During a typical 7-day period (a week), how many times on average do you do the following kinds of exercise / physical activity for more than 10 minutes during your free time and on average how long would each session be?

	Average number of times per week	Average minutes per session
Strenuous exercise - **(Heart beats rapidly)** e.g. running, jogging, hockey, football, soccer, squash, basketball, judo, vigorous swimming, vigorous long distance bicycling	⬍	⬍
Moderate exercise - **(Not exhausting)** e.g. fast walking, baseball, tennis, easy bicycling, badminton, easy swimming, dancing	⬍	⬍
Mild exercise - **(Minimal effort)** e.g. yoga, fishing, bowling, golf, easy walking	⬍	⬍

In the first column enter the average number of times per week, you would engaged in the type of activity, e.g. if you usually participate in strenuous exercise on Monday and Wednesday, enter '2' in the first column.

In the second column enter the average number of minutes each session of activity lasts, e.g. if each session of strenuous exercise lasts on average 30 minutes, enter '30' in the second column.

If you do not generally undertake the activity enter '0' in both the average number of times per week and average minutes per session columns.

Only count exercise / physical activity sessions of 10 or more minutes undertaken during leisure time.

THE UNIVERSITY of ADELAIDE   **Internet Use and Exercise**

Section D

* **31. Has the amount of <u>aerobic exercise</u> you do changed since you were diagnosed with prostate cancer? (tick the most relevant box)**

○ No – I do the same amount of aerobic exercise now

○ Yes – I do MORE aerobic exercise now

○ Yes – I do LESS aerobic exercise now

THE UNIVERSITY of ADELAIDE Internet Use and Exercise

Section D

* **32. During a typical 7-day period (a week), how many times would you participate in resistance (strength) training? (tick the most relevant box)**

○ Do not undertake resistance training

○ Once a week

○ Twice a week

○ Three times a week

○ Four or more times a week

Resistance training includes; lifting, pushing, pulling and controlled lowering (e.g. using machine weights, free weights, body weight, stretchy-bands).

THE UNIVERSITY of ADELAIDE **Internet Use and Exercise**

Section D

* 33. Has the amount of <u>resistance training</u> you do change since you were diagnosed with prostate cancer? (tick the most relevant box)

○ No – I do the same amount of resistance training now

○ Yes – I do MORE resistance training now

○ Yes – I do LESS resistance training now

THE UNIVERSITY of ADELAIDE **Internet Use and Exercise**

Section D

* 34. Which of the following types of exercise / physical activity would you most like to do? (tick all relevant boxes)

- [ ] Walking
- [ ] Jogging
- [ ] Running
- [ ] Cycling
- [ ] Football
- [ ] Soccer
- [ ] Rugby
- [ ] Basketball
- [ ] Golf
- [ ] Weight Training / resistance training
- [ ] Swimming
- [ ] Yoga/Pilates
- [ ] Lawn bowls
- [ ] Racket sports
- [ ] Group aerobics
- [ ] DIY / Gardening
- [ ] None of the above
- [ ] Other (please specify)

[   ]

THE UNIVERSITY of ADELAIDE **Internet Use and Exercise**

Section D

* **35. Which type of exercise / physical activity session would you prefer to participate in? (tick all relevant boxes)**

☐ Exercise with other cancer survivors

☐ Organised group training sessions / team sports (not specifically for cancer survivors)

☐ Exercise on your own at home

☐ Exercise on your own outdoors

☐ Exercise on your own at a gym

☐ Exercise with friends and family at home

☐ Exercise with friends and family outdoors

☐ Exercise with friends and family at a gym / fitness centre / swimming pool

☐ None of the above

THE UNIVERSITY of ADELAIDE | **Internet Use and Exercise**

Section D

* 36. Do you currently have membership to a fitness centre / gym? (tick the most relevant box)

◯ Yes

◯ No

THE UNIVERSITY of ADELAIDE **Internet Use and Exercise**

Section D

* **37. What currently motivates you to participate in regular exercise / physical activity? (tick all relevant boxes)**

☐ Do not currently participate in regular exercise / physical activity

☐ Body image

☐ Weight loss

☐ Improve cardio fitness

☐ Increase muscle mass

☐ Reduce anxiety / depression

☐ Because a health professional advised you to

☐ Because a family member / friend advised you to

☐ You have always enjoyed exercise / sport

☐ Improve overall health

☐ Other (please specify)

THE UNIVERSITY of ADELAIDE **Internet Use and Exercise**

Section D

* **38. What do you see as your main barriers to exercise? (tick all relevant boxes)**

☐ No barriers enjoys exercise / physical activity

☐ Fatigue / tired

☐ Lack of time

☐ No motivation

☐ Injury

☐ Poor health

☐ Can't afford it

☐ Lack of facilities

☐ Feel old

☐ Feel fat

☐ Shy / embarrassed

☐ Incontinence

☐ Lack of knowledge of suitable exercises

☐ Lack of support from family and friends

☐ Never liked exercise

THE UNIVERSITY of ADELAIDE **Internet Use and Exercise**

Section D

* **39. I am confident I could engage in regular physical activity in the next 3 months if I wanted to do so? (tick the most relevant box)**

◯ 1 = Strongly disagree

◯ 2 = Moderately disagree

◯ 3 = Slightly disagree

◯ 4 = Neutral

◯ 5 = Slightly agree

◯ 6 = Moderately agree

◯ 7 = Strongly agree

THE UNIVERSITY of ADELAIDE   **Internet Use and Exercise**

Section D

* **40. Over the next _three months_, I intend to engage in physical activity ____ times per week? (tick the most relevant box)**

◯ Not at all

◯ Once a week

◯ Twice a week

◯ Three times a week

◯ Four times a week

◯ Five times a week

◯ Six times a week

◯ Seven times a week

THE UNIVERSITY of ADELAIDE **Internet Use and Exercise**

Section D

* **41. Since your diagnosis has a health care professional ever suggested regular exercise / physical activity as something you should undertake? (tick the most relevant box)**

○ Yes

○ No

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Section D

* **42. Since your diagnosis has a health care professional ever provided you with information on the benefits of exercise / physical activity? (tick the most relevant box)**

◯ Yes

◯ No

THE UNIVERSITY of ADELAIDE **Internet Use and Exercise**

Section D

* **43. What format was this advice in? (tick all relevant boxes)**

◯ Directed to a specific website

◯ Given a leaflet on exercise

◯ Given contact details of professionals who specialise in exercise

◯ Other (please specify)

THE UNIVERSITY of ADELAIDE Internet Use and Exercise

Section D

* **44. Do you _currently_ login to a specific website where you can record your health, diet, or exercise progress? (tick the most relevant box)**

○ Yes

○ No

Some websites offer users the ability to login to a personal area within their website where you can setup and monitor your health progress, e.g. record what you have eaten in a day, record how many times you have been to the gym, what exercises you undertook and for how long.

Internet Use and Exercise

Section D

45. What is the company name or web address of the website?

Website 1

Website 2

Website 3

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* 46. Do you <u>currently</u> use an app (e.g. a fitness watch) where you can monitor your exercise / physical activity? (tick the most relevant box)

◯ Yes

◯ No

There are a number of companies that now offer apps to help you monitor your actual exercise / physical activity levels. Usually this is done by wearing a watch / wrist band that monitors your activity level throughout the day, e.g. the number of steps you have taken, or your heart rate.

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47. What is the name of the company that produces the app?

