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## Review Article

## Evidence, safety and recommendations for when to use acupuncture for treating cancer related symptoms: a narrative review

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## ABSTRACT

**Background:** Recently research on acupuncture for cancer related symptoms has significantly increased. To what extent have medical professionals recommended to use acupuncture in light of that evidence? **Methods:** Evidence of effectiveness and safety was found by searching Pubmed for reviews to identify for what conditions and general results. Publications that recommend acupuncture in oncology were searched in the database of an ongoing general search for publications that recommend acupuncture. This database was developed by searching google for publications that recommend the use of acupuncture with the terms 'name of symptom' and 'clinical practice guideline' or 'treatment guideline'.

**Results:** Acupuncture is moderately or weakly effective for 19 symptoms in patients with cancer and cancer survivors. Acupuncture is a safe therapy in cancer care if administered by trained acupuncturists. Acupuncture is targeted to improve symptoms associated with the cancer and different cancer treatments, not to treat the cancer itself. More than 350 publications by clinical practice guideline groups and expert groups, including public health statements made by national and government agencies recommended the use of acupuncture for 61 cancer related symptoms many with positive evidence of effectiveness.

**Conclusion:** The strength of evidence is weak for many indications, however the evidence for many standard therapies is either not very strong or if stronger, the incidence of adverse events is more, which makes acupuncture a treatment option despite the weak evidence. We have found evidence that many oncologists around the world have started to incorporate acupuncture into the treatment of various cancer related symptoms.

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## 1. Introduction

Acupuncture is increasingly used by patients with cancer to help treat symptoms of cancer, side effects of cancer therapies and in cancer survivors,<sup>1,2</sup> with a growing body of research and evidence in cancer care.<sup>2–4</sup> This short narrative review summarizes evidence of effectiveness and safety of acupuncture for a range of symptoms in cancer patients and emergent evidence regarding how oncology specialists and oncology groups have digested that evidence and recommend acupuncture in patients with cancer and in cancer survivors.

## 2. Methods

Publications that describe evidence of effectiveness and safety in the use of acupuncture in different cancer related symptoms were searched for by identifying Systematic Reviews and review articles in Pubmed using 'acupuncture', 'cancer', 'review', 'clinical trials' as search terms. Publications that were found were then hand searched to examine the papers they cite to identify other publications. All publications found by this snow-balling approach were reviewed to identify what conditions are mentioned, whether there was any positive evidence and the relative strength of that evidence. A similar search found publications that discussed the safety of acupuncture, also in oncology. The search strategy for publications that recommend acupuncture involved an evolving snowball approach on the google search engine using key words such as 'clinical practice guideline', 'treatment guideline' and the name of the

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symptom. This approach led not only to article publications but many websites, each of which was searched for further references or websites, these links often led to others. Details of this search strategy are described elsewhere.<sup>5</sup>

### 3. Results

#### 3.1. Effectiveness of acupuncture in oncology

The November 1997 US National Institutes of Health ‘Consensus Development Conference on Acupuncture’ evaluated the available clinical trial evidence for acupuncture concluding that acupuncture was effective for three conditions, including chemotherapy induced nausea and vomiting (CINV).<sup>6</sup> Over the next few years other groups also concluded that acupuncture was effective for CINV,<sup>7,8</sup> but there was as yet too little research to draw clear conclusions about other cancer-related symptoms. In the years since then, clinical trial research on acupuncture has grown significantly.<sup>9</sup> During this time the number of studies in cancer patients also increased.<sup>1,2</sup> There is a growing body of research on acupuncture in cancer care and cancer-related symptoms where many positive findings have emerged.<sup>2–4</sup> The strength of evidence is not yet strong for symptoms other than CINV,<sup>10,11</sup> but it has increased so that authors now recognize that acupuncture may be effective for cancer pain,<sup>10,11</sup> aromatase inhibitor induced arthralgia (in breast cancer), fatigue, recovery after colorectal cancer resection<sup>11</sup> as well as symptoms also seen commonly in cancer patients such as post-operative nausea and vomiting (PONV), anxiety, depression and sleep problems.<sup>10,11</sup> The following symptoms have been found to have clearly positive or trend positive findings in reviews:<sup>5</sup> CINV,<sup>12–22</sup> PONV,<sup>14</sup> post-op pain,<sup>23–25</sup> cancer related pain,<sup>14,17,19,21,23,26–29</sup> arthralgia from aromatase inhibitors,<sup>30–33</sup> xerostomia,<sup>14,34–39</sup> hot flashes (especially in breast cancer),<sup>12,14,17,22,23,31,40–42</sup> fatigue,<sup>17,21,22,31,34,43–47</sup> depression,<sup>48,49</sup> anxiety,<sup>48–50</sup> sleep problems,<sup>48–51</sup> chemotherapy-induced peripheral neuropathy (CIPN),<sup>31,52–55</sup> hiccups,<sup>21,22,56</sup> dyspnoea in palliative care,<sup>57</sup> radiation induced nausea and vomiting (RINV),<sup>34</sup> lymphoedema,<sup>31,58</sup> leucopenia,<sup>22</sup> post-op gastroparesis,<sup>21,59</sup> and quality of life in cancer patients.<sup>21,45,48</sup>

