

# ONS RADIODERMATITIS SYMPTOM MANAGEMENT GUIDELINE

## Supplementary Material

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## 1. Guideline panel conflict of interest disclosures

Guideline Panel Member	Conflict of Interest Disclosure
Tracy Gosselin, PhD, RN, AOCN®, NEA-BC, FAAN Chief Nursing and Patient Services Officer Duke University Hospital, Durham, NC	<i>Employment or Leadership:</i> Oncology Nursing Foundation President (self), uncompensated; Glaxo Smith Kline employee (spouse) compensated
Susan D. Bruce, MSN, RN, OCN®, AOCNS® Clinical Nurse Specialist Duke Cancer Center Raleigh, NC	No conflicts reported
Andrea Hutton, Patient Advocate Director of Content Production and Web Publishing PatientPower.info MBC Alliance, Santa Barbara, CA	No conflicts reported
Carol M. Marquez, MD, FACR Clinical Associate Professor Department of Radiation Oncology Stanford University, San Jose, CA	No conflicts reported
Lisa A. McGee, MD Consultant Mayo Clinic, Scottsdale, AZ	<i>Employment:</i> Mayo Clinic, self, compensated
Anne Marie Shaftic, DNP, RN, NP-C, AOCNP® Oncology Nurse Practitioner NJ Cancer and Blood Specialist, Rutherford, NJ	<i>Honoraria:</i> Kyowa Kirin Speakers Bureau, self
Lauren V. Suarez, MSN, RN, OCN®, CBCN® Patient Care Manager Miami Cancer Institute, Miami, FL	<i>Employment:</i> Miami Cancer Institute, Assistant Nurse Manager Radiation Oncology, self, compensated; Cyberknife Center of Miami, VP Operations, mother, compensated  <i>Honoraria:</i> Society of Nuclear Medicine and Molecular Imaging, self

## 2. PICO questions

Population	Intervention(s)	Comparator	Outcomes
<b>Care for patients receiving radiation therapy</b>			
Patients receiving radiation therapy for cancer in the breast/chest region	Deodorant/antiperspirant in addition to normal washing	Normal washing	Time to development of radiodermatitis (e.g. rash, desquamation, necrosis)
<b>Care to minimize radiodermatitis</b>			
Patients receiving radiation therapy for cancer	Aloe vera lotion	Standard of care	Pain Pruritis Dry skin Quality of life Cost Time to develop radiodermatitis Intervention adherence and fidelity
Patients receiving radiation therapy for cancer	Emu oil	Standard of care	Pain Pruritis Dry skin Quality of life Cost Time to develop radiodermatitis Intervention adherence and fidelity

<p>Patients receiving radiation therapy for cancer</p>	<p>Oral curcumin</p>	<p>Standard of care</p>	<p>Pain Pruritis Dry skin Quality of life Cost Time to develop radiodermatitis Intervention adherence and fidelity</p>
<p>Patients receiving radiation therapy for cancer</p>	<p>Topical nonsteroidal interventions (creams, lotions, ointments)</p>	<p>Standard of care</p>	<p>Pain Pruritis Dry skin Quality of life Cost Time to develop radiodermatitis Intervention adherence and fidelity</p>
<p>Patients receiving radiation therapy for cancer</p>	<p>Topical calendula</p>	<p>Standard of care</p>	<p>Pain Pruritis Dry skin Quality of life Cost Time to develop radiodermatitis</p>

			Intervention adherence and fidelity
Patients receiving radiation therapy for cancer	Semipermeable dressings	Standard of care	Pain Pruritis Dry skin Quality of life Cost Time to develop radiodermatitis Intervention adherence and fidelity
Patients receiving radiation therapy for cancer	Topical steroidal creams	Standard of care	Pain Pruritis Dry skin Quality of life Cost Time to develop radiodermatitis Intervention adherence and fidelity
<b>Care to treat radiodermatitis</b>			
Patients with radiodermatitis symptoms receiving radiation therapy for cancer	Topical nonsteroidal interventions (creams, lotions, ointments)	Standard of care	Pain Symptom severity Quality of life Cost

			<p>Breaks/discontinuation in radiation treatment</p> <p>Secondary infections</p> <p>Time to resolution of radiodermatitis</p> <p>Protocol adherence and fidelity</p>
<p>Patients with radiodermatitis symptoms receiving radiation therapy for cancer</p>	<p>Topical steroidal creams</p>	<p>Standard of care</p>	<p>Pain</p> <p>Symptom severity</p> <p>Quality of life</p> <p>Cost</p> <p>Breaks/discontinuation in radiation treatment</p> <p>Secondary infections</p> <p>Time to resolution of radiodermatitis</p> <p>Intervention adherence and fidelity</p>
<p>Patients with radiodermatitis symptoms receiving radiation therapy for cancer</p>	<p>Semipermeable dressings</p>	<p>Standard of care</p>	<p>Pain</p> <p>Symptom severity</p> <p>Quality of life</p> <p>Cost</p> <p>Breaks/discontinuation in radiation treatment</p> <p>Secondary infections</p>

			Time to resolution of radiodermatitis Intervention adherence and fidelity
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**3. Evidence-to-Decision Frameworks** (Developed using GRADEpro GDT: GRADEpro Guideline Development Tool [Software]. McMaster University, 2015 (developed by Evidence Prime, Inc.). Available from [gradepro.org](http://gradepro.org).)

- Deodorant/antiperspirant in addition to normal washing vs. normal washing (breast/chest region radiation therapy)
- Aloe vera vs. standard of care
- Emu oil vs. standard of care
- Oral curcumin vs. standard of care
- Topical nonsteroidal interventions (creams, lotions, ointments) vs. standard of care
- Calendula vs. standard of care
- Topical steroid creams vs. standard of care
- Semipermeable dressings vs. standard of care

**Deodorant/antiperspirant in addition to normal washing vs. normal washing (breast/chest region radiation therapy)**

**RECOMMENDATION**

Should deodorant/antiperspirant in addition to normal washing be used rather than normal washing alone in persons receiving radiation therapy for cancer in the breast/chest region?	
<b>POPULATION:</b>	Individuals receiving radiation therapy in the breast/chest region
<b>INTERVENTION:</b>	Deodorant/antiperspirant in addition to normal washing
<b>COMPARISON:</b>	Normal washing
<b>MAIN OUTCOMES:</b>	Time to development of necrosis (e.g., rash, desquamation, necrosis)
<b>SETTING:</b>	Clinical care
<b>PERSPECTIVE:</b>	Clinical recommendation - Population perspective
<b>BACKGROUND:</b>	Radiation-induced skin reactions can have minimal to significant impact on a patient’s quality of life and may also have associated out of pocket costs (Schnur et al., 2012).
<b>CONFLICT OF INTERESTS:</b>	<p>ONS conflict of interest declaration and management policies were applied and the following panel members were voting panel members (determining the direction and strength of the recommendation): Tracy Gosselin, PhD, RN, AOCN®, NEA-BC, FAAN, Susan D. Bruce, MSN, RN, OCN®, AOCNS®, Andrea Hutton, Carol M. Marquez, MD, FACR, Anne Shaftic, DNP, RN, NP-C, AOCNP®, Lauren V. Suarez, MSN, RN, OCN®, CBCN®</p> <p>Panel members recused as a result of risk of conflicts of interest: None</p>