Company / app name

Company / app name

Company / app name

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* **48. Since your diagnosis, have you participated in any exercise / physical activity programs designed to help you increase your participating in exercise / physical activity? (tick the most relevant box)**

◯ Yes

◯ No

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* 49. Who told you about the exercise / physical activity program? (tick the most relevant box)

○ General practitioner (GP)

○ Urologist

○ Other health care professional

○ Friend / Family

○ Prostate cancer support group

○ Cancer support group

○ Other (please specify)

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50. Please describe the exercise / physical activity program

Appendix C: Content Analysis of Internet Searches

Table C1

Content analysis of Internet searches.

#	Search phrases	# responses
Search one: Generic health/fitness searches		
1	Aerobic	1
2	Aerobic exercise program	1
3	**Exercise**	**7**
4	Exercise activity	1
5	Exercise fitness health	1
6	Exercise gym	1
7	Exercise options	1
8	Exercise plans	1
9	Exercise programes	1
10	Exercise programmes	1
11	Exercise programs	1
12	**Fitness**	**2**
13	Fitness activity	1
14	Fitness exercises	1
15	Fitness plan	1
16	Fitness training	1
17	Health improvement	1
18	Healthy activities	1
19	Healthy activity	1
20	How much exercise can I do	1
21	How to keep fit	1
22	Physical activities	1
23	Physical activity	1
24	**Physical exercise**	**2**
25	Physical training	1
26	Physical work out	1
27	Recommend levels of exercise	1
28	Wellness programs for men	1
29	Workout	1
30	Workout routines	1
Search two: Exercise & prostate cancer searches		
1	Best physical activity for prostate cancer	1
2	Does exercise help with dealing with Prostate cancer	1
3	Exercise + prostate	1
4	Exercise for prostate cancer	1
5	**Exercise prostate cancer**	**5**
6	Exercise prostate cancer site:edu	1

#	Search phrases	# responses
Search two: Exercise & prostate cancer searches		
7	Exercises for men with Prostate cancer	1
8	Exercises for prostate	1
9	Indoor exercises for prostate patience	1
10	Muscle strengthening + prostate	1
11	**Physical activity prostate cancer**	**2**
12	Physical activity prostate cancer site:edu	1
13	Physical fitness prostate cancer	1
14	Prostate cancer and exercise	1
15	**Prostate cancer exercise**	**6**
16	Prostate cancer exercise activity	1
17	Prostate Cancer Exercise regimes	1
18	**prostate cancer physical activity**	**2**
19	Prostate cancer physical exercise	1
20	Prostate cancer physical exercise activity	1
21	**Prostate exercises**	**4**
Search three: Physical activity searches		
1	Aquarobics	1
2	Core strength	1
3	**Gym**	**3**
4	Intensive exercise	1
5	Interval exercise	1
6	Jogging	1
7	Kettle bells	1
8	Personal trainers	1
9	Pilates	1
10	**Running**	**2**
11	Stretching	1
12	Swim programes	1
13	Swimming	1
14	Swimming pool	1
15	Training for indoor exercises	1
16	Walking	1
17	Walking exercise	1
18	Yoga	1
Search four: pre/post cancer treatment searches		
1	Exercise after abdominal surgery	1
2	**Exercise after prostate cancer**	**1**
3	Exercise and pelvic floor	1
4	Exercise post prostate cancer	1
5	**Exercise post Prostate Cancer surgery**	**1**
6	Exercise to help improve recovery from cancer	1

#	Search phrases	# responses
	Search four: pre/post cancer treatment searches	
7	Exercise: prostate cancer recovery	1
8	Exercises post surgery	1
9	Exercises pre-surgery	1
10	How much exercise should I do after an operation	1
11	**Incontinence physio rehab prostate cancer**	**1**
12	Physical activity: prostate cancer recovery	1
13	Post operative exercise for prostate	1
14	Post operative exercises	1
15	Post operative physiotherapy	1
16	Post prostetectomy	1
17	Prostate cancer post op exercise	1
18	Prostate recovery	1
19	Rehabilitation exercise prostate cancer	1
	Search five: Older age searches	
1	Exercise age group 60-70	1
2	Exercise for men over 70 years age	1
3	Exercise for over 70's	1
4	Exercise for seniors	1
5	Exercise Older Men	1
6	Exercises for 70 year olds	1
7	Over 60 exercise program	1
8	Seniors activity	1
9	Strength and conditioning over 50	1
	Search six: Cancer searches with no mention of prostate	
1	Cancer	1
2	Cancer Council of Aust	1
3	Cancer prevention and health	1
4	Exercise and cancer	1
5	Exercise cancer	2
6	Physical activity cancer	1
	Search seven: Prostate searches no mention of exercise	
1	Prostate cancer	1
2	Prostate cancer fatigue management	1
3	Prostate cancer immunology defence (also defense)	1
4	Prostate cancer side effects	1
5	Prostate side effects	1
	Search eight: Food / diet searches	
1	Diet	1
2	Foods to eat avoid prostate cancer	1
3	Prostate cancer diet exercise	1
4	Prostate cancer dietary options	1

#	Search phrases	# responses
	Search eight: Food / diet searches	
5	Prostate cancer proactive diet exercise	1
6	Weight loss	1
	Search nine: Local searches	
1	Fitness gyms Pennant Hills NSW	1
2	Gyms in my area	1
3	Gyms near my home	1
4	Local gyms	1
5	Mens exercise in Fremantle	1

Appendix D: Specific Web Addresses

Table D1

Web addresses entered by men relating to prostate cancer.

Website	Website category	Responses
Prostate Cancer Foundation Australia	**Cancer Organisation**	**13**
Cancer Council	**Cancer Organisation**	**3**
Prostate Cancer Treatment Research Foundation	Cancer Organisation	1
Cancer Australia	Cancer Organisation	1
Australian Cancer Research Foundation	Cancer Organisation	1
Cancer Council Victoria	Cancer Organisation	1
Australian Prostate Cancer Research	Cancer Organisation	1
Prostate Cancer Foundation America	Cancer Organisation	1
Prostate Cancer Institute	Cancer Organisation	1
Prostatepedia	Cancer Organisation	1
Shepparton prostate cancer support group	Cancer Organisation	1
Pathfinder	Cancer Organisation	1
Andrology Australia	**Men's Health**	**2**
ManUp	Men's Health	1
Movember	Men's Health	1
Mens Health Melbourne	Men's Health	1
Men's Health Complete Physiotherapy	Men's Health	1
Lions Club Australia	Men's Health	1
mayoclinic	Medical Advice	1
Garvan Institute of medical research	University / research	1
Independence Australia	Private company offering service	1
Continence Foundation of Australia	Private company offering service	1
drred.com.au	Private company offering service	1
www.craigallingham.com	Private company offering service	1
Utopia Wellness	Private company offering service	1
Urological Society of Australia and New Zealand (USANZ)	Professional	1
Unable to determine		13

Table D2

Web addresses entered by men relating to physical activity.

Website	Website category	Responses
Parkrun	Activity	1
The Man Plan	Men's Health	1
Fitness First	Private company offering service	2
North Sydney recreation facilities	Private company offering service	1
Hawthorn Aquatic Leisure Centre	Private company offering service	1
Ash Redman Fitness	Private company offering service	1
Mens Health Physiotherapy	Private company offering service	1
Physio.com.au	Private company offering service	1
Point Walter Physio	Private company offering service	1
Sports Care Physio	Private company offering service	1
Prostate Collaborative Cancer Research Alliance	University / research	1
Edith Cowen University	University / research	2
Institute for Physical Activity & Nutrition – Deakin University	University / research	1
Wikihow – muscle exercises	Wiki	1
The Australian	Newspaper	1

Appendix E: Literature Review for Website Criteria Selection

Table E1

Literature review for website criteria selection.