Recently we also find oncologists recognizing that acupuncture has a further potential. Many cancer patients have ‘symptom clusters’<sup>60</sup> rather than single symptoms. From the above evidence we can see that acupuncture appears able to treat not only single symptoms but probably also symptom clusters, making it a somewhat unique therapy among treatment options in oncology practice.<sup>61</sup> Further, some reviews have found that acupuncture may be one of the best treatment options for certain cancer related symptoms “To date, only acupuncture and exercise have been demonstrated to result in a statistically significant improvement in aromatase inhibitor-associated symptoms,”<sup>62</sup> these results have been recently confirmed.<sup>63</sup> On the other hand, for many of the symptoms for which acupuncture is used, the evidence is still relatively weak. A rationale for recommending acupuncture when the evidence is still weak is stated by Berger et al “Although evidence of the beneficial effects on fatigue outcomes is not particularly strong for interventions such as acupuncture, massage, or bright light, use of these therapies in clinical practice for fatigue management can be rationalized based on the fact that they are generally well tolerated and may be efficacious in particular fatigue contexts or may favourably affect symptoms that amplify fatigue, including anxiety, depression, sleep disturbance, and pain.”<sup>64</sup> In their 2013 review Towler et al stated their rationale thus: “Acupuncture should be considered for symptom management where there are limited treatment options, using current peer-reviewed guidelines and clinical reasoning.”<sup>65</sup> These arguments seem to be gaining ground among oncology groups where treatment challenges are severe

and effective therapies often hard to establish. Patients demand other options since they are often under-treated for their cancer symptoms<sup>66,67</sup> and usual treatments can result in inadequately controlled symptoms.<sup>61,68</sup> The recent breast cancer guideline from the German National Gynaecological Oncologist Group recommends acupuncture for 13 different symptoms in breast cancer treatment despite the weak evidence for many of them.<sup>69</sup>

#### 3.2. Safety of acupuncture

In general acupuncture is considered to be a safe therapy when practiced by qualified practitioners<sup>8,11,70–73</sup> with publications in oncology describing it as a safe therapy.<sup>74–76</sup> Acupuncture is also seen to be safe in paediatrics<sup>77–79</sup> and in paediatric cancer patients it is said to be safe,<sup>78,80–82</sup> feasible and well tolerated.<sup>78</sup>

#### 3.3. Recommendations to use acupuncture in oncology

When a therapy has evidence of effectiveness and safety it starts to be considered as a treatment option by Clinical Practice Guideline (CPG) development groups.<sup>83</sup> A recent publication based on an extensive search through August 2017 for publications that recommend acupuncture has found acupuncture to be more extensively recommended by CPG and expert groups than was previously thought.<sup>5</sup> These recommendations generally appear to be evidence based.<sup>5</sup> Since August 2017 searching for such publications has continued. At present the current number of recommendations to use acupuncture in the search database is for over 5100 recommendations covering more than 340 different symptoms [Birch et al, unpublished data]. How many of these are cancer related? What kind of groups have made these recommendations?

Table 1 summarizes current unpublished data from the ongoing search in relation to cancer related symptoms covering 61 symptoms in cancer care [Birch, unpublished data]. Publications recommending acupuncture in cancer patients starts to emerge in the late 1990s, gradually increasing in the early 2000s and in recent years have more rapidly increased. This trend can be seen in figure one in a previous paper by the authors.<sup>5</sup> Some of the recommendations appear in updated publications from the same sources and thus the number of recommendations includes several for a symptom from the same source. The total number of institutions and groups that make recommendations is thus smaller than the total number of recommendations per symptom.

Looking at the most commonly indicated symptoms among the more than 5100 recommendations found to date, CINV, cancer pain, cancer related fatigue, cancer related hot flashes and associated symptoms of PONV, post-op pain, anxiety and depression are among the 20 most recommended symptoms for the use of acupuncture [Birch, unpublished data], all of which have positive or trend positive evidence of effectiveness.

Out of the recommendations for the use of acupuncture in symptom management in cancer patients, many are made by national and state government and health departments (+ in Table 1), indicating broad public health support for the use of acupuncture. Appendix 2 in a recent paper by the authors lists examples of publications recommending acupuncture, including some for cancer patients.<sup>5</sup> Table 2 lists those symptoms for which acupuncture is recommended by national and state government and public health service groups.

In Table 2, we see that publications from the Australian Government recommend acupuncture for at least nine symptoms in cancer care with recommendations for an additional three symptoms by State Governments in Australia. In recent years, acupuncture has been recommended for at least 25 symptoms in cancer care by different regional or central NHS websites in the UK. Surveys have found that acupuncture is increasingly used by patients

**Table 1**  
Indications, Number of Recommendations, Countries, First and Most Recent Years of Publication, for Using Acupuncture in Cancer Care