## ASSESSMENT

Problem																														
Is the problem a priority?																														
JUDGEMENT		RESEARCH EVIDENCE			ADDITIONAL CONSIDERATIONS																									
<ul style="list-style-type: none"> <li><input type="radio"/> No</li> <li><input type="radio"/> Probably no</li> <li><input type="radio"/> Probably yes</li> <li><input checked="" type="radio"/> Yes</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>		<p>In the year 2000 about 24% of cancer survivors received radiation, and in 2020 that number is expected to increase to 29% (Bryant et al., 2017). This increase was seen across cancer sites with the largest increases for patients being treated for breast or prostate cancer (Bryant et al., 2017). Radiation induced skin reactions are one of the most commonly reported side effects of radiation therapy that can impact up to 95% of patients, and it is known to vary across treatment sites (Gewandter, Walker, Heckler, Morrow, &amp; Ryan, 2013; Gosselin, Schneider, Plambeck, Rowe, 2010). Due to this high risk, interventions for radiodermatitis are aimed at minimizing the severity or delaying progression to higher grades, rather than prevention.</p> <p>Skin changes from radiation are caused by disruption to the normal process of cell division and repair due to ionizing radiation therapy (Bray et al., 2016). Radiodermatitis can range from mild erythema to dry desquamation and moist desquamation (Singh et al., 2016). These skin changes usually manifest within two to three weeks of radiation initiation and can persist for up to four weeks following the completion of treatment (Naylor &amp; Mallett, 2001). Radiodermatitis can be painful and uncomfortable to patients and affects quality of life (Aistars, 2006; Vaz et al, 2007). If severe, it can also lead to changes in radiation treatment schedules (McQuestion, 2006).</p>																												
Desirable Effects																														
How substantial are the desirable anticipated effects?																														
JUDGEMENT		RESEARCH EVIDENCE			ADDITIONAL CONSIDERATIONS																									
<ul style="list-style-type: none"> <li><input checked="" type="radio"/> Trivial</li> <li><input type="radio"/> Small</li> <li><input type="radio"/> Moderate</li> <li><input type="radio"/> Large</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>		<table border="1"> <thead> <tr> <th>Outcomes</th> <th>No of participants (studies) Follow up</th> <th>Certainty of the evidence (GRADE)</th> <th>Relative effect (95% CI)</th> <th colspan="2">Anticipated absolute effects* (95% CI)</th> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <th>Risk with soap</th> <th>Risk difference with Deodorant</th> </tr> </thead> <tbody> <tr> <td>Development of Grade 2 RD</td> <td>517 (3 RCTs<sup>1,2,3</sup>)</td> <td>⊕⊕○○ LOW<sup>a,b</sup></td> <td>RR 0.99 (0.76 to 1.29)</td> <td colspan="2">Study population</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>349 per 1,000</td> <td><b>3 fewer per 1,000</b> (84 fewer to 101 more)</td> </tr> </tbody> </table>			Outcomes	No of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects* (95% CI)						Risk with soap	Risk difference with Deodorant	Development of Grade 2 RD	517 (3 RCTs <sup>1,2,3</sup> )	⊕⊕○○ LOW <sup>a,b</sup>	RR 0.99 (0.76 to 1.29)	Study population						349 per 1,000	<b>3 fewer per 1,000</b> (84 fewer to 101 more)	<p>The panel noted that there may be some differences in quality of life. The use of deodorant/anti-perspirant is more important to persons in warm climates.</p> <p>The panel discussed whether the desirable effects were small or trivial but decided on trivial.</p>	
Outcomes	No of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects* (95% CI)																										
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Development of Grade 3 RD	517 (3 RCTs <sup>1,2,3</sup> )	⊕⊕○○ LOW <sup>a,b</sup>	<b>RR 0.74</b> (0.27 to 2.02)	Study population		
				51 per 1,000	<b>13 fewer per 1,000</b> (37 fewer to 52 more)	
	Pruritis at end of radiation treatment	80 (1 RCT <sup>4</sup> )	⊕○○○ VERY LOW <sup>b,c,d</sup>	<b>OR 2.62</b> (1.01 to 6.78)	Study population	
					634 per 1,000	<b>185 more per 1,000</b> (2 more to 287 more)
Moderate-to-severe pain at end of radiation treatment	80 (1 RCT <sup>4</sup> )	⊕○○○ VERY LOW <sup>a,b,c</sup>	<b>OR 0.77</b> (0.29 to 2.09)	Study population		
				122 per 1,000	<b>25 fewer per 1,000</b> (83 fewer to 103 more)	
Sweating at end of radiation treatment	80 (1 RCT <sup>4</sup> )	⊕○○○ VERY LOW <sup>b,c</sup>	<b>OR 0.34</b> (0.12 to 0.93)	Study population		
				268 per 1,000	<b>157 fewer per 1,000</b> (226 fewer to 14 fewer)	

**Explanations:**

- a. The 95% CI includes the potential for both benefit and harm.
- b. Few events reported do not meet the optimal information size and suggest fragility in the estimate.
- c. Theberge 2009 had some concerns with allocation concealment, patient blinding, and incomplete outcome reporting.
- d. The 95% CI may not include meaningful harm.

	<p><b>References:</b></p> <ol style="list-style-type: none"><li>1. Bennett, C. (2009). An investigation into the use of a non-metallic deodorant during radiotherapy treatment: A randomised controlled trial. <i>Journal of Radiotherapy in Practice</i>, 8, 3–9. <a href="https://doi.org/10.1017/S146039690800647X">https://doi.org/10.1017/S146039690800647X</a></li><li>2. Gee, A., Moffitt, D., Churn, M., &amp; Errington, R. D. (2000). A randomised controlled trial to test a non-metallic deodorant used during a course of radiotherapy. <i>Journal of Radiotherapy in Practice</i>, 1, 205–212. <a href="https://doi.org/10.1017/S1460396999000321">https://doi.org/10.1017/S1460396999000321</a></li><li>3. Lewis, L., Carson, S., Bydder, S., Athifa, M., Williams, A.M., &amp; Bremner, A. (2014). Evaluating the effects of aluminum-containing and non-aluminum containing deodorants on axillary skin toxicity during radiation therapy for breast cancer: A 3-armed randomized controlled trial. <i>International Journal of Radiation Oncology* Biology* Physics</i>, 90, 765–771. <a href="https://doi.org/10.1016/j.ijrobp.2014.06.054">https://doi.org/10.1016/j.ijrobp.2014.06.054</a></li><li>4. Théberge, V., Harel, F., &amp; Dagnault, A. (2009). Use of axillary deodorant and effect on acute skin toxicity during radiotherapy for breast cancer: A prospective randomized noninferiority trial. <i>International Journal of Radiation Oncology* Biology* Physics</i>, 75, 1048–1052. <a href="https://doi.org/10.1016/j.ijrobp.2008.12.046">https://doi.org/10.1016/j.ijrobp.2008.12.046</a></li></ol> <p>In a Canadian randomized controlled trial (Watson, Gies, Thompson, &amp; Thomas, 2012) of aluminum-based anti-perspirant use in patients with breast cancer undergoing radiotherapy, there was no difference in quality of life between the anti-perspirant use and the control (washing only) groups.</p> <p>In an Australian 3-arm randomized controlled study (Lewis et al., 2014) of the effects of deodorant with and without aluminum on axillary skin toxicity during radiotherapy for breast cancer, 91 patients using aluminum-containing deodorant, 90 patients using non-aluminum-containing deodorant, and 104 no-deodorant-use patients completed the study. The aluminum-containing group had significantly less perspiring than the control. The odds of the aluminum-containing group experiencing perspiring that was barely tolerable and frequently or always interfering with daily activities was reduced by 85%.</p>	
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# Undesirable Effects

How substantial are the undesirable anticipated effects?