Model criteria	Author	Overview of systematic review/study	Research finding
Design	(Devine, Broderick, Harris, Wu, & Hilfiker, 2016)	Undertook a review of 100 top ranked US health websites in order to set measureable objectives for the US Department of Health and Human Services Office of Disease Prevention and Health Promotion for use in measuring website quality improvements.	Framework criteria: clearly labelled content categories, visually group related topics, text and background colours contrast.
Credibility & accountability	(Eysenbach, Powell, Kuss, & Sa, 2002)	Systematic review of 79 studies evaluating 5,941 websites, assessing elements used to assess the quality of health websites with the aim of developing a framework for future health website quality assessments.	Resulting framework criteria: statement of purpose; disclosure of ownership, disclosure of advertising, disclosure of sponsorship, disclosure of authorship, authors credentials disclosed, date of last update disclosed, references provided, feedback mechanisms provided.
Credibility & accountability	(Devine et al., 2016)	Undertook a review of 100 top ranked US health websites in order to set measureable objectives for the US Department of Health and Human Services Office of Disease Prevention and Health Promotion for use in measuring website quality improvements.	Framework criteria: purpose, association with commercial products, identify advertising content, authorship, privacy policy, feedback mechanism, display date updated.

Model criteria	Author	Overview of systematic review/study	Research finding
Participation	(Laranjo et al., 2015)	Systematic review of 12 studies investigating the influence of social networking sites on health behaviour change. Review consisted of 7,411 participants.	Facebook, Twitter and health specific social networking working sites were the most frequently used forms of social media and were effective at engaging people in health behaviour change.
Participation	(Moorhead et al., 2013)	Systematic review of 98 studies investigating the benefits and limitations of social media for health communication among the general public, patients, and health professionals.	Facebook, blogs and Twitter were the most commonly used forms of social media in health communication.
Participation	Online questionnaire developed for this study	Participants asked to identify the social media they had used in the past month.	Facebook, Twitter, Chartrooms / blogs most frequently used social media.
Usability	(Devine et al., 2016)	Undertook a review of 100 top ranked US health websites in order to set a measureable objectives for the US Department of Health and Human Services Office of Disease Prevention and Health Promotion to use to measure website quality improvements.	Framework criteria: present a clear visual hierarchy, provide easy search functionality.

Model criteria	Author	Overview of systematic review/study	Research finding
Usability	(Eysenbach et al., 2002)	Systematic review of 79 studies evaluating 5,941 websites, assessing elements used to assess the quality of health websites with the aim of developing a framework for future health website quality assessments.	Resulting framework criteria: Easy navigation.
Relevance	Online questionnaire developed for this study	Participants asked to identify the PA they would most like to participate in.	Most frequent responses: walking, DIY, gardening, weight training, swimming, golf, water sports, running / jogging, yoga / Pilates, classes run by health care professionals.
Relevance	Online questionnaire developed for this study	Participants asked to identify their motivations to undertake PA.	Most frequent responses: improvement to overall health, improve cardio fitness, enjoyment of physical activity, weight loss, increase muscle mass, reduce anxiety / depression, body image, advised to by a health professional, reduce side effects of cancer treatment, reduce fatigue, increase self esteem.
Relevance	Online questionnaire developed for this study	Participates asked to identify barriers to undertaking PA.	Most frequent responses: lack of time, fatigue, injury, incontinence, pain, increased age, lack confidence, pre-existing co-morbidities, lack motivation, lack of advice from health professionals, incontinence.

Model criteria	Author	Overview of systematic review/study	Research finding
Relevance	(Wolin, 2003)	Study of gender issues in advertising between 1970 and 2002.	Men preferred appropriate gender symbols.
Accuracy	(Hayes, Spence, Galvão, & Newton, 2009)	A position stand of the Australian Association for Exercise and Sport Science: recommendations for weekly levels of PA for cancer survivors.	General exercise participation for people undertaking or having completing cancer treatment is low to moderate intensity, 3-5 times/week for at least 20 minutes per session, involving aerobic and resistance.
Behaviour change techniques			
Social comparison	(Ashford, Edmunds, & French, 2010)	Systematic review - most effective ways to change self-efficacy to promote a healthy lifestyle and PA. 27 PA interventions, 5,501 participants.	Being able to compare an individual's performance with others was effective at increasing self-efficacy.
Providing information on consequences of behaviour	(Rothman, Bartels, Wlaschin, & Salovey, 2006)	Paper on how theory can inform practice in the promotion of healthy behaviour.	Gain framed messages are more effective when targeting behaviours that prevent a disease and loss framed messages are more effective when targeting behaviours that detect the presence of a disease.

Model criteria	Author	Overview of systematic review/study	Research finding
Providing information on consequences of behaviour	(Li, Cheng, & Fung, 2014)	Self-report study investigated the effects of message framing and PA, 100 older adult participants.	Gain-framed messaging was more effective than loss framed messages at increasing PA.
Providing information on consequences of behaviour	(Jacks & Lancaster, 2015)	Experimental study investigating the effects of nonverbal delivery style and message framing, in relation to the effectiveness of encouraging PA, 108 participants.	Men responded more favourably to eager and/or gain framed messages.
Barrier identification / problem solving	(French, Olander, Chisholm, & Mc Sharry, 2014)	Systematic review - changes in levels of PA after an intervention, in adults over 60 years of age. 24 studies, mean number of participants 349, mean age 69 years, mean age range 60-84.	Barrier identification was significantly associated with higher PA behaviour effect size when present.
Action planning	(Williams & French, 2011)	Systematic review - estimate the association of PA interventions and changes in PA behaviour in adults, using CALO-RE taxonomy of BCT. 27 studies, range of participants in each study was 33-874, mean 199, mean participant age 43.	Moderator analyses found that action planning was associated with significantly higher levels of both self-efficacy and physical activity.

Model criteria	Author	Overview of systematic review/study	Research finding
Prompt self-monitoring of behavioural outcome	(Olander et al., 2013)	Systematic review - identify techniques in changing obese individuals PA, self-efficacy behaviour, 58 articles, mean age of participants 50, age range 28-77.	Significant association between self-monitoring of behaviour and positive changes in PA.
Prompt self-monitoring of behavioural outcome	(Morgan, Lubans, Collins, Warren, & Callister, 2011)	Randomised control trial (RCT) – 12 month outcomes and process evaluation of SHED-IT RCT: An internet based weight loss program targeting men. 65 overweight males assigned to an internet group (n=34) or information only control group (n=31), mean age 35.9.	Internet group compliers who self-monitored as instructed maintained greater weight loss at 12 months than non-compliers and control.
Feedback on performance	(O'Brien et al., 2015)	Systematic review & meta-analysis on features of interventions associated with long-term effectiveness of PA interventions in adults aged 55-70 years, meta-analysis of 19 trials, totalling, 10,423 participants, mean age of 60.7 years, age range 55.0-67.6.	Subgroup analyses suggests interventions using feedback are effective at promoting long-term PA.
Feedback on performance	(Krebs, Prochaska, & Rossi, 2010)	Meta-analysis of computer tailored interventions for health behaviour change. Study included 88 articles, 25 studies specifically investigated increasing PA by providing computer tailored feedback based on individual assessments using computer, print or telephone communication.	Dynamic tailoring of feedback was more effective than static feedback on improving an individual's PA performance.