Cancer related symptoms	Nr. rec	Countries	Years of publication
CINV	275	International, UK+ $\beta$ , Scotland+, Wales+, Germany $\beta$ , France, Austria, Netherlands, Denmark, US+, Australia+, New Zealand+, Canada+, Saudi Arabia, Brazil, S. America, India	1998–2019
Cancer pain	243	International, UK+, Scotland $\beta$ , Wales+, Northern Ireland+, Germany $\beta$ , Netherlands, Denmark, Norway, Spain, Romania, US+ $\beta$ , Australia +, New Zealand, Canada+, Mexico $\beta$ , Latin America, China+, Hong Kong, India, Malaysia+, Singapore+, Kenya+	1994–2019
Fatigue	97	International, US +, UK+, Germany $\beta$ , Canada +, Australia +, New Zealand +, Mexico $\beta$	2006–2019
Xerostomia	75	International, US+, UK +, Canada +, Germany $\beta$ , Italy, Poland, Croatia, India	2005–2019
Post-surgery pain	>50	US +, UK, Australia +, New Zealand +, Germany $\beta$ , Rwanda +, International, Malaysia +,	2006–2019
PONV	>50	UK, Scotland, US, Canada, Australia +, New Zealand, Germany $\beta$ , Netherlands, Brazil	2003–2019
Hot flashes (especially breast cancer)	95	US+, Canada, UK +, Europe, Australia +, NZ, Sweden, Norway, Denmark, Germany $\beta$ , Mexico $\beta$ , India	2005–2019
Aromatase-inhibitor arthralgia (breast cancer)	45	UK+, US + $\beta$ , Germany $\beta$ , NZ, Turkey, India, Taiwan	2007–2016
Neuropathy	79	US +, Canada+, Australia, UK +, Europe, International, Germany $\beta$ , Denmark, Ireland, Hong Kong, Mexico $\beta$	2007–2019
Anxiety	43	US+, UK+, Canada+, Germany $\beta$ , NZ, International	2006–2017
Dyspnoea (especially in palliative care)	33	Denmark, US, UK+, Australia +, Canada +	2005–2019
Quality of life (QoL) or well-being in cancer	25	Denmark, US+, Canada+, Australia +, NZ	2009–2017
Depression	24	Germany $\beta$ , UK+, US+, Canada +, NZ	2010–2017
Insomnia	22	Australia +, US+, Canada, Germany $\beta$	2011–2019
Symptom relief in cancer	16	Taiwan, Australia +, US +	2003–2015
Lymphoedema	12	Mexico $\beta$ , US, Europe, Germany $\beta$ , India	2005–2015
Breathlessness	12	UK+	2012–2018
Stress	10	UK+	2006–2019
Hiccup in palliative care	9	Denmark, UK+, Scotland +, Canada+, India	2009–2017
Constipation in cancer	8	US+, Canada+, Germany $\beta$	2013–2019
Cognitive dysfunction in cancer	6	Germany $\beta$	2012–2018
Mood problems in breast cancer	5	US, UK+	2014–2019
Leucopenia in cancer	4	Germany $\beta$	2014–2017
Muscle spasm/dysfunction (especially after head/neck surgery)	4	US, UK+	2007–2013
Menopausal symptoms in cancer (especially in breast cancer)	4	NZ, UK+	2017–2018
Loss of appetite in cancer	4	US+	2015–2019
Radiation induced nausea and vomiting, RINV	4	US, Denmark	2008–2018
Phantom limb pain	3	UK+	2014–2018
Swallowing difficulties in cancer	3	US	2015
Weight loss in cancer	3	US+	2015–2019
Diarrhoea in cancer	3	US+	2015–2019
Palliative care for elderly	2	Australia+, Canada	2011–2013
Night sweats	2	UK+	2008
Myoclonus in palliative care	2	Denmark, South Africa $\beta$	2012–2016
Headache in cancer	2	US	2014
Pruritis in palliative care	2	Denmark, UK+	2008
Painful bowel movements	2	UK+	2015–2018
Hyperhidrosis	2	UK+	2014
Muscular pain	2	UK+, Canada	2008–2013
Dystonia – palliative care	1	South Africa $\beta$	2012
Weight loss in cancer		US	2015
Radiation proctitis		UK	2006
Mucositis-related pain		US	2008
Cancer-related infertility		US	2009
Post-op muscular discomfort		Germany $\beta$	2016
Radiation-related abdominal pain/bloating		UK	2014
Radiation-related anal pain (proctalgia fugax)		UK	2014
Palliative Care		UK+	2013
Panic attacks		UK+	2008

Table 1 (Continued)

Cancer related symptoms	Nr. rec	Countries	Years of publication
Post-op ileus		US+	2019
Ulcers post-surgery/radiation		UK	2006
Palliative care in children		US	2009
Wound pain in palliative care		New Zealand	2005
Radiation-related tenesmus		UK	2014
Radiation-related abdominal pain		UK	2014
Radiation-related anal/perianal pain on defecation		UK	2014
Diarrhoea in cancer		US	2015
Chemotherapy induced neutropenia		US	2018
Healing scar tissue		US	2019
Regulate elimination		US	2019
Cough		UK+	2015

+ indicates that there are National Ministry of Health, Department of Health, State Department of Health or National Health Service recommendations (see Table 2).

β indicates national guideline group recommendations.

Table 2

Countries that have Made Public Health Recommendations for the use of Acupuncture in Cancer Care on Government Websites, or by <sup>a</sup> National Ministries, Departments or Institutes of Health, <sup>b</sup> State Departments of Health or <sup>c</sup> National Health Service Websites