JUDGEMENT	RESEARCH EVIDENCE					ADDITIONAL CONSIDERATIONS	
<ul style="list-style-type: none"> <li><input type="radio"/> Large</li> <li><input type="radio"/> Moderate</li> <li><input type="radio"/> Small</li> <li><input checked="" type="radio"/> Trivial</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	<b>Outcomes</b>	<b>No of participants (studies) Follow up</b>	<b>Certainty of the evidence (GRADE)</b>	<b>Relative effect (95% CI)</b>	<b>Anticipated absolute effects* (95% CI)</b>		<p>The panel determined the magnitude of the harms to be trivial based on the reported events of axillary pruritus reported in Théberge et al., 2009, (3/40 in deodorant arm vs. 9/44 in non-deodorant arm) and the trivial different in itch reported in both the aluminum and non-aluminum deodorant arms compared with soap in Lewis et al., 2014 (adjusted change in rating score: -0.04; 95% CI: -0.21, 0.13 and adjusted change in rating score: 0.06; 95% CI -0.11, 0.23, respectively).</p>
	Development of Grade 2 RD	517 (3 RCTs <sup>1,2,3</sup> )	⊕⊕○○ LOW <sup>a,b</sup>	RR 0.99 (0.76 to 1.29)	Study population		
					349 per 1,000	<b>3 fewer per 1,000</b> (84 fewer to 101 more)	
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	<p><b>Explanations:</b></p> <ol style="list-style-type: none"><li>The 95% CI includes the potential for both benefit and harm.</li><li>Few events reported do not meet the optimal information size and suggest fragility in the estimate.</li><li>Theberge 2009 had some concerns with allocation concealment, patient blinding, and incomplete outcome reporting.</li><li>The 95% CI may not include meaningful harm.</li></ol> <p><b>References:</b></p> <ol style="list-style-type: none"><li>Bennett, C. (2009). An investigation into the use of a non-metallic deodorant during radiotherapy treatment: A randomised controlled trial. <i>Journal of Radiotherapy in Practice</i>, <i>8</i>, 3–9. <a href="https://doi.org/10.1017/S146039690800647X">https://doi.org/10.1017/S146039690800647X</a></li><li>Gee, A., Moffitt, D., Churn, M., &amp; Errington, R. D. (2000). A randomised controlled trial to test a non-metallic deodorant used during a course of radiotherapy. <i>Journal of Radiotherapy in Practice</i>, <i>1</i>, 205–212. <a href="https://doi.org/10.1017/S1460396999000321">https://doi.org/10.1017/S1460396999000321</a></li><li>Lewis, L., Carson, S., Bydder, S., Athifa, M., Williams, A.M., &amp; Bremner, A. (2014). Evaluating the effects of aluminum-containing and non-aluminum containing deodorants on axillary skin toxicity during radiation therapy for breast cancer: A 3-armed randomized controlled trial. <i>International Journal of Radiation Oncology* Biology* Physics</i>, <i>90</i>, 765–771. <a href="https://doi.org/10.1016/j.ijrobp.2014.06.054">https://doi.org/10.1016/j.ijrobp.2014.06.054</a></li><li>Théberge, V., Harel, F., &amp; Dagnault, A. (2009). Use of axillary deodorant and effect on acute skin toxicity during radiotherapy for breast cancer: A prospective randomized noninferiority trial. <i>International Journal of Radiation Oncology* Biology* Physics</i>, <i>75</i>, 1048–1052. <a href="https://doi.org/10.1016/j.ijrobp.2008.12.046">https://doi.org/10.1016/j.ijrobp.2008.12.046</a></li><li>Watson, L.C., Gies, D., Thompson, E., &amp; Thomas, B. (2012). Randomized control trial: Evaluating aluminum-based antiperspirant use, axilla skin toxicity, and reported quality of life in women receiving external beam radiotherapy for treatment of Stage 0, I, and II breast cancer. <i>International Journal of Radiation Oncology* Biology* Physics</i>, <i>83</i>, e29–e34. <a href="https://doi.org/10.1016/j.ijrobp.2011.12.006">https://doi.org/10.1016/j.ijrobp.2011.12.006</a></li></ol> <p>In a Canadian randomized controlled trial (Watson, Gies, Thompson, &amp; Thomas, 2012) of aluminum-based anti-perspirant use in patients with breast cancer undergoing radiotherapy, there was no difference in quality of life between the anti-perspirant use and the control (washing only) groups.</p> <p>In an Australian 3-arm randomized controlled study (Lewis et al., 2014) of the effects of deodorant with and without aluminum on axillary skin toxicity during radiotherapy for breast cancer, 91 patients using aluminum-containing deodorant, 90 patients using non-aluminum-containing deodorant, and 104 no-deodorant-use patients completed the study. The aluminum-containing group had significantly less perspiring than the control. The odds of the aluminum-containing group experiencing perspiring that was barely tolerable and frequently or always interfering with daily activities was reduced by 85%.</p>	
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Certainty of evidence		
What is the overall certainty of the evidence of effects?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li>● Very low</li> <li>○ Low</li> <li>○ Moderate</li> <li>○ High</li> <li>○ No included studies</li> </ul>		<p>The certainty in the estimates for deodorant/antiperspirant use was judged as low and very low due to concerns with risk of bias and for few events.</p>
Values		
Is there important uncertainty about or variability in how much people value the main outcomes?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li>○ Important uncertainty or variability</li> <li>○ Possibly important uncertainty or variability</li> <li>● Probably no important uncertainty or variability</li> <li>○ No important uncertainty or variability</li> </ul>	No research evidence identified	<p>The panel determined that people value the prevention of sweating and body odor but that their preference can depend on the severity of the itching. Some may put greater value on avoiding itching, and some may place greater value on using deodorant. However, people still place value on not increasing the severity of radiodermatitis and the ability to prevent a change in lifestyle.</p> <p>The panel noted that a group exists of people who do not use deodorant in normal practice.</p> <p>The panel noted that the population is predominantly females with breast cancer.</p>
Balance of effects		
Does the balance between desirable and undesirable effects favor the intervention or the comparison?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li>○ Favors the comparison</li> <li>○ Probably favors the comparison</li> <li>● Does not favor either the intervention or the comparison</li> <li>○ Probably favors the intervention</li> <li>○ Favors the intervention</li> <li>○ Varies</li> <li>○ Don't know</li> </ul>		<p>In determining the balance of effects, the panel discussed the very low certainty in the evidence of harms and that there may be additional benefit from deodorant in addressing body odor. They also noted the trivial desirable and undesirable effects.</p>

## Resources required

How large are the resource requirements (costs)?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Large costs</li> <li><input type="radio"/> Moderate costs</li> <li><input checked="" type="radio"/> Negligible costs and savings</li> <li><input type="radio"/> Moderate savings</li> <li><input type="radio"/> Large savings</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	No research evidence identified	The panel determined that there would be no additional cost to their routine with use of the intervention. They measured it against the cost of soap/water.

## Certainty of evidence of required resources

What is the certainty of the evidence of resource requirements (costs)?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Very low</li> <li><input type="radio"/> Low</li> <li><input type="radio"/> Moderate</li> <li><input type="radio"/> High</li> <li><input checked="" type="radio"/> No included studies</li> </ul>	No research evidence identified	

## Cost effectiveness

Does the cost-effectiveness of the intervention favor the intervention or the comparison?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Favors the comparison</li> <li><input type="radio"/> Probably favors the comparison</li> <li><input type="radio"/> Does not favor either the intervention or the comparison</li> <li><input type="radio"/> Probably favors the intervention</li> <li><input type="radio"/> Favors the intervention</li> <li><input type="radio"/> Varies</li> <li><input checked="" type="radio"/> No included studies</li> </ul>	No research evidence identified	

Equity		
What would be the impact on health equity?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<input type="radio"/> Reduced <input type="radio"/> Probably reduced <input checked="" type="radio"/> Probably no impact <input type="radio"/> Probably increased <input type="radio"/> Increased <input type="radio"/> Varies <input type="radio"/> Don't know	No research evidence identified	The panel determined there would probably be no impact on health equity.
Acceptability		
Is the intervention acceptable to key stakeholders?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<input type="radio"/> No <input type="radio"/> Probably no <input type="radio"/> Probably yes <input checked="" type="radio"/> Yes <input type="radio"/> Varies <input type="radio"/> Don't know	In an English randomized controlled trial (Bennett, 2009) comparing non-metallic deodorant use and no deodorant use during radiotherapy, 63 questionnaires were distributed that included questions about reactions to the study. Twenty-seven patients reported using the deodorant. All of them said it was easy to use, would use again, and preferred using it over forgoing deodorant. Fourteen percent of the no-deodorant group made positive comments about forgoing deodorant.	The panel decided that the patients are the main key stakeholder and that for healthcare providers, there would require a change in practice.
Feasibility		
Is the intervention feasible to implement?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<input type="radio"/> No <input type="radio"/> Probably no <input type="radio"/> Probably yes <input checked="" type="radio"/> Yes <input type="radio"/> Varies <input type="radio"/> Don't know	No research evidence identified	The panel decided that the intervention would be feasible to implement.

## SUMMARY OF JUDGEMENTS

	JUDGEMENT						
PROBLEM	No	Probably no	Probably yes	<b>Yes</b>		Varies	Don't know
DESIRABLE EFFECTS	<b>Trivial</b>	Small	Moderate	Large		Varies	Don't know
UNDESIRABLE EFFECTS	Large	Moderate	Small	<b>Trivial</b>		Varies	Don't know



	JUDGEMENT						
CERTAINTY OF EVIDENCE	Very low	Low	Moderate	High			No included studies
VALUES	Important uncertainty or variability	Possibly important uncertainty or variability	<b>Probably no important uncertainty or variability</b>	No important uncertainty or variability			
BALANCE OF EFFECTS	Favors the comparison	Probably favors the comparison	<b>Does not favor either the intervention or the comparison</b>	Probably favors the intervention	Favors the intervention	Varies	Don't know
RESOURCES REQUIRED	Large costs	Moderate costs	<b>Negligible costs and savings</b>	Moderate savings	Large savings	Varies	Don't know
CERTAINTY OF EVIDENCE OF REQUIRED RESOURCES	Very low	Low	Moderate	High			<b>No included studies</b>
COST EFFECTIVENESS	Favors the comparison	Probably favors the comparison	Does not favor either the intervention or the comparison	Probably favors the intervention	Favors the intervention	Varies	<b>No included studies</b>
EQUITY	Reduced	Probably reduced	<b>Probably no impact</b>	Probably increased	Increased	Varies	Don't know
ACCEPTABILITY	No	Probably no	Probably yes	<b>Yes</b>		Varies	Don't know
FEASIBILITY	No	Probably no	Probably yes	<b>Yes</b>		Varies	Don't know

### TYPE OF RECOMMENDATION

Strong recommendation against the intervention <input type="radio"/>	Conditional recommendation against the intervention <input type="radio"/>	Conditional recommendation for either the intervention or the comparison <input checked="" type="radio"/>	Conditional recommendation for the intervention <input type="radio"/>	Strong recommendation for the intervention <input type="radio"/>
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## CONCLUSIONS

### Recommendation

Among individuals receiving radiation treatment to the breast/chest region, the ONS Guidelines panel *suggests* either deodorant/antiperspirant use in addition to standard washing/skin care regimen or standard washing/skin care regimen alone (conditional recommendation for either; very low certainty of evidence).

**Remarks:** This decision will be driven by the values and preferences of the patient. Education should include that antiperspirants/deodorant do not seem to cause harm, sweating is decreased, and the risk of Grade 2 or 3 radiodermatitis is not increased.

### Justification

Based on the evidence, the panel issued a conditional recommendation for either deodorant or antiperspirant use in addition to normal washing or normal washing alone for patients receiving radiation therapy to the breast or chest fields. The panel determined that whether to wear deodorant or antiperspirant or not is unlikely to impact the risk of radiodermatitis, so patients receiving radiation to the chest/breast can follow their normal routine. This recommendation suggests that patients have the autonomy to decide whether or not to wear deodorant or antiperspirant during their treatment.