Model criteria	Author	Overview of systematic review/study	Research finding
Provides rewards contingent on effort or progress towards behaviours and successful behaviour	(French et al., 2014)	Systematic review - Changes in levels of PA after an intervention, in adults over 60 years of age, 24 studies, mean number of participants 349, mean age 69 years, mean range age range 60-84.	Providing rewards on contingent of successful behaviour were significantly associated with higher PA behaviour effect size wen present.
Provides rewards contingent on effort or progress towards behaviours and successful behaviour	(Williams & French, 2011)	Systematic review - Estimate the association of PA interventions and changes in PA behaviour in adults, using CALO-RE taxonomy of BCT. 27 studies, range of participants in each study was 33-874, mean 199, mean participant age 43.	Moderator analyses found reinforcing effort towards behaviour was associated with significantly higher levels of both self-efficacy and physical activity.
Instructions on how to perform behaviour	(Williams & French, 2011)	Systematic review - Estimate the association of PA interventions and changes in PA behaviour in adults, using CALO-RE taxonomy of BCT. 27 studies, range of participants in each study was 33-874, mean 199, mean participant age 43.	Moderator analyses found that, providing instruction was associated with significantly higher levels of both self-efficacy and physical activity.
Model / demonstrate the behaviour	(French et al., 2014)	Systematic review - Changes in levels of PA after an intervention, in adults over 60 years of age 24 studies, mean number of participants 349, mean age 69 years, mean age range 60-84.	Use of demonstrations of behaviour were significantly associated with higher PA behaviour effect size when present.

Model criteria	Author	Overview of systematic review/study	Research finding
Model / demonstrate the behaviour	(Campbell, 2012)	Hypothesized that reaching men electronically, with 90-second video clips on men's preventative health topics might provide effective health education. 2951 videos were viewed, total viewing time 85 hours.	Short men's health educational video may be an effective way of reaching men with important health information.
Information on where and when to perform behaviour	(Williams & French, 2011)	Systematic review - estimate the association of PA interventions and changes in PA behaviour in adults, using CALO-RE taxonomy of BCT. 27 studies, range of participants in each study was 33-874, mean 199, mean participant age 43.	Moderator analyses found that, providing instruction was associated with significantly higher levels of both self-efficacy and physical activity.
Prompt practice	(Fry & Neff, 2009)	Systematic review – investigated if periodic prompts / reminders relating to health promotion were associate to behaviour change 19 articles, 15,655 participants.	11 studies reported positive findings regarding the use of periodic prompts for health improvements. Effectiveness is enhanced if prompts are frequent and personal contact with a counsellor is included.
Prompt practice	(Kelders, Kok, Ossebaard, & Van Gemert-Pijnen, 2012)	Systematic review – investigate whether intervention characteristic and design affect adherence to health related intervention 101 articles on 83 interventions.	Increased interaction with a counsellor, more frequent intended usage, more frequent updates and more extensive employment of dialogue support significantly predicated better adherence.

Model criteria	Author	Overview of systematic review/study	Research finding
Prompt practice	(Webb, Joseph, Yardley, & Michie, 2010)	Systematic review and meta-analysis - investigate the use of the internet to promote health behaviour change of 85 studies, 42,236 participants.	Found text-messaging individuals was a highly effective way to promote interaction with the intervention. The use of other communication functions e.g. access to an advisor for further advice was also effective, suggesting even though the internet is suitable for delivering health interventions personal contact via e-mail, online or text message helps support behaviour change.
Plan social support / social change	(Olander et al., 2013)	Systematic review - identify techniques in changing obese individuals PA, self-efficacy behaviour 58 articles, mean age of participants 50, age range 28-77.	Significant association between use of social support and positive changes in PA.
Plan social support / social change	(Brouwer et al., 2011)	Systematic review – which intervention characteristics are related to more exposure to internet—delivered healthy lifestyle promotion interventions, 69 studies, mean number of participants per study 3,367, mean age range of 32-52.	Peer support / counsellor support were related to longer exposure to the website.
Plan social support / social change	(Kelders et al., 2012)	Systematic review – investigate whether intervention characteristic and design affect adherence to health related intervention 101 articles on 83 interventions.	Increased interaction with a counsellor, more frequent intended usage, more frequent updates and more extensive employment of dialogue support significantly predicated better adherence.

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Appendix F: Website Quality Assessment Tool

Table F1

Website quality assessment tool.

Model criteria	Assessment element	Assessment Options	Quality score	Assessment rubric	Evidence
Design	Do heading labels relate to the text below the heading?	In no places	0	0 – no headings used (one block of text) on any of the webpages assessed	(Devine, Broderick, Harris, Wu, & Hilfiker, 2016)
		In some places	1	1 – heading relate to subsequent text on 1 of the 3 webpages assessed	
		In most places	2	2 – heading relate to subsequent text on 2 of the 3 webpages assessed	
		In every place	3	3 – headings always relate to the subsequent text on the webpages assessed	
Design	Is the website visually appealing?	No visual appeal	0	0 - no visual appeal, unpleasant to look at, poorly designed, clashing/mismatched colours	(Devine et al., 2016)
		Little visual appeal	1	1 - little visual appeal – poorly designed, bad use of colour, visually boring	
		Some visual appeal	2	2 - some visual appeal – average, neither pleasant, nor unpleasant	
		High level of visual appeal	3	3 - high level of visual appeal – seamless graphics – consistent, professionally designed, very attractive, memorable	

Model criteria	Assessment element	Assessment Options	Quality score	Assessment rubric	Evidence
Credibility & accountability	Is the website developed by a credible source?	Source identified but legitimacy of source questionable	0	0 - source identified but credibility of source is questionable (e.g., commercial business with vested interest)	(Devine et al., 2016; Eysenbach, Powell, Kuss, & Sa, 2002)
		Appears to come from legitimate source, cannot be verified	1	1 - appears to come from a credible source, but it cannot be verified (e.g., has no webpage)	
		Developed by specialised commercial business	2	2 - developed by specialised commercial business with expertise and no ethical concerns (e.g., not a quick smoking app by Tabaco company)	
		Developed by gov, university or NGO	3	3 - developed by government, university or NGO	
		Developed in partnership across credible institutions	4	4 - developed in partnership across credible institutions NGO, Government, University, Business working together	
Credibility & accountability	[a] Does the website have a statement of purpose ?	Unable to determine	0	Can a clear statement of what the company's purpose is be found either on one of the three assessed pages, or within one click away from one of the assessed pages? (e.g., click on About us tab to find statement of purpose)	(Devine et al., 2016; Eysenbach et al., 2002)
		Yes	1		

Model criteria	Assessment element	Assessment Options	Quality score	Assessment rubric	Evidence
Credibility & accountability	Is there evidence of website ownership?	Unable to determine	0	Is there evidence of who owns the website, either on one of the three assessed pages or within one click away from one of the assessed? (e.g., name of company next to the copyright symbol)	(Eysenbach et al., 2002)
		Yes	1		
Credibility & accountability	[a] Is there evidence the website has a Privacy Policy?	Unable to determine	0	Is there evidence of a Privacy policy, either on one of the three assessed pages or within one click away from one of the assessed pages? Wording must state "Privacy Policy"	(Devine et al., 2016)
		Yes	1		
Credibility & accountability	[a] Is there evidence the website has an Advertising Policy?	Unable to determine	0	Is there evidence of an Advertising policy, either on one of the three assessed pages or within one click away from the assessed pages? Wording must state "Advertising Policy"	(Eysenbach et al., 2002)
		Yes	1		

Model criteria	Assessment element	Assessment Options	Quality score	Assessment rubric	Evidence
Credibility & accountability	[a] Does the company or website sponsors have a potential conflict of interest with positive public health outcomes?	Yes No	0 1	0 – yes - the company and / or its sponsors are inappropriate in relation to promoting positive public health messages, (e.g., a fast food company sponsoring a physical activity website). 1 – no – the company and its sponsors are appropriate in relation to promoting positive public health messages (e.g., a government department sponsoring the Cancer Council website)	(Devine et al., 2016; Eysenbach et al., 2002)
Credibility & accountability	[a] Is it easy to identify advertising from non-advertising content?	No No advertising present Yes	0 1 1	0 – no - not possible to distinguish between advertising and non-advertising content on any of the assessed webpages 1 – no advertising present – the website has no adverting on the assessed webpages 1 – yes – the website has advertising on the assessed webpages, it is easy to distinguish between advertisements and non-advertising content on the webpages	(Devine et al., 2016).