Country	Public health–recommended uses of acupuncture in cancer
Australia	CINV <sup>a,b</sup> , Cancer pain <sup>a,b</sup> , Post-op pain <sup>a</sup> , PONV <sup>b</sup> , Dyspnoea in palliative care <sup>a</sup> , Fatigue <sup>b</sup> , Symptom relief in cancer <sup>b</sup> , Palliative care for the elderly <sup>a</sup> , Quality of Life in cancer patients <sup>a</sup> , hot flashes <sup>a</sup> , insomnia <sup>a</sup> , Pain control in palliative care <sup>a</sup>
USA	CINV <sup>a,c</sup> , Cancer pain <sup>a,c</sup> , Post-op pain <sup>a</sup> , CIPN <sup>a</sup> , symptom relief <sup>b</sup> , fatigue <sup>a</sup> , hot flashes <sup>a</sup> , Aromatase inhibitor arthralgia <sup>a</sup> , anxiety <sup>a</sup> , depression <sup>a</sup> , quality of life <sup>a</sup> , sleep disturbance <sup>a</sup> , xerostomia <sup>a</sup> , Diarrhea <sup>a</sup> , constipation <sup>a</sup> , post-op ileus <sup>a</sup> , poor appetite <sup>a</sup> , weight loss <sup>a</sup>
Canada	CINV <sup>b</sup> , Cancer pain <sup>b</sup> , CIPN <sup>b</sup> , Xerostomia <sup>b</sup> , fatigue <sup>b</sup> , constipation <sup>b</sup> , depression <sup>b</sup> , anxiety <sup>b</sup> , Dyspnoea in palliative care <sup>b</sup> , Hiccup in palliative care <sup>b</sup> , Quality of Life in cancer patients <sup>b</sup>
UK <sup>*</sup>	CINV <sup>a,c</sup> , cancer pain <sup>a,c</sup> , Fatigue <sup>c</sup> , Hiccup in palliative care <sup>c</sup> , anxiety <sup>c</sup> , stress <sup>c</sup> , depression <sup>c</sup> , Cancer related neuropathy <sup>c</sup> , radiation induced xerostomia <sup>c</sup> , xerostomia <sup>c</sup> , hot flashes <sup>c</sup> , breathlessness <sup>c</sup> , aromatase inhibitor arthralgia <sup>c</sup> , muscle spasms <sup>c</sup> , pruritis <sup>c</sup> , cough <sup>c</sup> , hyperhidrosis <sup>c</sup> , muscle pain <sup>c</sup> , palliative care <sup>c</sup> , panic attacks <sup>c</sup> , night sweats <sup>c</sup> , Phantom limb pain <sup>c</sup> , painful bowel movements <sup>c</sup> , cancer related menopausal problems <sup>c</sup> , Mood problems in cancer <sup>c</sup>
Scotland	CINV <sup>a,b</sup> , hiccup in palliative care <sup>a,c</sup>
Wales	Cancer pain <sup>a</sup> , CINV <sup>a</sup>
Northern Ireland	Cancer pain <sup>a</sup>
Ireland	
New Zealand	CINV <sup>a</sup> , post-op pain <sup>a</sup> , fatigue <sup>a</sup>
Malaysia	Cancer pain <sup>a</sup> , post-op pain <sup>a</sup>
Singapore	Cancer pain <sup>a</sup>
Kenya	Cancer pain <sup>a</sup>
Rwanda	Post-op pain <sup>a</sup>
China	Cancer pain <sup>a</sup>

\* In the UK there are many NHS regional groups each with their own websites. Among them the search has found recommendations to use acupuncture for 25 symptoms so far.

with cancer.<sup>3,28,84</sup> Official oncology groups have been recommending acupuncture for a slowly growing list of symptoms in cancer care, for example in the US: American Cancer Society,<sup>85</sup> National Cancer Comprehensive Network,<sup>86</sup> UK: MacMillan,<sup>87</sup> Germany: Arbeitsgemeinschaft Gynakologische Onkologie,<sup>69</sup> Europe: European Oncology Nursing Society,<sup>88</sup> Canada: Cancer Care Ontario,<sup>89</sup> Pediatric Oncology Group of Ontario,<sup>90</sup> Australia: Cancer Council Australia,<sup>91</sup> New Zealand: New Zealand Gynecological Cancer Foundation.<sup>92</sup> National government or health service publications also make many recommendations to use acupuncture, see for example the Scottish NHS,<sup>93</sup> the Australian Government: Cancer Australia,<sup>94</sup> Health Direct,<sup>95</sup> New Zealand Government: Ministry of Health New Zealand,<sup>96</sup> US National Cancer Institute,<sup>4</sup> the Canadian State governments of Alberta<sup>97</sup> and British Columbia<sup>98</sup> and so on. This interest in the use of acupuncture in cancer care is especially found outside of Asia. A few Asian Ministry of Health publications have been found recommending acupuncture for cancer related symptoms like pain in China,<sup>99</sup> Malaysia,<sup>100</sup> and Singapore.<sup>101</sup> But none have been found to date in Japan and South Korea. It is interesting that use of acupuncture in cancer care is growing in

Europe, North America and Australasia, but is being less widely adopted in East Asia. Occasionally international groups such as the World Health Organization<sup>102</sup> and some European groups<sup>88,103</sup> and Pan-American groups<sup>104</sup> have made recommendations to use acupuncture in cancer care.

Since the evidence of effectiveness is relatively weak due in part to the small number of studies with small sample sizes,<sup>1,3,4,10</sup> and acupuncture is being widely adopted and recommended in cancer care, it is important that more clinical trials be performed examining the additive role of acupuncture in managing the various symptoms of patients with cancer. The Society for Integrative Oncology has been tracking evidence for the use of integrative therapies like acupuncture<sup>105</sup> and has published guidelines promoting their use in oncology practice.<sup>106</sup> Previous publications have discussed problems of implementation of published guidelines and how the many recommendations to use acupuncture have been under-utilized.<sup>11,83</sup> The acupuncture field needs to work with oncologists and public health officials to develop more effective implementation strategies if the growing recommendations to use acupuncture in cancer care are to be followed.



#### 4. Conclusions

As can be seen above, the use of acupuncture in oncology is growing. This is probably due to many factors such as the demands of patients; the fact that patients are often under-treated for their cancer symptoms; that usual treatments can result in inadequately controlled symptoms; that acupuncture is considered safe with a growing evidence base of effectiveness for a number of cancer related symptoms. Acupuncture is an interesting option for many cancer patients and cancer survivors because: it can simultaneously address so many different types of cancer-related symptoms with a relatively low risk of adverse effects; it is well tolerated even among paediatric patients; it is especially useful for addressing the common 'symptom clusters' in cancer care. Further research is needed to more firmly establish the use of acupuncture in symptom management for patients with cancer and in cancer survivors. Better implementation strategies are needed to help ensure patients are able to follow-up on recommendations to use acupuncture.

#### Conflicts of interest

The lead author has received a grant to establish an online searchable registry of the found publications that recommend acupuncture.

#### Funding

Funding for the registry came as a research grant from the British Acupuncture Council, the study was approved in late 2018.

#### Ethical statement

No ethical approval was required for this manuscript as this study did not involve human subjects or laboratory animals.

#### Data availability

At present the data on recommendations for the use of acupuncture is unavailable, but it is planned to have the registry complete around the end of 2020. This will be an online searchable registry.