### Subgroup considerations

No subgroup considerations

### Implementation considerations

Patient education and healthcare provider education around the use of antiperspirants in addition to deodorant would be required because this will be a change in practice.

### Monitoring and evaluation

Current practice versus practice after guideline dissemination should be monitored.

## Research priorities

No research priorities identified

### IN-TEXT CITED REFERENCES

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## Aloe vera vs. standard of care

### RECOMMENDATION

Should aloe vera rather than standard of care be used to minimize the development of radiodermatitis?	
POPULATION:	Individuals receiving radiation therapy for cancer
INTERVENTION:	Aloe vera
COMPARISON:	Standard of care
MAIN OUTCOMES:	Pain; time to development of radiodermatitis; pruritis; dry skin; quality of life; cost; intervention adherence and fidelity
SETTING:	Clinical care
PERSPECTIVE:	Clinical recommendation - Population perspective
BACKGROUND:	Radiation-induced skin reactions can have minimal to significant impact on a patient's quality of life and may also have associated out of pocket costs (Schnur et al., 2012).
CONFLICT OF INTERESTS:	ONS conflict of interest declaration and management policies were applied and the following panel members were voting panel members (determining the direction and strength of the recommendation): Tracy Gosselin, PhD, RN, AOCN®, NEA-BC, FAAN, Susan D. Bruce, MSN, RN, OCN®, AOCNS®, Andrea Hutton, Carol M. Marquez, MD, FACR, Anne Shaftic, DNP, RN, NP-C, AOCNP®, Lauren V. Suarez, MSN, RN, OCN®, CBCN®  Panel members recused as a result of risk of conflicts of interest: None

### ASSESSMENT

Problem		
Is the problem a priority?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> No</li> <li><input type="radio"/> Probably no</li> <li><input type="radio"/> Probably yes</li> <li><input checked="" type="radio"/> Yes</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	<p>In the year 2000 about 24% of cancer survivors received radiation, and in 2020 that number is expected to increase to 29% (Bryant et al., 2017). This increase was seen across cancer sites with the largest increases for patients being treated for breast or prostate cancer (Bryant et al., 2017). Radiation induced skin reactions are one of the most commonly reported side effects of radiation therapy that can impact up to 95% of patients, and it is known to vary across treatment sites (Gewandter, Walker, Heckler, Morrow, &amp; Ryan, 2013; Gosselin, Schneider, Plambeck, Rowe, 2010). Due to this high risk, interventions for radiodermatitis are aimed at minimizing the severity or delaying progression to higher grades, rather than prevention.</p> <p>Skin changes from radiation are caused by disruption to the normal process of cell division and repair due to ionizing radiation therapy (Bray et al., 2016). Radiodermatitis can range from mild erythema to dry desquamation and moist desquamation (Singh et al., 2016). These skin changes usually manifest</p>	

within two to three weeks of radiation initiation and can persist for up to four weeks following the completion of treatment (Naylor & Mallett, 2001). Radiodermatitis can be painful and uncomfortable to patients and affects quality of life (Aistars, 2006; Vaz et al, 2007). If severe, it can also lead to changes in radiation treatment schedules (McQuestion, 2006).

## Desirable Effects

How substantial are the desirable anticipated effects?

### JUDGEMENT

- Trivial
- Small
- Moderate
- Large
- Varies
- Don't know

### RESEARCH EVIDENCE

Outcomes	No of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects* (95% CI)	
				Risk with standard of care	Risk difference with Aloe vera lotion
Development of RD grade 2 or 3 at wk 5 RT	106 (1 RCT <sup>1</sup> )	⊕⊕○○ LOW <sup>a,b,c</sup>	RR 0.22 (0.08 to 0.61)	Study population	
				340 per 1,000	265 fewer per 1,000 (312 fewer to 132 fewer)
Moist desquamation (<50% of field; CSSP score 9-10)	158 (1 RCT <sup>2</sup> )	⊕⊕○○ LOW <sup>a,b</sup>	RR 1.74 (0.68 to 4.48)	Study population	
				78 per 1,000	58 more per 1,000 (25 fewer to 271 more)
Adverse events related to treatment discontinuation	106 (1 RCT <sup>1</sup> )	⊕⊕○○ LOW <sup>b</sup>	-	No treatment-related adverse event reported in either arm (0/53 vs 0/53).	
Skin Rash	158 (1 RCT <sup>2</sup> )	⊕⊕○○ LOW <sup>a,b</sup>	RR 1.90 (1.02 to 3.53)	Study population	
				156 per 1,000	140 more per 1,000 (3 more to 394 more)


### ADDITIONAL CONSIDERATIONS

Chan et al. (2014) had identified Heggie et al., 2002, Merchant et al., 2007, Olsen et al., 2001, and Williams et al., 1996 in reviewing non-steroidal topicals, but those studies did not effectively address the evidence base for this guideline, so the panel's decision was informed by the Hoopfer et al. (2015) and Haddad et al. (2013) studies that were found in the update systematic review (Ginex et al., 2020).

The panel noted a reduction in pain and a large reduction of the relative risk of grade 2 and 3 at week 5. However, when taking the Hoopfer et al., 2015, results using the modified 10-point Catterall scale (CSSP) into account for grade 2 and 3, the panel determined that the magnitude of the desirable effect of grade 2 and 3 reduction may be reduced because CSSP results cannot be combined with the Radiation Therapy Oncology Group (RTOG) results in Haddad et al. (2013). In Hoopfer et al., 2015, the aloe cream arm had 81 randomized patients and the placebo arm had 77.

The panel noted the lack of a standardized formula and a lack of reported evidence (reporting bias).

The availability of so many aloe products makes the formulation of the product more important; therefore, the panel decided that "don't know" best represented the decision for desirable and undesirable.

	Pain	158 (1 RCT <sup>2</sup> )	 LOW <sup>a,b</sup>	RR 0.80 (0.49 to 1.30)	Study population
					325 per 1,000
					65 fewer per 1,000 (166 fewer to 97 more)
<b>Explanations</b>					
a. The 95% CI includes the potential for both benefit and harm.					
b. Few events reported do not meet the optimal information size and suggest fragility in the estimate					
c. Haddad 2013 has some concerns with incomplete outcome data, however, may contribute to the imprecision					
<b>References:</b>					
1. Haddad, P., Amouzgar–Hashemi, F., Samsami, S., Chinichian, S., & Oghabian, M.A. (2013). Aloe vera for prevention of radiation-induced dermatitis: A self-controlled clinical trial. <i>Current Oncology</i> , 20, e345–e348. <a href="http://dx.doi.org/10.3747/co.20.1356">http://dx.doi.org/10.3747/co.20.1356</a>					
2. Hoopfer, D., Holloway, C., Gabos, Z., Alidrisi, M., Chafe, S., Krause, B., ... Hanson, J. (2015). Three-arm randomized phase III trial: Quality aloe and placebo cream versus powder as skin treatment during breast cancer radiation therapy. <i>Clinical Breast Cancer</i> , 15, 181–190. <a href="http://dx.doi.org/10.1016/j.clbc.2014.12.006">http://dx.doi.org/10.1016/j.clbc.2014.12.006</a>					

## Undesirable Effects

How substantial are the undesirable anticipated effects?

JUDGEMENT	RESEARCH EVIDENCE				ADDITIONAL CONSIDERATIONS	
<input type="radio"/> Large <input type="radio"/> Moderate <input type="radio"/> Small <input type="radio"/> Trivial <input type="radio"/> Varies <input checked="" type="radio"/> Don't know	<b>Outcomes</b>	<b>No of participants (studies) Follow up</b>	<b>Certainty of the evidence (GRADE)</b>	<b>Relative effect (95% CI)</b>	<b>Anticipated absolute effects* (95% CI)</b>	
					<b>Risk with standard of care</b>	<b>Risk difference with Aloe vera lotion</b>
					Study population	
	<p>The panel considered the outcomes of moist desquamation and skin rash. The panel questioned how reported improvement in grades 2 and 3 could be possible if there is moist desquamation. The panel noted that the CSSP categories of 9 and 10 are not the same as grade 3.</p> <p>Hoopfer et al. (2015) used aloe and other ingredients in the topical preparation, so the panel decided that evidence was indirect. The panel also noted that Hoopfer et al. (2015) used powder as the standard of care.</p>					

Development of RD grade 2 or 3 at wk 5 RT	106 (1 RCT <sup>1</sup> )	⊕⊕○○ LOW <sup>a,b,c</sup>	<b>RR 0.22</b> (0.08 to 0.61)	340 per 1,000	265 fewer per 1,000 (312 fewer to 132 fewer)
Moist desquamation (<50% of field; CSSP score 9-10)	158 (1 RCT <sup>2</sup> )	⊕⊕○○ LOW <sup>a,b</sup>	<b>RR 1.74</b> (0.68 to 4.48)	Study population	
				78 per 1,000	58 more per 1,000 (25 fewer to 271 more)
Adverse events related to treatment discontinuation	106 (1 RCT <sup>1</sup> )	⊕⊕○○ LOW <sup>b</sup>	-	No treatment-related adverse event reported in either arm (0/53 vs 0/53).	
Skin Rash	158 (1 RCT <sup>2</sup> )	⊕⊕○○ LOW <sup>a,b</sup>	<b>RR 1.90</b> (1.02 to 3.53)	Study population	
				156 per 1,000	140 more per 1,000 (3 more to 394 more)
Pain	158 (1 RCT <sup>2</sup> )	⊕⊕○○ LOW <sup>a,b</sup>	<b>RR 0.80</b> (0.49 to 1.30)	Study population	
				325 per 1,000	65 fewer per 1,000 (166 fewer to 97 more)

**Explanations**

- a. The 95% CI includes the potential for both benefit and harm.
- b. Few events reported do not meet the optimal information size and suggest fragility in the estimate.
- c. Haddad 2013 has some concerns with incomplete outcome data, however, may contribute to the imprecision.