Model criteria	Assessment element	Assessment Options	Quality score	Assessment rubric	Evidence
Credibility & accountability	Is the author of the content appropriate?	No author mentioned	0	Author's name must be next to written articles on assessed webpages	(Devine et al., 2016; Eysenbach et al., 2002)
		Author is credible	1	0 – no author mentioned	
		Author is highly credible	2	1 – authors is named and is credible, but not a medical professional or academic	
				2 – authors named and are medical professionals or academics (Dr, / professor)	
Credibility & accountability	Is there evidence of when the content was published / last updated?	Not evident	0	Do the articles on the assessed pages have dates of when the articles were published	(Devine et al., 2016; Eysenbach et al., 2002)
		Evident	1	0 – not evident – no dates of publication shown	
		Very evident	2	1 – evident – dates of publication shown on some articles	
				2 – very evident – date of publication shown on all articles	

Model criteria	Assessment element	Assessment Options	Quality score	Assessment rubric	Evidence
Credibility & accountability	Is the content supported by easily accessible research articles?	No Yes	0 1	0 – no - empirical references never used 1 – yes - empirical references used within articles	(Eysenbach et al., 2002)
Credibility & accountability	Can a user provide feedback to the company who owns the website?	Unable to determine Yes	0 1	Within one of the three assessed webpages, or within one click away from one of the assessed webpages, is it possible to provide feedback to the website owner? (e.g., contact us tab) 0 – unable to determine 1 – yes – able to contact website owner	(Devine et al., 2016; Eysenbach et al., 2002)
Credibility & accountability	Is there evidence of the website being quality accredited by a known health accreditation body?	Unable to determine Yes	0 1	Is there evidence that the website has obtained a recognised quality accreditation standard? (e.g., HON, URAC, GOV-UK, EC quality criteria etc.)	
Participation	[a] Does the website have a Facebook page?	Unable to determine Yes	0 1	Does the website have a link to their Facebook page?	(Laranjo et al., 2015; Moorhead et al., 2013) Online survey
Participation	[a] Does the website have a Twitter account?	Unable to determine Yes	0 1	Does the website have a link to their Twitter account?	(Laranjo et al., 2015; Moorhead et al., 2013) Online survey

Model criteria	Assessment element	Assessment Options	Quality score	Assessment rubric	Evidence
Participation	[a] Does the website have other types of social media?	Unable to determine Yes	0 1	Does the website have links to other social media platforms? (e.g., Instagram, Google+)	(Laranjo et al., 2015; Moorhead et al., 2013) Online survey
Participation	[a] Can a participant add content to the website?	Unable to determine Yes	0 1	Does the website have its own chatroom where participants can engage in conversation?	(Moorhead et al., 2013). Online survey
Usability	[a] Does the website have a clear hierarchy structure for navigating within the website?	No visible headings at the top of the webpage to help with navigation to other pages Headings visible at the top of the webpages to help with navigation heading but title not intuitive for locating information	0 1	Does the website have clear headings at the top of the website, which if selected, provide clear subheadings and can be clicked on to navigate to the appropriate webpage? 0 – no visible headings at the top of the webpage to help with navigation to other pages 1 – headings visible at the top of the webpages to help with navigation heading but title not intuitive for locating information	(Devine et al., 2016)

		Headings visible at the top of the webpages to help with navigation and intuitively labelled but subheading structure ill-defined	2	2 – headings visible at the top of the webpages to help with navigation and intuitively labelled but subheading structure ill-defined 3 – heading visible at top of webpages to help with navigation, headings are intuitive and subheading structure is intuitive	
		Heading visible at top of webpages to help with navigation, headings are intuitive and subheading structure is intuitive	3		
Usability	[a] Does the website have an internal search function?	Unable to determine	0	Does the website have a search function within the website to help individuals locate information?	(Devine et al., 2016)
		Yes	1		

Model criteria	Assessment element	Assessment Options	Quality score	Assessment rubric	Evidence
Usability	[a] How easy is it to navigate the website?	Very difficult	0	In the opinion of the researcher how easy is it to navigate the website to find desired information?	(Eysenbach et al., 2002)
		Difficult	1		
				0 – hard to identify how to navigate to another webpage, requires multiple mouse clicks to read an article	
		Neutral	2	1 – navigational structure between webpages in place, but heading not intuitive and requires multiple mouse clicks to read an article	
		Easy	3	2 – navigational structure between webpages headings intuitive, appropriate hyperlinks within main body of text appear, but requires multiple mouse clicks to read an article	
		Very easy	4	3 – clearly visible navigational headings at the top of each webpage which are intuitive to use, hyperlinks within text are clear and minimal use of mouse clicks	
				4 – navigation throughout the assessed webpages is very intuitive	

Model criteria	Assessment element	Assessment Options	Quality score	Assessment rubric	Evidence
Relevance	[a] Does the website address at least one of the specific physical activities men would prefer to undertake?	Unable to determine Yes	0 1	Does the website provide information on any of the below: walking, DIY, gardening, weight training, swimming, golf, cycling, running/jogging, yoga/pilates	Online survey
Relevance	Does the website promote achieving at least one of the goals men or men with prostate cancer would like to achieve?	Unable to determine Yes	0 1	Does the website address at least one of the below goals: improvement to overall health, improve cardio fitness, enjoyment of physical activity, weight loss, increase muscle mass, reduce anxiety / depression, body image, advised to by a health professional, family member/friend advise?	Online survey
Relevance	Does the website acknowledge at least one potential barrier to PA perceived by men with prostate cancer?	Unable to determine Yes	0 1	Does the website address at least one of the below barriers for men to undertake PA: lack of time, fatigue, injury, incontinence, increased age, lack motivation, lack support form family & friends, poor health, feel fat, lack of knowledge of suitable exercises, incontinence	Online survey

Model criteria	Assessment element	Assessment Options	Quality score	Assessment rubric	Evidence
Relevance	Are prostate cancer specific exercises recommended on the website?	Unable to determine Yes	0 1	Does the website provide information on specific exercises to help with prostate cancer? (e.g., pelvic floor exercises, Kegel exercises etc.)	
Relevance	Is the website content (visual, language, design) targeted at men with prostate cancer	Not appropriate Generally appropriate but not specifically targeted at men with prostate cancer Specifically targeted at men with prostate cancer	0 1 2	Are visual images and PA instructions on the website suitable for men with prostate cancer 0 – visual images, language, design is clearly targeted at another audience (e.g., young males / females / children) 1 – visual images, language, design is targeted at older men or people with cancer 2 – visual images, language, design clearly targeted at men with prostate cancer (e.g., appropriate PA for men with prostate cancer)	(Lohan, Aventin, Oliffe, Han, & Bottorff, 2015; Wolin, 2003)