#### References

1. Cho WCS, editor. *Acupuncture and moxibustion as an evidence-based therapy for cancer*. Dordrecht: Springer Publishers; 2012.
2. Zia FZ, Olaku O, Bao T, Berger A, Deng G, Fan AY, et al. The National Cancer Institute's conference on acupuncture for symptom management in oncology: state of the science, evidence, and research gaps. *J Natl Cancer Inst Monogr* 2017;68–73.
3. Kilian-Kita A, Puskulluoglu M, Konopka K, Krzemieniecki K. Acupuncture: could it become everyday practice in oncology? *Contemp Oncol* 2016;20:119–23.
4. National Cancer Institute. *PDQ cancer information summaries [Internet]*. Bethesda (MD): Acupuncture (PDQ®); 2002. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK65714/?report=classic>. Accessed March 28, 2019.
5. Birch S, Alraek T, Lee MS, Kim TH. Overview of treatment guidelines that recommend the use of acupuncture: a bibliometric analysis. *J Altern Complement Med* 2018;24:752–69.
6. Anon. Acupuncture: NIH consensus development panel on acupuncture. *JAMA* 1998;280:1518–24.
7. Tait PL, Brooks L, Harstall C. *Acupuncture: evidence from systematic reviews and meta-analyses*. Alberta, Canada: Alberta Heritage Foundation for Medical Research; 2002.
8. Vickers A, Wilson P, Kleijnen J. Effectiveness bulletin: acupuncture. *Qual Saf Health Care* 2002;11:92–7.
9. Ma Y, Dong M, Zhou K, Mita C, Liu J, Wayne PM. Publication trends in acupuncture research: a 20-year bibliometric analysis based on PubMed. *PLoS ONE* 2016;11:e0168123.
10. Hempel S, Taylor SL, Solloway M, Miake-Lye IM, Beroes JM, Shanman R, et al. *Evidence map of acupuncture*. US Department of Veterans Affairs – Evidence Synthesis Program; 2019. Project #05-226; 2013. Available from: <http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0063214/pdf/TOC.pdf>. Accessed March 28.
11. McDonald J, Janz S. *The acupuncture evidence project: a comparative evidence review*; 2019. Australian Acupuncture and Chinese Medicine Association, January 2017. Available from: <http://www.acupuncture.org.au>. Accessed March 28.
12. Abrams DI. An integrative approach to prostate cancer. *J Altern Complement Med* 2018;24:872–80.
13. Ben-Arye E, Samuels N, Lavie O. Integrative medicine for female patients with gynecologic cancer. *J Altern Complement Med* 2018;24:881–9.
14. Cassileth BR, Yarett I, Acupuncture. *Does it alleviate symptoms associated with cancer care?*; 2019. Available from: <http://www.ascopost.com/issues/july-25-2016/acupuncture-does-it-alleviate-symptoms-associated-with-cancer-care/>. Accessed March 28.
15. Chen HY, Li SG, Cho WCS, Zhang ZJ. The role of acupoint stimulation as an adjunct therapy for lung cancer: a systematic review and meta-analysis. *BMC Complement Altern Med* 2013;13:362.
16. Garcia MK, McQuade J, Haddad R, Patel S, Lee R, Yang P, et al. Systematic review of acupuncture in cancer care: a synthesis of the evidence. *J Clin Oncol* 2013;31:952–60.
17. Jan A. The role of acupuncture in the management of prostate cancer. *Med Acupunct* 2015;27:168–78.
18. Ladas DJ. Integrative medicine in childhood cancer. *J Altern Complement Med* 2018;24:910–5.
19. Lian WL, Pan MQ, Zhou DH, Zhang ZJ. Effectiveness of acupuncture for palliative care in cancer patients: a systematic review. *Chin J Integr Med* 2014;20:136–47.
20. McKeon C, Smith CA, Hardy J, Chang E. Acupuncture and acupressure for chemotherapy-induced nausea and vomiting: a systematic review. *Aust J Acupunct Chin Med* 2013;3:2–27.
21. Tao WW, Jiang H, Jiang P, Sha LY, Sun XC. Effects of acupuncture, tuina, tai chi, qigong, and traditional Chinese medicine five-element music therapy on symptom management and quality of life for cancer patients: a meta-analysis. *J Pain Symptom Manage* 2016;51:728–47.
22. Wu XY, Chung VCH, Hui EP, Zie ETC, Ng BFL, Ho RST, et al. Effectiveness of acupuncture and related therapies for palliative care of cancer: overview of systematic reviews. *Sci Rep* 2015;5:16776.
23. Chiu HY, Hsieh YJ, Tsai PS. Systematic review and meta-analysis of acupuncture to reduce cancer-related pain. *Eur J Cancer Care* 2017;26:e12457.
24. Kim KH, Kim DH, Kim HY, Son GM. Acupuncture for recovery after surgery in patients undergoing colorectal cancer resection: a systematic review and meta-analysis. *Acupunct Med* 2016;34:248–56.
25. Wu M-S, Chen K-H, Chen I-F, Huang SK, Tzeng P-C, Yeh M-L, et al. The efficacy of acupuncture in post-operative pain management: a systematic review and meta-analysis. *PLoS ONE* 2016;11:e0150367.
26. Bao Y, Kong X, Yang L, Liu R, Shi Z, Li W, et al. Complementary and alternative medicine for cancer pain: an overview of systematic reviews. *eCAM* 2014;2014:170396.
27. Deng G, Bao T, Mao JJ. Understanding the benefits of acupuncture treatment for cancer pain management. *Oncology* 2018;32:310–6.
28. Hu CQ, Zhang HB, Wu WY, Yu WQ, Li Y, Bai JP, et al. Acupuncture for pain management in cancer: a systematic review and meta-analysis. *eCAM* 2016;2016:1720239.
29. Lau CH, Wu X, Chung VC, Liu X, Hui EP, Cramer H, et al. Acupuncture and related therapies for symptom management in palliative cancer care: systematic review and meta-analysis. *Medicine (Baltimore)* 2016;95:e2901.
30. Bae K, Yoo HS, Lamoury G, Boyle F, Rosenthal DS, Oh B. Acupuncture for aromatase inhibitor-induced arthralgia: a systematic review. *Integr Cancer Ther* 2015;14:496–502.
31. Bao T. Applications of acupuncture in breast cancer survivors. *Breast Cancer Manag* 2015;4:199–207.
32. Chen L, Lin CC, Huang TW, Kuan YC, Huang YH, Chen HC, et al. Effect of acupuncture on aromatase inhibitor-induced arthralgia in patients with breast cancer: a meta-analysis of randomized controlled trials. *Breast* 2017;33:132–8.
33. Chien TJ, Liu CY, Chang YF, Fang CJ, Hsu CH. Acupuncture for treating aromatase inhibitor-related arthralgia in breast cancer: a systematic review and meta-analysis. *J Altern Complement Med* 2015;21:251–60.
34. Asadpour R, Meng ZQ, Kessel KA, Combs SE. Use of acupuncture to alleviate side effects in radiation oncology: current evidence and future directions. *Adv Rad Oncol* 2016;1:344–50.
35. Furness S, Bryan G, McMillan R, Birchenough S, Worthington HV. Interventions for the management of dry mouth: non-pharmacological interventions. *Cochrane DB Sys Rev* 2013;CD009603.
36. Garcia MK, Niemtzw RC, McQuade J, et al. Acupuncture for xerostomia in patients with cancer: an update. *Med Acupunct* 2015;27:158–67.
37. Hanchanale S, Adkinson L, Daniel S, Fleming M, Oxberry SG. Systematic literature review: xerostomia in advanced cancer patients. *Support Care Cancer* 2015;23:881–8.
38. Lovelace TL, Fox NF, Sood AJ, Nguyen SA, Day TA. Management of radiotherapy-induced salivary hypofunction and consequent xerostomia in patients with oral or head and neck cancer: meta-analysis and literature review. *Oral Surg Oral Med Oral Pathol Oral Radiol* 2014;117:595–607.
39. Zhuang L, Yang Z, Zeng X, Zhua X, Chen Z, Liu L, et al. The preventive and therapeutic effect of acupuncture for radiation-induced xerostomia in