	<p><b>References:</b></p> <ol style="list-style-type: none"> <li>Haddad, P., Amouzgar–Hashemi, F., Samsami, S., Chinichian, S., &amp; Oghabian, M.A. (2013). Aloe vera for prevention of radiation-induced dermatitis: A self-controlled clinical trial. <i>Current Oncology</i>, <i>20</i>, e345–e348. <a href="http://dx.doi.org/10.3747/co.20.1356">http://dx.doi.org/10.3747/co.20.1356</a></li> <li>Hoopfer, D., Holloway, C., Gabos, Z., Alidrisi, M., Chafe, S., Krause, B., ... Hanson, J. (2015). Three-arm randomized phase III trial: Quality aloe and placebo cream versus powder as skin treatment during breast cancer radiation therapy. <i>Clinical Breast Cancer</i>, <i>15</i>, 181–190. <a href="http://dx.doi.org/10.1016/j.clbc.2014.12.006">http://dx.doi.org/10.1016/j.clbc.2014.12.006</a></li> </ol>	
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## Certainty of evidence

What is the overall certainty of the evidence of effects?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li>● Very low</li> <li>○ Low</li> <li>○ Moderate</li> <li>○ High</li> <li>○ No included studies</li> </ul>		<p>The certainty in the evidence was rated as very low due to the imprecision, risk of bias, inconsistency, indirectness, and publication bias (selective reporting of outcomes).</p>

## Values

Is there important uncertainty about or variability in how much people value the main outcomes?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li>○ Important uncertainty or variability</li> <li>○ Possibly important uncertainty or variability</li> <li>● Probably no important uncertainty or variability</li> <li>○ No important uncertainty or variability</li> </ul>	<p>No research evidence identified.</p>	<p>The panel noted the perception among patients that topical aloe may be sticky and dry the skin. Also, aloe may irritate the skin. They noted a difference in gel versus cream preparations.</p> <p>The panel determined that aloe may appeal to people wanting a natural product or a cooling product (when stored in the refrigerator).</p>



Balance of effects		
Does the balance between desirable and undesirable effects favor the intervention or the comparison?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Favors the comparison</li> <li><input type="radio"/> Probably favors the comparison</li> <li><input type="radio"/> Does not favor either the intervention or the comparison</li> <li><input type="radio"/> Probably favors the intervention</li> <li><input type="radio"/> Favors the intervention</li> <li><input type="radio"/> Varies</li> <li><input checked="" type="radio"/> Don't know</li> </ul>		
Resources required		
How large are the resource requirements (costs)?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Large costs</li> <li><input type="radio"/> Moderate costs</li> <li><input checked="" type="radio"/> Negligible costs and savings</li> <li><input type="radio"/> Moderate savings</li> <li><input type="radio"/> Large savings</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	The cost of aloe was estimated from results of an Internet search.	The panel determined that aloe preparations would cost patients \$5–10 per bottle.
Certainty of evidence of required resources		
What is the certainty of the evidence of resource requirements (costs)?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Very low</li> <li><input type="radio"/> Low</li> <li><input type="radio"/> Moderate</li> <li><input type="radio"/> High</li> <li><input checked="" type="radio"/> No included studies</li> </ul>	No research evidence identified.	

## Cost effectiveness

Does the cost-effectiveness of the intervention favor the intervention or the comparison?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Favors the comparison</li> <li><input type="radio"/> Probably favors the comparison</li> <li><input type="radio"/> Does not favor either the intervention or the comparison</li> <li><input type="radio"/> Probably favors the intervention</li> <li><input type="radio"/> Favors the intervention</li> <li><input type="radio"/> Varies</li> <li><input checked="" type="radio"/> No included studies</li> </ul>	No research evidence identified.	

## Equity

What would be the impact on health equity?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Reduced</li> <li><input type="radio"/> Probably reduced</li> <li><input checked="" type="radio"/> Probably no impact</li> <li><input type="radio"/> Probably increased</li> <li><input type="radio"/> Increased</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	No research evidence identified	The panel determined there would probably be no impact on health equity.

## Acceptability

Is the intervention acceptable to key stakeholders?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> No</li> <li><input type="radio"/> Probably no</li> <li><input type="radio"/> Probably yes</li> <li><input checked="" type="radio"/> Yes</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	No research evidence identified	The panel decided that patients would accept the intervention and that clinicians would probably accept it. They noted that a standardized formula is needed

## Feasibility

Is the intervention feasible to implement?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<input type="radio"/> No <input type="radio"/> Probably no <input type="radio"/> Probably yes <input checked="" type="radio"/> Yes <input type="radio"/> Varies <input type="radio"/> Don't know	No research evidence identified	The panel decided that the intervention would be feasible to implement.

## SUMMARY OF JUDGEMENTS

PROBLEM	JUDGEMENT						
	No	Probably no	Probably yes	Yes		Varies	Don't know
DESIRABLE EFFECTS	Trivial	Small	Moderate	Large		Varies	<b>Don't know</b>
UNDESIRABLE EFFECTS	Large	Moderate	Small	Trivial		Varies	<b>Don't know</b>
CERTAINTY OF EVIDENCE	<b>Very low</b>	Low	Moderate	High			No included studies
VALUES	Important uncertainty or variability	Possibly important uncertainty or variability	<b>Probably no important uncertainty or variability</b>	No important uncertainty or variability			
BALANCE OF EFFECTS	Favors the comparison	Probably favors the comparison	Does not favor either the intervention or the comparison	Probably favors the intervention	Favors the intervention	Varies	<b>Don't know</b>
RESOURCES REQUIRED	Large costs	Moderate costs	<b>Negligible costs and savings</b>	Moderate savings	Large savings	Varies	Don't know
CERTAINTY OF EVIDENCE OF REQUIRED RESOURCES	Very low	Low	Moderate	High			<b>No included studies</b>
COST EFFECTIVENESS	Favors the comparison	Probably favors the comparison	Does not favor either the intervention or the comparison	Probably favors the intervention	Favors the intervention	Varies	<b>No included studies</b>
EQUITY	Reduced	Probably reduced	<b>Probably no impact</b>	Probably increased	Increased	Varies	Don't know
ACCEPTABILITY	No	Probably no	Probably yes	<b>Yes</b>		Varies	Don't know
FEASIBILITY	No	Probably no	Probably yes	<b>Yes</b>		Varies	Don't know

## TYPE OF RECOMMENDATION

Strong recommendation against the intervention ○	Conditional recommendation against the intervention ○	Conditional recommendation for either the intervention or the comparison ○	Conditional recommendation for the intervention ○	Strong recommendation for the intervention ○
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## CONCLUSIONS

### Recommendation

Among individuals receiving radiation therapy for cancer, the ONS Guidelines panel recommends aloe vera and aloe vera formulations only *in the context of a clinical trial* (no recommendation, knowledge gap).

### Justification

Limited consistent evidence exists to support a recommendation for aloe vera for the treatment of radiodermatitis in patients with cancer. Based on the low quality of the evidence and the lack of standardization in the formulas included in the research, the guideline panel was unable to determine the benefits or harms and made no recommendation for aloe vera and identified this intervention as an evidence gap that warrants further research.