Model criteria	Assessment element	Assessment Options	Quality score	Assessment rubric	Evidence
Accuracy	What level of safety advice does the website provide for men with prostate cancer in relation to undertaking PA?	No – PA safety advise given	0	0 – no PA safety advise given	(Hayes, Spence, Galvão, & Newton, 2009)
		Yes - general advice is given	1	1 – general advice is given (e.g., how to warm up and cool down, or contact a health professional before undertaking PA)	
		Yes - cancer specific advice is given	2	2 - cancer specific advice is given (e.g., avoid public gyms if immune function is compromised due to treatment)	
		Yes - prostate cancer specific advice is given	3	3 - prostate cancer specific advice is given (e.g., avoid x y z if incontinence is an issue)	
Accuracy	Does the website suggest a weekly level of PA?	Unable to determine	0	Does the website suggest undertaking a certain level of PA in a week?	(Hayes et al., 2009)
		Yes	1		

Model criteria	Assessment element	Assessment Options	Quality score	Assessment rubric	Evidence
Accuracy	Does the website provide correct information on the levels of weekly activity recommended by the Australian Association for exercise and sport science position stand: optimising cancer outcomes through exercise?	No mention of recommended levels of PA	0	Aerobic exercise: Frequency - at least 3–5 times/week Intensity - moderate Duration - at least 20–30min continuous exercise per session Progression - Progression should be slower and more gradual for deconditioned patients or those who are experiencing severe side-effects of treatment. Patients should meet frequency and duration goals before they increase intensity	(Hayes et al., 2009)
		Recommended levels of PA In line with guidelines but incomplete	1		
		Recommended levels of PA completely in line with guidelines	2	Resistance training Type - resistance exercises should be dynamic in nature using both concentric (lifting and pushing/pulling phase) and eccentric (controlled lowering/returning phase) muscle contractions. Frequency - 1–3times/week Intensity - 50–80% 1-repetition maximum or 6–12 repetition maximum Duration - 6–10 exercises, 1–4 sets per muscle group Progression – as per aerobic	

Model criteria	Assessment element	Assessment Options	Quality score	Assessment rubric	Evidence
Behaviour change interventions	How does the website encourage competitive behaviour?	Does not mention competitive behaviour	0	(Michie et al., 2011) CALO-RE taxonomy 28 – Facilitate social comparison Does the website encourage competitive behaviour, either online where comparison of PA performance with other individuals is visible, or in a competitive social setting (e.g., running race)	(Ashford, Edmunds, & French, 2010).
		Language used	1		
		Ability to participate in online competition	2		
Behaviour change interventions	Does the website acknowledge the relationship between physical activity and behaviour?	No	0	(Michie et al., 2011) CALO-RE taxonomy. 1 – Provide information on consequences of behaviour in general Does the website provide information on benefits / consequences (gains / losses) of undertaking physical activity, or not undertaking physical activity? (e.g., gain framed, - by undertaking regular physical activity, you reduce your risk of dying from cancer by X?). Loss famed – by not undertaking regular physical activity, you increase the risk cardiovascular disease)	(Jacks & Lancaster, 2015; Li, Cheng, & Fung, 2014; Rothman & Salovey, 1997)
		Yes – Messaging strategy present but not clear	1		
		Yes – Predominantly using gain framed messages	2		

Model criteria	Assessment element	Assessment Options	Quality score	Assessment rubric	Evidence
Behaviour change interventions	Does the website promote the identification of barrier identification / problem solving?	No Yes	0 1	(Michie et al., 2011) CALO-RE taxonomy 8 – Barrier identification / problem solving Information provided to prompt an individual to think about potential barriers and identify ways to overcome them. Barriers can be cognitive, emotional, environmental, social and physical	(French, Olander, Chisholm, & Mc Sharry, 2014).
Behaviour change interventions	How does the website promote action planning in relation to PA?	Action planning not mentioned	0	(Michie et al., 2011) CALO-RE taxonomy	(Williams & French, 2011).
		Only talks about action planning	1	7 – Action planning Information provided to help individuals in planning how to achieve more physical activity, (e.g., minimum amount of activity that will be carried out, when, where and for how long)	
		Recommends another website / company for online action planning	2		
		Provides printable action plan	2		
		Provides online function to create action plan	3		
		Provides choice of print / online action plan	4		

Model criteria	Assessment element	Assessment Options	Quality score	Assessment rubric	Evidence
Behaviour change interventions	How does the website promote self-monitoring of PA?	Self-monitoring not mentioned	0	(Michie et al., 2011) CALO-RE taxonomy	(Morgan, Lubans, Collins, Warren, & Callister, 2011; Olander et al., 2013)
		Only talks about PA self-monitoring	1	17 – Prompt self-monitoring of behavioural outcome	
		Recommends another website / company for online PA self-monitoring	2	Website provides information on how an individual can keep a record of their PA (e.g., keeping a diary of the type of physical activity undertaken, how long for and intensity)	
		Provides printable format to monitor PA progress	2		
		Provides online function to monitor PA progress	3		
		Provides choice of print / online PA self-monitoring	4		

Model criteria	Assessment element	Assessment Options	Quality score	Assessment rubric	Evidence
Behaviour change interventions	How does the website provide feedback on PA performance?	No feedback on PA performance provided	0	(Michie et al., 2011) CALO-RE taxonomy

19 – Provide feedback on performance | (Krebs, Prochaska, & Rossi, 2010; O'Brien et al., 2015) |
| | | Generic feedback on PA progress is provided | 1 | Does the website provide feedback on an individual's actual progress against goals set and is this feedback generic or | |
| | | Personalised feedback on PA progress is provided | 2 | personalised (e.g., Dear Adam or Dear participant your plan was to achieve 150 minutes of exercise this week, you actually achieved 200 minutes) | |
| Behaviour change interventions | How does the website promote the use of rewards in progress to / or achieving PA goal? | No promotion of rewards | 0 | (Michie et al., 2011) CALO-RE taxonomy

12 – Provide rewards contingent on effort or progress towards behaviour | (French et al., 2014; Williams & French, 2011) |
| | | Only talks about using rewards on progress to / or achieving goal | 1 | Does the website encourage use of praise / reward for attempts at achieving a PA goal? | |
| | | Provides rewards on progress to / or achieving goal | 2 | 13 – Provide rewards contingent on successful behaviour
Does the website encourage use of praise / reward when an explicit goal is achieved? | |

Model criteria	Assessment element	Assessment Options	Quality score	Assessment rubric	Evidence
Behaviour change interventions	How does the website give instructions on how to undertake a particular PA (excluding video)?	No instructions on how to undertake PA	0	(Michie et al., 2011) CALO-RE taxonomy 21 – Provide instruction on how to perform the behaviour Encourages PA by giving written or diagrammatical instructions on how to undertake the physical activity (e.g., instructions on how to do pelvic floor exercises)	(Williams & French, 2011).
		Only written instructions on how to undertake PA	1		
		Only diagrams on how to undertake PA	1		
		Written instructions and diagrams on how to undertake PA	2		
Behaviour change interventions	Does the website use videos to demonstrate how to perform a certain PA?	No	0	(Michie et al., 2011) CALO-RE taxonomy 22 – Model / demonstrate the behaviour Uses a visual demonstration of how to undertake PA (video)	(Campbell, 2012; French et al., 2014)
		Yes	1		

Model criteria	Assessment element	Assessment Options	Quality score	Assessment rubric	Evidence
Behaviour change interventions	Does the website give information on when & where to perform PA?	No	0	(Michie et al., 2011) CALO-RE taxonomy	(Williams & French, 2011) Online survey
		Yes	1	20 – Provide information on where and when to perform the behaviour Does the website give information on when and where an individual can perform PA (e.g., at home, in a fitness facility and at what time)	
Behaviour change interventions	How does the website provide prompts to undertake PA?	No prompts provided	0	(Michie et al., 2011) CALO-RE taxonomy	(Fry & Neff, 2009; Kelders, Kok, Ossebaard, & Van Gemert-Pijnen, 2012; Webb, Joseph, Yardley, & Michie, 2010)
		E-mail	1		
		SMS	1	26 – Prompt practice Does the website provide prompts / reminders to individuals to undertake physical activity?	
		More than one method of prompt	2		
		Telephone (councillor)	2		