- patients with head and neck cancer: a systematic review. *Integr Cancer Ther* 2013;12:197–205.
40. Frisk JW, Hammar ML, Ingvar M, Spetz Holm ACE. How long do the effects of acupuncture on hot flashes persist in cancer patients? *Support Care Cancer* 2014;22:1409–15.
  41. Johns C, Seav SM, Dominick SA, Gorman JR, Li H, Natarajan L, et al. Informing hot flash treatment decisions for breast cancer survivors: a systematic review of randomized trials comparing active interventions. *Breast Cancer Res Treat* 2016;156:415–26.
  42. Wang XP, Zhang DJ, Wei XD, Wang JP, Zhang DZ. Acupuncture for the relief of hot flashes in breast cancer patients: a systematic review and meta-analysis of randomized controlled trials and observational studies. *J Can Res Ther* 2018;14:600–8.
  43. He XR, Wang Q, Li PP. Acupuncture and moxibustion for cancer-related fatigue: a systematic review and meta-analysis. *Asian Pac J Cancer Prev* 2013;14:3067–74.
  44. Ling WM, Lui LYY, So WKW, Chan K. Effects of acupuncture and acupressure on cancer-related fatigue: a systematic review. *Oncol Nurs Rev* 2014;41:581–92.
  45. Tao W, Luo X, Cui B, Liang D, Wang C, Duan Y, et al. Practice of traditional Chinese medicine for psycho-behavioral intervention improves quality of life in cancer patients: a systematic review and meta-analysis. *Oncotarget* 2015;6:39725–39.
  46. Zeng YC, Luo TZ, Finnegan-John J, Cheng ASK. Meta-analysis of randomized controlled trials of acupuncture for cancer-related fatigue. *Integr Cancer Ther* 2014;13:193–200.
  47. Zhang Y, Lin L, Li HL, Hu Y, Tian L. Effects of acupuncture on cancer-related fatigue: a meta-analysis. *Support Care Cancer* 2018;26:415–25.
  48. Haddad NE, Palesh O. Acupuncture in the treatment of cancer-related psychological symptoms. *Integr Cancer Ther* 2014;13:371–85.
  49. Wang LZ, Bao T. Acupuncture for cancer patients, practice and research. In: Chen LL, Cheng TO, editors. *Acupuncture in modern medicine*. Intech; 2013:277–95. Available from: <http://www.intechopen.com/books/acupuncture-in-modern-medicine/acupuncture-for-cancer-patients-practice-and-research>. Accessed March 29, 2019.
  50. Chandwani KD, Ryan JL, Peppone LJ, Janelins MM, Sprod LK, Devine K, et al. Cancer-related stress and complementary and alternative medicine: a review. *Evid Based Complement Altern Med* 2012;2012:979213.
  51. Choi TY, Kim JI, Lim HJ, Lee MS. Acupuncture for managing cancer-related insomnia: a systematic review of randomized clinical trials. *Integr Cancer Ther* 2017;16:135–46.
  52. Al-Atiyyat N, Obaid A. Management of peripheral neuropathy induced by chemotherapy in adults with cancer: a review. *Int J Palliat Nurs* 2017;23:13–7.
  53. Cheng XL, Liu HQ, Wang Q, Huo JG, Wang XN, Cao P. Chemotherapy-induced peripheral neurotoxicity and complementary and alternative medicines: progress and perspective. *Front Pharmacol* 2015;6:234.
  54. Costa TC, Lopes M, Yokoyama dos Anjos AC, Zago MMF. Chemotherapy-induced peripheral neuropathies: an integrative review of the literature. *Rev Esc Enferm USP* 2015;49:332–41.
  55. Oh PJ, Kim YL. Effectiveness of non-pharmacologic interventions in chemotherapy induced peripheral neuropathy: a systematic review and meta-analysis. *J Korean Acad Nurs* 2018;48:123–42.
  56. Choi TY, Lee MS, Ernst E. Acupuncture for cancer patients suffering from hiccups: a systematic review and meta-analysis. *Complement Ther Med* 2012;20:447–55.
  57. Bausewein C, Booth S, Cysels M, Higginson I. Non-pharmacological interventions for breathlessness in advanced stages of malignant and non-malignant diseases. *Cochrane DB Syst Rev* 2008;CD005623.
  58. Li L, Yuan L, Chen X, Wang Q, Tian J, Yang K, et al. Current treatments for breast cancer-related lymphoedema: a systematic review. *Asian Pac J Cancer Prev* 2016;17:4875–83.
  59. Cheong KB, Zhang JP, Huang Y. The effectiveness of acupuncture in post-operative gastroparesis syndrome – a systematic review and meta-analysis. *Complement Ther Med* 2014;22:767–86.
  60. Dodd MJ, Miskowski C, Pau SM. Symptom clusters and their effect on the functional status of patients with cancer. *Oncol Nurs Forum* 2001;28:465–70.
  61. Thompson LMA, Johnstone PAS. Acupuncture for cancer symptom clusters. *ASCO Post* 2019, January 2016. Available from: <http://www.ascopost.com/issues/january-25-2016/acupuncture-for-cancer-symptom-clusters/>. Accessed March 29.
  62. Runowicz CD, Leach CR, Henry NL, Henry KS, Mackey HT, Cowens-Alvarado RL, et al. American Cancer Society/American Society of Clinical Oncology Breast Cancer Survivorship Care Guideline. *J Clin Oncol* 2016;34:611–35.
  63. Kim TH, Kang JW, Lee TH. Therapeutic options for aromatase inhibitor-associated arthralgia in breast cancer survivors: a systematic review of systematic reviews, evidence mapping, and network meta-analysis. *Maturitas* 2018;118:29–37.
  64. Berger AM, Mitchell SA, Jacobsen PB, Pirl WF. Screening, evaluation, and management of cancer-related fatigue: ready for implementation to practice? *CA Cancer J Clin* 2015;65:190–211.
  65. Towler P, Molassiotis A, Brearley SG. What is the evidence for the use of acupuncture as an intervention for symptom management in cancer supportive and palliative care: an integrative overview of reviews. *Support Care Cancer* 2013;21:2913–23.
  66. International Association for the Study of Pain. *Cancer pain in older people*. IASP; 2008. Available from: [http://www.iasp-pain.org/files/Content/ContentFolders/GlobalYearAgainstPain2/CancerPainFactSheets/OlderPeople\\_Final.pdf](http://www.iasp-pain.org/files/Content/ContentFolders/GlobalYearAgainstPain2/CancerPainFactSheets/OlderPeople_Final.pdf).