### Subgroup considerations

No subgroup considerations

### Implementation considerations

No implementation considerations

## Monitoring and evaluation

No monitoring and evaluation considerations

## Research priorities

Standardized formulation is required

### IN-TEXT CITED REFERENCES

- Aistars, J. (2006). The validity of skin care protocols followed by women with breast cancer receiving external radiation. *Clinical Journal of Oncology Nursing*, 10, 487–492. <https://doi.org/10.1188/06.CJON.487-492>
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## Emu oil vs. standard of care

### RECOMMENDATION

#### Should emu oil rather than standard of care be used to minimize the development of radiodermatitis?

<b>POPULATION:</b>	Individuals receiving radiation treatment for cancer
<b>INTERVENTION:</b>	Emu oil
<b>COMPARISON:</b>	Standard of care
<b>MAIN OUTCOMES:</b>	Pain; pruritis; dry skin; quality of life; cost; time to development of radiodermatitis; intervention adherence and fidelity
<b>SETTING:</b>	Clinical care
<b>PERSPECTIVE:</b>	Clinical recommendation – Population perspective
<b>BACKGROUND:</b>	Radiation-induced skin reactions can have minimal to significant impact on a patient’s quality of life and may also have associated out of pocket costs (Schnur et al., 2012)
<b>CONFLICT OF INTERESTS:</b>	ONS conflict of interest declaration and management policies were applied and the following panel members were voting panel members (determining the direction and strength of the recommendation): Tracy Gosselin, PhD, RN, AOCN®, NEA-BC, FAAN, Susan D. Bruce, MSN, RN, OCN®, AOCNS®, Andrea Hutton, Carol M. Marquez, MD, FACR, Anne Shaftic, DNP, RN, NP-C, AOCNP®, Lauren V. Suarez, MSN, RN, OCN®, CBCN®  Panel members recused as a result of risk of conflicts of interest: None

## ASSESSMENT

Problem		
Is the problem a priority?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> No</li> <li><input type="radio"/> Probably no</li> <li><input type="radio"/> Probably yes</li> <li><input checked="" type="radio"/> Yes</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	<p>In the year 2000 about 24% of cancer survivors received radiation, and in 2020 that number is expected to increase to 29% (Bryant et al., 2017). This increase was seen across cancer sites with the largest increases for patients being treated for breast or prostate cancer (Bryant et al., 2017). Radiation induced skin reactions are one of the most commonly reported side effects of radiation therapy that can impact up to 95% of patients, and it is known to vary across treatment sites (Gewandter, Walker, Heckler, Morrow, &amp; Ryan, 2013; Gosselin, Schneider, Plambeck, Rowe, 2010). Due to this high risk, interventions for radiodermatitis are aimed at minimizing the severity or delaying progression to higher grades, rather than prevention.</p> <p>Skin changes from radiation are caused by disruption to the normal process of cell division and repair due to ionizing radiation therapy (Bray et al., 2016). Radiodermatitis can range from mild erythema to dry desquamation and moist desquamation (Singh et al., 2016). These skin changes usually manifest within two to three weeks of radiation initiation and can persist for up to four weeks following the completion of treatment (Naylor &amp; Mallett, 2001). Radiodermatitis can be painful and uncomfortable to patients and affects quality of life (Aistars, 2006; Vaz et al., 2007). If severe, it can also lead to changes in radiation treatment schedules (McQuestion, 2006).</p>	
Desirable Effects		
How substantial are the desirable anticipated effects?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input checked="" type="radio"/> Trivial</li> <li><input type="radio"/> Small</li> <li><input type="radio"/> Moderate</li> <li><input type="radio"/> Large</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	<p>Rollmann, D.C., Novotny, P.J., Petersen, I.A., Garces, Y.I., Bauer, H.J., Yan, E.S., ... Laack, N.N.I. (2015). Double-blind, placebo-controlled pilot study of processed ultra emu oil versus placebo in the prevention of radiation dermatitis. <i>International Journal of Radiation Oncology* Biology* Physics</i>, 92, 650–658. <a href="http://dx.doi.org/10.1016/j.ijrobp.2015.02.028">http://dx.doi.org/10.1016/j.ijrobp.2015.02.028</a></p>	<p>Rollman et al. (2015) used the Skindex-16 for patient-reported outcomes. The panel noted that emu oil may improve quality of life but that the difference between the area under the curve scores of 7.2 for emu oil patients and 10.4 for the placebo patients was probably not meaningful.</p> <p>Cottonseed oil was used as the placebo, but the panel did not know much about it.</p>

Undesirable Effects		
How substantial are the undesirable anticipated effects?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Large</li> <li><input type="radio"/> Moderate</li> <li><input type="radio"/> Small</li> <li><input checked="" type="radio"/> Trivial</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	<p>Rollmann, D.C., Novotny, P.J., Petersen, I.A., Garces, Y.I., Bauer, H.J., Yan, E.S., ... Laack, N.N.I. (2015). Double-blind, placebo-controlled pilot study of processed ultra emu oil versus placebo in the prevention of radiation dermatitis. <i>International Journal of Radiation Oncology* Biology* Physics</i>, 92, 650–658. <a href="http://dx.doi.org/10.1016/j.ijrobp.2015.02.028">http://dx.doi.org/10.1016/j.ijrobp.2015.02.028</a></p>	<p>In the Rollman et al. (2015) study, patients using emu oil had a slightly worse score for maximum Common Terminology Criteria (CTC) grade (the difference was not significant). One patient using emu oil had an instance of grade 3 CTC moist desquamation.</p> <p>The panel noted a potential for an increased risk of G2+ by using emu oil.</p>
Certainty of evidence		
What is the overall certainty of the evidence of effects?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input checked="" type="radio"/> Very low</li> <li><input type="radio"/> Low</li> <li><input type="radio"/> Moderate</li> <li><input type="radio"/> High</li> <li><input type="radio"/> No included studies</li> </ul>		<p>The certainty in the estimates for emu oil were judged to be very low due to risk of bias, indirectness (i.e., only reported on grade 3 or above radiodermatitis) and imprecision.</p>
Values		
Is there important uncertainty about or variability in how much people value the main outcomes?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Important uncertainty or variability</li> <li><input type="radio"/> Possibly important uncertainty or variability</li> <li><input checked="" type="radio"/> Probably no important uncertainty or variability</li> <li><input type="radio"/> No important uncertainty or variability</li> </ul>		<p>The panel decided there would probably be no important uncertainty or variability in how much people value the main outcomes.</p>



Balance of effects		
Does the balance between desirable and undesirable effects favor the intervention or the comparison?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Favors the comparison</li> <li><input type="radio"/> Probably favors the comparison</li> <li><input checked="" type="radio"/> Does not favor either the intervention or the comparison</li> <li><input type="radio"/> Probably favors the intervention</li> <li><input type="radio"/> Favors the intervention</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>		The panel considered the trivial benefits versus trivial harms.
Resources required		
How large are the resource requirements (costs)?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Large costs</li> <li><input checked="" type="radio"/> Moderate costs</li> <li><input type="radio"/> Negligible costs and savings</li> <li><input type="radio"/> Moderate savings</li> <li><input type="radio"/> Large savings</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	The cost of emu oil was estimated from results of an Internet search.	The panel noted that the cost of emu oil would be about \$20 per treatment, based on the regimen followed in Rollmann et al. (2015). Patients were asked to use 1.5 ml of oil two times a day. And the cost of 16 oz. (475 ml) is about \$40.
Certainty of evidence of required resources		
What is the certainty of the evidence of resource requirements (costs)?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Very low</li> <li><input type="radio"/> Low</li> <li><input type="radio"/> Moderate</li> <li><input type="radio"/> High</li> <li><input checked="" type="radio"/> No included studies</li> </ul>	No research evidence identified	

Cost effectiveness		
Does the cost-effectiveness of the intervention favor the intervention or the comparison?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Favors the comparison</li> <li><input type="radio"/> Probably favors the comparison</li> <li><input type="radio"/> Does not favor either the intervention or the comparison</li> <li><input type="radio"/> Probably favors the intervention</li> <li><input type="radio"/> Favors the intervention</li> <li><input type="radio"/> Varies</li> <li><input checked="" type="radio"/> No included studies</li> </ul>	No research evidence identified	
Equity		
What would be the impact on health equity?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Reduced</li> <li><input checked="" type="radio"/> Probably reduced</li> <li><input type="radio"/> Probably no impact</li> <li><input type="radio"/> Probably increased</li> <li><input type="radio"/> Increased</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	No research evidence identified	The panel determined there may be a decrease in equity due to accessibility issues.
Acceptability		
Is the intervention acceptable to key stakeholders?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> No</li> <li><input type="radio"/> Probably no</li> <li><input checked="" type="radio"/> Probably yes</li> <li><input type="radio"/> Yes</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	No research evidence identified	The panel decided that clinicians would accept the intervention and that patients probably would accept it--some patients would object to the use of an animal product.

## Feasibility

Is the intervention feasible to implement?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<input type="radio"/> No <input type="radio"/> Probably no <input checked="" type="radio"/> Probably yes <input type="radio"/> Yes <input type="radio"/> Varies <input type="radio"/> Don't know	No research evidence identified	The panel noted that it would be difficult to apply such a small amount of the emu oil. They determined that formulation, dosing, and acquisition of the product are concerns.