Model criteria	Assessment element	Assessment Options	Quality score	Assessment rubric	Evidence
Behaviour change interventions	Are prompts personalised?	Prompts not provided	0	0 – website does not use prompts	(Bottorff et al., 2015; Krebs et al., 2010)
		Prompts are generic	1	1 – website provides prompts to individuals but the prompt is generic	
		Prompts are personalised	2	2 – website provides prompts and the prompts at personalised to the individual (e.g., use of individuals name and comments in relation to their specific activity / behaviour)	
Behaviour change interventions	How does the website promote the use of social support to undertake PA?	Social support not mentioned	0	(Michie et al., 2011) CALO-RE taxonomy	(Brouwer et al., 2011; Kelders et al., 2012; Olander et al., 2013) Online survey
		Join a specific group activity	1	29 – Plan social support / social change Does the website provide information on encouraging an individual to seek social support to carry out physical activity (e.g., participate in a group activity / undertake PA with friends / family)	
		Join a gym/fitness facility	1		
		Family/friends	1		
		Family/friends/join group exercise activity	1		

[a] Item not included in shortened version of quality assessment tool

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Appendix G: Website Quality Scores

Table G1

Website quality assessment ranking by company - using full version of website quality assessment tool.

Company name	Search term	Content analysis group	Type of website	Total quality score	Grade
Webmed	Exercise	Generic health/fitness	Medical advise	49	Silver
Prostate Cancer UK	Prostate cancer physical activity	Exercise & prostate cancer	Cancer organisations	46	Silver
HelpGuide.org	Exercise	Generic health/fitness	Medical advise	45	Silver
Cancer Council Australia	Cancer Council Australia	Websites suggested by men	Cancer organisations	43	Silver
Better Health	Physical exercise	Generic health/fitness	Government	41	Silver
Medline Plus - U.S. National Library of Medicine	Exercise	Generic health/fitness	Government	41	Silver
Chartered Society of Physiotherapy	Incontinence physio rehab prostate cancer	Pre/post cancer treatment	Professional sites	41	Silver
Seattle Cancer Care Alliance	Exercise prostate cancer	Exercise & prostate cancer	Cancer organisations	40	Silver
Prostate Cancer Foundation America	Exercise prostate cancer	Exercise & prostate cancer	Cancer organisations	38	Silver

Company name	Search term	Content analysis group	Type of website	Total quality score	Grade
Zero the End to Prostate Cancer	Exercise prostate cancer	Exercise & prostate cancer	Cancer	38	Silver
National Cancer Institute (USA)	Physical activity prostate cancer	Exercise & prostate cancer	Government	38	Silver
Health Direct	Physical exercise	Generic health/fitness	Government	37	Silver
Andrology Australia	Andrology Australia	Websites suggested by men	Medical advise	37	Silver
Virginia Mason	Exercise after prostate cancer	Pre/post cancer treatment	Private companies (offering specific services)	37	Silver
Pelvic Floor First	Prostate exercises	Exercise & prostate cancer	Professional sites	37	Silver
The Care Giving Partnership	Exercise after prostate cancer	Pre/post cancer treatment	Private companies (offering specific services)	36	Silver
Exercise is medicine (USA)	Exercise	Generic health/fitness	Professional sites	36	Silver
Healthline	Prostate exercises	Exercise & prostate cancer	Medical advise	35	Silver
Mayo Clinic	Exercise	Generic health/fitness	Medical advise	35	Silver
Harvard University	Exercise prostate cancer	Exercise & prostate cancer	University/research	34	Silver
World Cancer Research Fund International	Prostate cancer physical activity	Exercise & prostate cancer	Cancer organisations	33	Silver

Company name	Search term	Content analysis group	Type of website	Total quality score	Grade
Bodybuilding.com	Exercise	Generic health/fitness	Private companies (health information only)	33	Silver
UCLA Health	Prostate exercises	Exercise & prostate cancer	University/research	33	Silver
Prostate Cancer Foundation Australia	Prostate Cancer Foundation Australia	Websites suggested by men	Cancer organisations	32	Silver
Easy Health Options	Prostate exercises	Exercise & prostate cancer	Private companies (health information only)	32	Silver
Exercise Right - Exercise & Sports Science Australia	Exercise	Generic health/fitness	Private companies (health information only)	32	Silver
Harvard University	Prostate exercises	Exercise & prostate cancer	University/research	32	Silver
Science Daily	Physical exercise	Generic health/fitness	Private companies (health information only)	31	Silver
MedicineNet	Physical exercise	Generic health/fitness	Medical advise	31	Silver
Livestrong	Exercise post Prostate Cancer surgery	Pre/post cancer treatment	Private companies (health information only)	29	Silver
Patient Resources	Exercise prostate cancer	Exercise & prostate cancer	Cancer organisations	27	Silver
Cool Running	Running	Activities	Private companies (health information only)	27	Silver

Company name	Search term	Content analysis group	Type of website	Total quality score	Grade
Mens Fitness Magazine	Fitness	Generic health/fitness	Private companies (health information only)	26	Silver
Fitness Magazine	Fitness	Generic health/fitness	Private companies (health information only)	25	Bronze
Runners World Magazine	Running	Activities	Private companies (health information only)	25	Bronze
Prostate Cancer Institute	Exercise prostate cancer	Exercise & prostate cancer	Cancer organisations	24	Bronze
Pop Sugar	Fitness	Generic health/fitness	Private companies (health information only)	23	Bronze
University of California	Exercise post prostate cancer surgery	Pre/post cancer treatment	University/research	20	Bronze

Table G2

Website quality assessment ranking by company - using shortened version of website quality assessment tool.

Company name	Search term	Content analysis group	Type of website	Total quality score	Grade
Prostate Cancer Foundation America	Exercise prostate cancer	Exercise & Prostate Cancer	PDF	29	Silver
Eileen Lavis - Rathmines Physiotherapy	Exercise post Prostate Cancer surgery	Pre / Post Cancer Treatment	PDF	24	Silver
Exercise tips for post-op prostate patients	Exercise after prostate cancer	Pre / Post Cancer Treatment	YouTube	20	Silver
The free dictionary	Physical exercise	Generic Health / Fitness	Wikipedia / dictionaries	18	Bronze
Newsmax	Prostate exercises	Exercise & Prostate Cancer	Newspapers	17	Bronze
Exercise is Medicine Australia	Exercise after prostate cancer	Pre / Post Cancer Treatment	PDF	16	Bronze
Healing Well	Exercise post Prostate Cancer surgery	Pre / Post Cancer Treatment	Blogs	16	Bronze

Company name	Search term	Content analysis group	Type of website	Total quality score	Grade
Physio-pedia	Incontinence physio rehab prostate cancer	Pre / Post Cancer Treatment	Wikipedia / dictionaries	15	Bronze
Wikipedia	Fitness	Generic Health / Fitness	Wikipedia / dictionaries	15	Bronze
Yoga Exercises for Prostate	Prostate exercises	Exercise & Prostate Cancer	YouTube	15	Bronze
Wikipedia	Exercise	Generic Health / Fitness	Wikipedia / dictionaries	14	Bronze
Wikipedia	Running	Activities	Wikipedia / dictionaries	14	Bronze
The Cancer Forums	Exercise post Prostate Cancer surgery	Pre / Post Cancer Treatment	Blogs	12	Bronze
The Benefits of Exercise	Physical exercise	Generic Health / Fitness	YouTube	12	Bronze
The Guardian	Running	Activities	Newspapers	11	Bronze