  67. Laugsand EA, Jakobsen G, Kaasa S, Klepstad P. Inadequate symptom control in advanced cancer patients across Europe. *Support Care Cancer* 2011;19:2005–14.
  68. Scottish Intercollegiate Guidelines Network. *106 Control of pain in adults with cancer. A national clinical guideline, Edinburgh*; 2008. [www.sign.ac.uk](http://www.sign.ac.uk).
  69. Arbeitsgemeinschaft Gynäkologische Onkologie. *Diagnosis and treatment of patients with primary and metastatic breast cancer*. Mamma Commission; 2015. Available from: [http://www.ago-online.de/fileadmin/downloads/leitlinien/mamma/maerz2015/en/2015E\\_Updated\\_Guidelines.pdf](http://www.ago-online.de/fileadmin/downloads/leitlinien/mamma/maerz2015/en/2015E_Updated_Guidelines.pdf). Accessed March 29, 2019.
  70. Birch S, Keppel Hesselink J, Jonkman FAM, Hekker TAM, Bos A. Clinical research of acupuncture: part one – what have reviews of the efficacy and safety of acupuncture told us so far? *J Altern Complement Med* 2004;10:468–80.
  71. MacPherson H, Hammerschlag R. Acupuncture and the emerging evidence base: contrived controversy and rational debate. *J Acupunct Meridian Stud* 2012;5:141–7.
  72. Lytle CD. *An overview of acupuncture*. U.S. Department of Health and Human Services, Public Health Service, Food and Drug Administration, Center for Devices and Radiological Health, Bethesda; 1993.
  73. Witt CM, Pach D, Brinkhaus B, Wruck K, Tag B, Mank S, et al. Safety of acupuncture: results of a prospective observational study with 229,230 patients and introduction of a medical information and consent form. *Forsch Komplementarmed* 2009;16:91e97.
  74. Cybularz PA, Brothers K, Singh GM, Feingold JL, Lewis ME, Niesley ML. The safety of acupuncture in patients with cancer therapy-related thrombocytopenia. *Med Acupunct* 2015;27:224–9.
  75. Filshie J, Hester J. Guidelines for providing acupuncture treatment for cancer patients – a peer-reviewed sample policy document. *Acupunct Med* 2006;24:172–82.
  76. Lu W, Doherty-Gilman AM, Rosenthal DS. Recent advances in oncology acupuncture and safety considerations in practice. *Curr Treat Options Oncol* 2010;11:141–6.
  77. Adams D, Cheng F, Jou H, Aung S, Yasui Y, Vohra S. The safety of pediatric acupuncture: a systematic review. *Pediatrics* 2011;128:e1575–87.
  78. Brittnier M, Le Pertel N, Gold MA. Acupuncture in pediatrics. *Curr Probl Pediatr Adolesc Health Care* 2016;46:179–83.
  79. Yang CS, Hao ZL, Zhang LL, Guo Q. Efficacy and safety of acupuncture in children: an overview of systematic reviews. *Pediatr Res* 2015;78:112–9.
  80. Jindal V, Ge A, Mansky PJ. Safety and efficacy of acupuncture in children: a review of the evidence. *J Pediatr Hematol Oncol* 2008;30:431–42.
  81. Kelly KM. Integrative therapies for children with hematological malignancies. *Hematology Am Soc Hematol Educ Program* 2009:307–12.
  82. Sagar SM, Wong RK. Safety and side effects of acupuncture and moxibustion as a therapy for cancer. In: Cho WCS, editor. *Acupuncture and moxibustion as an evidence-based therapy for cancer*. Dordrecht: Springer Publishers; 2012:250–64.
  83. Birch S, Alraek T, Lee MS. Challenges for clinical practice guidelines in traditional medicines: the example of acupuncture. *Eur J Integr Med* 2016;8:332–6.
  84. Greenlee H, DuPont-Reyes MJ, Balneaves LG. Clinical practice guidelines on the evidence-based use of integrative therapies during and after breast cancer treatment. *CA Cancer J Clin* 2017;67:194–232.
  85. American Cancer Society. *Complementary and alternative methods and cancer*; 2019. Available from: <https://www.cancer.org/treatment/treatments-and-side-effects/complementary-and-alternative-medicine/complementary-and-alternative-methods-and-cancer.html>. Accessed March 29.
  86. National Comprehensive Cancer Network. USA. Available from: <http://www.nccn.org/>. Accessed March 29, 2019.
  87. MacMillan Cancer Support Organisation, 2018. Available from: <http://www.macmillan.org.uk>. Accessed March 29, 2019.
  88. European Oncology Nursing Society. Available from: <http://www.cancernurse.eu/>. Accessed March 29, 2019.
  89. Cancer Care Ontario. Available from: <https://www.cancercare.on.ca/>. Accessed March 29, 2019.
  90. Pediatric Oncology Group of Ontario. Symptom management guide for children near/at end-of-life. Available from: <https://www.pogo.ca/>. Accessed March 29, 2019.
  91. Cancer Council Australia. Available from: <http://www.cancer.org.au/>. Accessed March 29, 2019.
  92. New Zealand Gynecological Cancer Foundation. Available from: <http://www.nzgcf.org.nz>. Accessed March 29, 2019.
  93. Breast Cancer Care. *Types of complementary therapies*; 2019. Available from: <https://www.breastcancercare.org.uk/information-support/facing-breast-cancer/living-beyond-breast-cancer/complementary-therapies/types-complementary-therapies#acupuncture>. Accessed March 29.
  94. Cancer Australia, Australian Government. Available from: <http://canceraustralia.gov.au/>. Accessed March 29, 2019.
  95. Health Direct, Australian Government. Available from: <https://www.healthdirect.gov.au/>. Accessed March 29, 2019.
  96. Ministry of Health, New Zealand. *Guidance for improving supportive care for adults with cancer in New Zealand*. Wellington: Ministry of Health; 2010. Available from: <http://www.moh.govt.nz>. Accessed March 29, 2019.
  97. Alberta Health Services. Available from: <http://www.albertahealthservices.ca/>. Accessed March 29, 2019.