## SUMMARY OF JUDGEMENTS

PROBLEM	JUDGEMENT						
	No	Probably no	Probably yes	Yes		Varies	Don't know
DESIRABLE EFFECTS	<b>Trivial</b>	Small	Moderate	Large		Varies	Don't know
UNDESIRABLE EFFECTS	Large	Moderate	Small	<b>Trivial</b>		Varies	Don't know
CERTAINTY OF EVIDENCE	<b>Very low</b>	Low	Moderate	High			No included studies
VALUES	Important uncertainty or variability	Possibly important uncertainty or variability	<b>Probably no important uncertainty or variability</b>	No important uncertainty or variability			
BALANCE OF EFFECTS	Favors the comparison	Probably favors the comparison	<b>Does not favor either the intervention or the comparison</b>	Probably favors the intervention	Favors the intervention	Varies	Don't know
RESOURCES REQUIRED	Large costs	<b>Moderate costs</b>	Negligible costs and savings	Moderate savings	Large savings	Varies	Don't know
CERTAINTY OF EVIDENCE OF REQUIRED RESOURCES	Very low	Low	Moderate	High			<b>No included studies</b>
COST EFFECTIVENESS	Favors the comparison	Probably favors the comparison	Does not favor either the intervention or the comparison	Probably favors the intervention	Favors the intervention	Varies	<b>No included studies</b>
EQUITY	Reduced	<b>Probably reduced</b>	Probably no impact	Probably increased	Increased	Varies	Don't know
ACCEPTABILITY	No	Probably no	<b>Probably yes</b>	Yes		Varies	Don't know
FEASIBILITY	No	Probably no	<b>Probably yes</b>	Yes		Varies	Don't know

## TYPE OF RECOMMENDATION

Strong recommendation against the intervention ○	Conditional recommendation against the intervention ●	Conditional recommendation for either the intervention or the comparison ○	Conditional recommendation for the intervention ○	Strong recommendation for the intervention ○
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## CONCLUSIONS

### Recommendation

Among individuals receiving radiation therapy for cancer, the ONS Guidelines panel *suggests* against emu oil in addition to standard washing/skin care regimen (conditional recommendation; very low certainty in the evidence).

### Justification

The panel acknowledged the limited evidence for emu oil and the trivial benefits and harms. In addition, emu oil may have moderate cost, possibly reduced accessibility, acceptability, and feasibility of implementation. Based on this evidence, the ONS Guidelines panel issued a conditional recommendation suggesting against use of emu oil for the management of radiodermatitis in patients with cancer receiving radiation therapy.

### Subgroup considerations

No subgroup considerations.

### Implementation considerations

No implementation considerations.

## Monitoring and evaluation

No monitoring and evaluation considerations.

## Research priorities

Standardized formulation is required.

### IN-TEXT CITED REFERENCES

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- Schnur, J.B., Zivin, J.G., Mattson, D.M., Green, S., Jandorf, L.H., Wernicke, A.G., & Montgomery, G.H. (2012). Acute skin toxicity-related, out-of-pocket expenses in patients with breast cancer treated with external beam radiotherapy. *Supportive Care in Cancer*, 20, 3105–3113. [10.1007/s00520-012-1435-6](https://doi.org/10.1007/s00520-012-1435-6)
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## Oral curcumin vs. standard of care

### RECOMMENDATION

Should oral curcumin rather than standard of care be used to minimize the development of radiodermatitis?	
POPULATION:	Individuals receiving radiation therapy for cancer
INTERVENTION:	Oral curcumin
COMPARISON:	Standard of care
MAIN OUTCOMES:	Pain; pruritis; dry skin; quality of life; cost; time to development of radiodermatitis; intervention adherence and fidelity
SETTING:	Clinical care
PERSPECTIVE:	Clinical recommendation - Population perspective
BACKGROUND:	Radiation-induced skin reactions can have minimal to significant impact on a patient's quality of life and may also have associated out of pocket costs (Schnur et al., 2012).
CONFLICT OF INTERESTS:	ONS conflict of interest declaration and management policies were applied and the following panel members were voting panel members (determining the direction and strength of the recommendation): Tracy Gosselin, PhD, RN, AOCN®, NEA-BC, FAAN, Susan D. Bruce, MSN, RN, OCN®, AOCNS®, Andrea Hutton, Carol M. Marquez, MD, FACR, Anne Shaftic, DNP, RN, NP-C, AOCNP®, Lauren V. Suarez, MSN, RN, OCN®, CBCN®  Panel members recused as a result of risk of conflicts of interest: None

### ASSESSMENT

Problem		
Is the problem a priority?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> No</li> <li><input type="radio"/> Probably no</li> <li><input type="radio"/> Probably yes</li> <li><input checked="" type="radio"/> Yes</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	<p>In the year 2000 about 24% of cancer survivors received radiation, and in 2020 that number is expected to increase to 29% (Bryant et al., 2017). This increase was seen across cancer sites with the largest increases for patients being treated for breast or prostate cancer (Bryant et al., 2017). Radiation induced skin reactions are one of the most commonly reported side effects of radiation therapy that can impact up to 95% of patients, and it is known to vary across treatment sites (Gewandter, Walker, Heckler, Morrow, &amp; Ryan, 2013; Gosselin, Schneider, Plambeck, Rowe, 2010). Due to this high risk, interventions for radiodermatitis are aimed at minimizing the severity or delaying progression to higher grades, rather than prevention.</p> <p>Skin changes from radiation are caused by disruption to the normal process of cell division and repair due to ionizing radiation therapy (Bray et al., 2016). Radiodermatitis can range from mild erythema to dry desquamation and moist desquamation (Singh et al., 2016). These skin changes usually manifest</p>	

within two to three weeks of radiation initiation and can persist for up to four weeks following the completion of treatment (Naylor & Mallett, 2001). Radiodermatitis can be painful and uncomfortable to patients and affects quality of life (Aistars, 2006; Vaz et al, 2007). If severe, it can also lead to changes in radiation treatment schedules (McQuestion, 2006).

## Desirable Effects

How substantial are the desirable anticipated effects?

### JUDGEMENT

- Trivial
- Small
- Moderate
- Large
- Varies
- Don't know

### RESEARCH EVIDENCE

Outcomes	No of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects* (95% CI)	
				Risk with standard of care	Risk difference with Curcumin
Development of radiodermatitis grade 2 or higher assessed with: moist desquamation	730 (2 RCTs <sup>1,2</sup> )	⊕○○○ VERY LOW <sup>a,b,c,d,e</sup>	RR 0.64 (0.42 to 0.96)	Study population	
				135 per 1,000	<b>48 fewer per 1,000</b> (78 fewer to 5 fewer)
RD at end of treatment	30 (1 RCT <sup>1</sup> )	⊕○○○ VERY LOW <sup>a,d</sup>	-	The mean RD at end of treatment was 0	MD 0.8 lower (1.36 lower to 0.23 lower)
Pain as measured by SF-MPQ	686 (1 RCT <sup>1</sup> )	⊕⊕○○ LOW <sup>a,f</sup>	- <sup>g</sup>	The mean pain as measured by SF-MPQ was 0	MD 0.007 higher (0.023 lower to 0.034 higher) <sup>g</sup>
HRQoL Symptom subscale from Skindex-29 assessed with:	686 (1 RCT <sup>1</sup> )	⊕⊕○○ LOW <sup>a,f</sup>	-	The mean hRQoL Symptom subscale from Skindex-29 was 0	MD 0.741 higher (0.394 lower to 0.021 higher)

### ADDITIONAL CONSIDERATIONS

The panel decided that the outcome of moist desquamation was an indirect measure of development of radiodermatitis grade 2 or higher therefore was renamed and rated down for indirectness in the evidence profile.

	<table border="1" data-bbox="531 107 1407 207"> <tr> <td data-bbox="531 107 722 207">Composite score at end of RT</td> <td data-bbox="722 107 856 207"></td> <td data-bbox="856 107 1005 207"></td> <td data-bbox="1005 107 1106 207"></td> <td data-bbox="1106 107 1276 207"></td> <td data-bbox="1276 107 1407 207"></td> </tr> </table> <p data-bbox="531 248 653 269"><b>Explanations:</b></p> <ol data-bbox="531 313 1402 670" style="list-style-type: none"> <li>Ryan Wolf 2018 has concerns with incomplete outcome data (15% dropped out after randomization), selective reporting (did not use a validated scale and demonstrated unreliable identification of moist desquamation)</li> <li>Some heterogeneity suspected (<math>I^2 = 69%</math>); however, likely contributes to imprecision and is accounted for within that domain</li> <li>Ryan 2013 and Ryan Wolf 2018 reported on moist desquamation, used here as an indirect measure of the critical outcome development of radiodermatitis.</li> <li>Few events reported do not meet the optimal information size and suggest fragility in the estimate</li> <li>The 95% CI may not include meaningful benefit.</li> <li>The 95% CI includes the potential for both benefit and harm.</li> <li>Ryan 2013 reported a similar finding when measuring SF-MQP among 35 patients (MD: 1.77, 95% CI: -0.93, 4.47). Based on the presentation of results in Ryan Wolf 2018, the results could not be pooled, so that estimate from the larger study was reported.</li> </ol> <p data-bbox="531 711 636 732"><b>References:</b></p> <ol style="list-style-type: none"> <li>Ryan, J.L., Heckler, C.E., Ling, M., Katz, A., Williams, J.P., Pentland, A.P., &amp; Morrow, G.R. (2013). Curcumin for radiation dermatitis: A randomized, double-blind, placebo-controlled clinical trial of thirty breast cancer patients. <i>Radiation Research</i>, 180, 34–43. <a href="https://doi.org/10.1667/RR3255.1">https://doi.org/10.1667/RR3255.1</a></li> <li>Ryan Wolf, J., Heckler, C.E., Guido, J.J., Peoples, A.R., Gewandter, J.S., Ling, M., ... Pentland, A.P. (2018). Oral curcumin for radiation dermatitis: A URCC NCORP study of 686 breast cancer patients. <i>Supportive Care in Cancer</i>, 26, 1543–1552. <a href="https://doi.org/10.1007/s00520-017-3957-4">https://doi.org/10.1007/s00520-017-3957-4</a></li> </ol> <p data-bbox="531 992 1413 1182">In a systematic review (Vaughn, Branum, &amp; Sivamani, 2016) of the effects of turmeric on skin health, including radiodermatitis, the authors noted that it is important to consider the dosages used in studies when considering curcumin use. They said that curcumin typically has poor bioavailability. The authors referenced Shah et al., 1999, in saying that curcumin may have an inhibitory effect on platelet aggregation and could interact with anticoagulation and antiplatelet medications. They referenced Rasyid and Lelo, 1999, in saying that curcumin can stimulate gallbladder contractions, thereby exacerbating symptoms in patients with gallstones.</p>	Composite score at end of RT						
Composite score at end of RT								



# Undesirable Effects

How substantial are the undesirable anticipated effects?