Company name	Search term	Content analysis group	Type of website	Total quality score	Grade
Prostate Cancer UK	Incontinence physio rehab prostate cancer	Pre / Post Cancer Treatment	PDF	11	Bronze
Wikipedia	Fitness	Generic Health / Fitness	Wikipedia / dictionaries	8	Bronze
Reddit	Fitness	Generic Health / Fitness	Blogs	6	Bronze

Table G3

Mean quality assessment scores by model criteria and website type (using full website quality assessment tool).

| Website category	Mean and standard deviation quality assessment scores							
	Design (range 0-6)	Credibility & accountability (range 0-17)	Participation (range 0-4)	Usability (range 0-8)	Relevance (range 0-6)	Accuracy (range 0-6)	Behaviour change techniques (range 0-26)	Total quality score (range 0-73)
Cancer organisations (*N*=9)	5.56(0.88)	10.11(1.90)	2.78(1.20)	6.56(1.51)	4.11(1.27)	2.67(1.58)	3.89(2.09)	35.67(7.26)
Government (*N*=4)	5.25(0.96)	12.25(0.96)	2.75(0.50)	7.00(1.15)	3.00(0.82)	4.00(1.41)	5.00(4.24)	39.25(2.06)
Private companies (health information only) (*N*=10)	5.10(0.57)	8.10(1.97)	2.60(1.26)	4.60(2.12)	2.30(0.82)	1.20(1.23)	4.40(2.27)	28.30(3.56)
Medical advise (*N*=6)	5.33(0.52)	12.83(1.33)	2.83(0.75)	5.17(1.23)	3.33(0.52)	3.00(0.89)	6.17(4.96)	38.67(6.86)
Private companies (offering specific services) (*N*=2)	5.00(0.00)	11.00(2.80)	3.50(0.70)	5.00(0.00)	5.00(0.00)	3.00(0.00)	4.00(1.40)	36.50(0.70)
Professional sites (*N*=3)	5.67(0.58)	10.00(1.73)	2.00(0.00)	6.67(1.53)	4.33(0.58)	3.67(0.58)	5.67(1.15)	38.00(2.65)
University/ research (*N*=4)	5.50(0.58)	7.75(2.50)	1.50 (1.29)	5.50(1.29)	3.50(1.00)	2.75(1.89)	3.25(0.96)	29.75(6.55)

Table G4

Mean quality assessment scores by model criteria and website type (using shortened version of website quality assessment tool).

Website category	Mean quality assessment scores							
	Design (range 0-6)	Credibility & accountability (range 0-12)	Participation (range 0-0)	Usability (range 0-0)	Relevance (range 0-6)	Accuracy (range 0-6)	Behaviour change techniques (range 0-26)	Total average (range 0-56)
Wikipedia/ dictionaries (*N*=6)	4.17(0.41)	3.83(1.33)	0.00	0.00	3.00(1.10)	1.50(1.38)	1.50(1.38)	14.00(3.67)
Newspapers/ radio/TV (*N*=2)	4.50(0.71)	6.00(1.41)	0.00	0.00	1.50(0.71)	1.50(2.12)	0.50(0.71)	14.00(4.24)
PDF (*N*=4)	5.50(0.58)	6.25(1.89)	0.00	0.00	2.75(2.22)	3.25(2.50)	2.25(2.22)	20.00(8.04)
Blogs (*N*=3)	2.00(1.00)	5.00(1.00)	0.00	0.00	3.00(2.65)	0.67(0.58)	0.67(0.58)	11.33(5.03)
YouTube (*N*=3)	6.00(0.00)	4.33(1.15)	0.00	0.00	3.00(2.00)	1.33(1.15)	1.00(1.00)	15.67(4.04)

Appendix H: Website Screenshots

Visually Appealing Websites
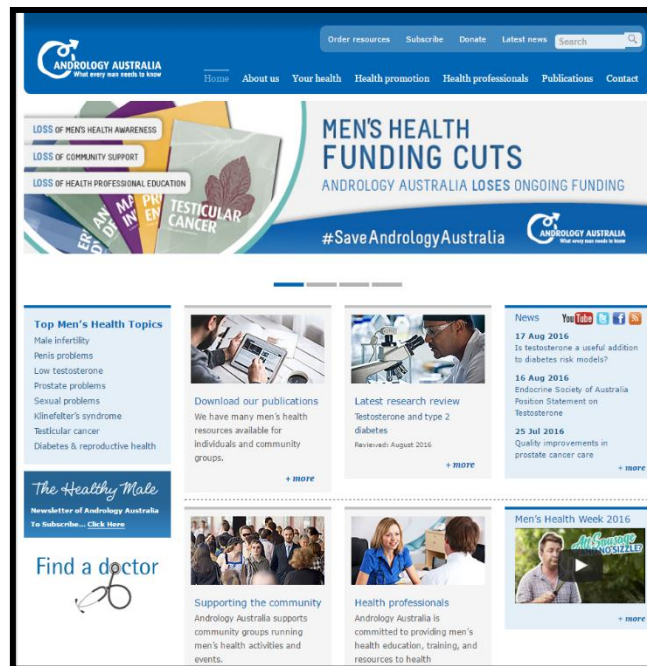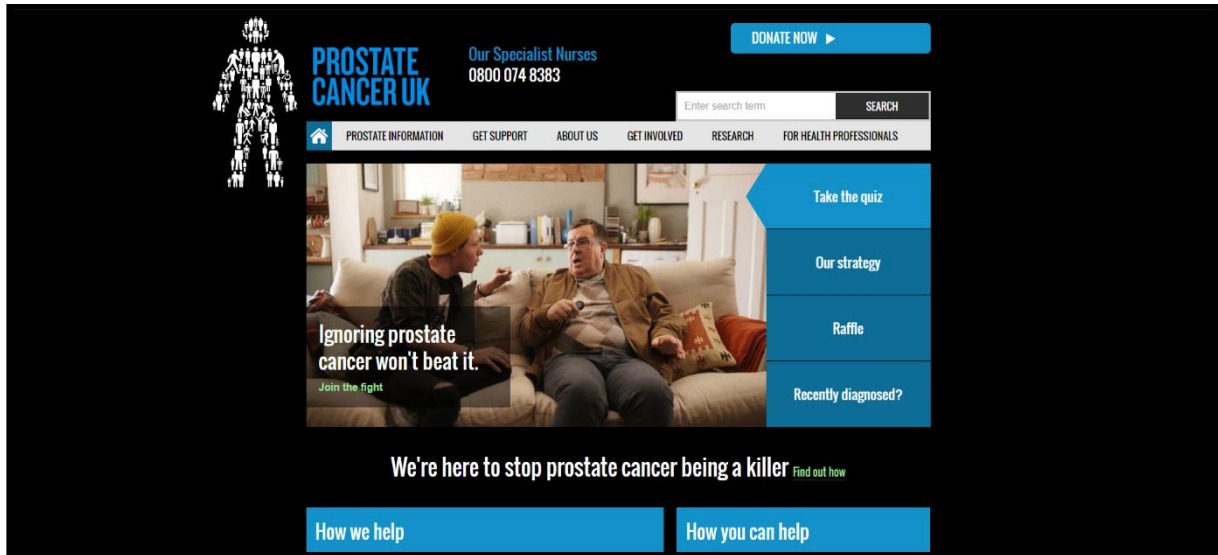
Inappropriate Visual Website Images