98. British Columbia Guidelines and Protocols, Advisory Committee. Available from: <http://www.bcguidelines.ca/>. Accessed March 29, 2019.
99. Chinese Ministry of Health. Cancer Pain Management Expert Panel of the Chinese Ministry of Health. Guidelines on cancer pain management (2011 edition). *Ann Palliat Med* 2013;2:18–25.
100. Ministry of Health Malaysia. *Clinical practice guidelines – management of cancer pain*. July; 2010.
101. Ministry of Health Singapore. *Clinical practice guidelines: cancer pain*; 2003.
102. WHO (World Health Organization). *Comprehensive cervical cancer control: a guide to essential practice*. 2nd ed; 2014. Available from: [http://apps.who.int/iris/bitstream/handle/10665/144785/9789241548953\\_eng.pdf;jsessionid=9715B6E44D6A98A46BAC8FA93091F366?sequence=1](http://apps.who.int/iris/bitstream/handle/10665/144785/9789241548953_eng.pdf;jsessionid=9715B6E44D6A98A46BAC8FA93091F366?sequence=1). Accessed March 29, 2019.
103. European Partnership for Action Against Cancer. *Complementary and alternative medicine (CAM) in cancer care development and opportunities of integrative care*; 2014. Available from: <http://www.srab.dk/files/Aktuelt/05-2015/EPAAC%20CAM%20cancer%202014.pdf>. Accessed March 29, 2019.
104. Pan American Health Organization. *Palliative care: guide for clinical management (in Spanish)*; 2002. Available from: [http://www2.paho.org/hq/index.php?option=com\\_docman&task=docview&gid=18717&Itemid=270&lang=es](http://www2.paho.org/hq/index.php?option=com_docman&task=docview&gid=18717&Itemid=270&lang=es). Accessed March 29, 2019.
105. Society for Integrative Oncology. Available from: <https://integrativeonc.org/>. Accessed March 29, 2019.
106. Greenlee H, Balneaves LG, Carlson LE, Cohen M, Deng G, Hershman D, et al. for the Society for Integrative Oncology Guidelines Working Group. Clinical practice guidelines on the use of integrative therapies as supportive care in patients treated for breast cancer. *J Natl Cancer Inst Monogr* 2014;50:346–58.