JUDGEMENT	RESEARCH EVIDENCE					ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li>○ Large</li> <li>○ Moderate</li> <li>○ Small</li> <li>● Trivial</li> <li>○ Varies</li> <li>○ Don't know</li> </ul>	<b>Outcomes</b>	<b>No of participants (studies)</b> Follow up	<b>Certainty of the evidence (GRADE)</b>	<b>Relative effect (95% CI)</b>	<b>Anticipated absolute effects* (95% CI)</b>	
	Development of radiodermatitis grade 2 or higher assessed with: moist desquamation	730 (2 RCTs <sup>1,2</sup> )	⊕○○○ VERY LOW <sup>a,b,c,d,e</sup>	<b>RR 0.64</b> (0.42 to 0.96)	Study population	
					135 per 1,000	<b>48 fewer per 1,000</b> (78 fewer to 5 fewer)
	RD at end of treatment	30 (1 RCT <sup>1</sup> )	⊕○○○ VERY LOW <sup>a,d</sup>	-	The mean RD at end of treatment was <b>0</b>	<b>MD 0.8 lower</b> (1.36 lower to 0.23 lower)
	Pain as measured by SF-MPQ	686 (1 RCT <sup>1</sup> )	⊕⊕○○ LOW <sup>a,f</sup>	- <sup>g</sup>	The mean pain as measured by SF-MPQ was <b>0</b>	<b>MD 0.007 higher</b> (0.023 lower to 0.034 higher) <sup>g</sup>
HRQoL Symptom subscale from Skindex-29 assessed with: Composite score at end of RT	686 (1 RCT <sup>1</sup> )	⊕⊕○○ LOW <sup>a,f</sup>	-	The mean hRQoL Symptom subscale from Skindex-29 was <b>0</b>	<b>MD 0.741 higher</b> (0.394 lower to 0.021 higher)	

The undesirable effects considered by the panel are based on the results from the pain and HRQoL scales.

The panel determined that participants would have been excluded from these studies if on anticoagulants because there may be increased risks if used among persons with a risk of bleeding. This has not been studied.

	<p><b>Explanations:</b></p> <ol style="list-style-type: none"> <li>a. Ryan Wolf 2018 has concerns with incomplete outcome data (15% dropped out after randomization), selective reporting (did not use a validated scale and demonstrated unreliable identification of moist desquamation)</li> <li>b. Some heterogeneity suspected (<math>I^2 = 69\%</math>); however, likely contributes to imprecision and is accounted for within that domain</li> <li>c. Ryan 2013 and Ryan Wolf 2018 reported on moist desquamation, used here as an indirect measure of the critical outcome development of radiodermatitis.</li> <li>d. Few events reported do not meet the optimal information size and suggest fragility in the estimate</li> <li>e. The 95% CI may not include meaningful benefit.</li> <li>f. The 95% CI includes the potential for both benefit and harm.</li> <li>g. Ryan 2013 reported a similar finding when measuring SF-MQP among 35 patients (MD: 1.77, 95% CI: -0.93, 4.47). Based on the presentation of results in Ryan Wolf 2018, the results could not be pooled, so that estimate from the larger study was reported.</li> </ol> <p><b>References:</b></p> <ol style="list-style-type: none"> <li>1. Ryan, J.L., Heckler, C.E., Ling, M., Katz, A., Williams, J.P., Pentland, A.P., &amp; Morrow, G.R. (2013). Curcumin for radiation dermatitis: A randomized, double-blind, placebo-controlled clinical trial of thirty breast cancer patients. <i>Radiation Research</i>, 180, 34–43. <a href="https://doi.org/10.1667/RR3255.1">https://doi.org/10.1667/RR3255.1</a></li> <li>2. Ryan Wolf, J., Heckler, C.E., Guido, J.J., Peoples, A.R., Gewandter, J.S., Ling, M., ... Pentland, A.P. (2018). Oral curcumin for radiation dermatitis: A URCC NCORP study of 686 breast cancer patients. <i>Supportive Care in Cancer</i>, 26, 1543–1552. <a href="https://doi.org/10.1007/s00520-017-3957-4">https://doi.org/10.1007/s00520-017-3957-4</a></li> </ol> <p>In a systematic review (Vaughn, Branum, &amp; Sivamani, 2016) of the effects of turmeric on skin health, including radiodermatitis, the authors noted that it is important to consider the dosages used in studies when considering curcumin use. They said that curcumin typically has poor bioavailability. The authors referenced Shah et al., 1999, in saying that curcumin may have an inhibitory effect on platelet aggregation and could interact with anticoagulation and antiplatelet medications. They referenced Rasyid and Lelo, 1999, in saying that curcumin can stimulate gallbladder contractions, thereby exacerbating symptoms in patients with gallstones.</p>	
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Certainty of evidence		
What is the overall certainty of the evidence of effects?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input checked="" type="radio"/> Very low</li> <li><input type="radio"/> Low</li> <li><input type="radio"/> Moderate</li> <li><input type="radio"/> High</li> <li><input type="radio"/> No included studies</li> </ul>		<p>The panel had very low certainty in the evidence of effects based on the harms, risk of bias due to lack of a standardized scale, and conflicting readings on the development of moist desquamation.</p>

Values		
Is there important uncertainty about or variability in how much people value the main outcomes?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Important uncertainty or variability</li> <li><input type="radio"/> Possibly important uncertainty or variability</li> <li><input checked="" type="radio"/> Probably no important uncertainty or variability</li> <li><input type="radio"/> No important uncertainty or variability</li> </ul>	No research evidence identified.	The panel decided there was probably no important uncertainty or variability in how much people value the main outcomes.
Balance of effects		
Does the balance between desirable and undesirable effects favor the intervention or the comparison?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Favors the comparison</li> <li><input type="radio"/> Probably favors the comparison</li> <li><input type="radio"/> Does not favor either the intervention or the comparison</li> <li><input type="radio"/> Probably favors the intervention</li> <li><input type="radio"/> Favors the intervention</li> <li><input type="radio"/> Varies</li> <li><input checked="" type="radio"/> Don't know</li> </ul>		In trying to determine the balance of effects, the panel noted some uncertainty in the pain and HRQoL scales and low certainty of benefits. The studies eliminated people who could be harmed. In Ryan Wolf et al. (2018), there was discrepancy in classifying moist desquamation from pictures. Radiation dermatitis severity (RDS) score was used, which is not standardized, so there were concerns about risk of bias. Ryan Wolf et al. (2018) was a multi-site study, so there was no interrater reliability. The report on the benefit is flawed, so the panel was not able to balance the effects.
Resources required		
How large are the resource requirements (costs)?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Large costs</li> <li><input checked="" type="radio"/> Moderate costs</li> <li><input type="radio"/> Negligible costs and savings</li> <li><input type="radio"/> Moderate savings</li> <li><input type="radio"/> Large savings</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	The cost of curcumin oral supplements was estimated from prices found in an Internet search.	The panel decided that given the over-the-counter price for a bottle of oral curcumin (varies between \$5 and \$20) and the requirement that 4 pills be taken by the person 3 times per day, this would be a moderate cost.

## Certainty of evidence of required resources

What is the certainty of the evidence of resource requirements (costs)?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Very low</li> <li><input type="radio"/> Low</li> <li><input type="radio"/> Moderate</li> <li><input type="radio"/> High</li> <li><input checked="" type="radio"/> No included studies</li> </ul>	No research evidence identified.	

## Cost effectiveness

Does the cost-effectiveness of the intervention favor the intervention or the comparison?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Favors the comparison</li> <li><input type="radio"/> Probably favors the comparison</li> <li><input type="radio"/> Does not favor either the intervention or the comparison</li> <li><input type="radio"/> Probably favors the intervention</li> <li><input type="radio"/> Favors the intervention</li> <li><input type="radio"/> Varies</li> <li><input checked="" type="radio"/> No included studies</li> </ul>	No research evidence identified.	

## Equity

What would be the impact on health equity?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Reduced</li> <li><input checked="" type="radio"/> Probably reduced</li> <li><input type="radio"/> Probably no impact</li> <li><input type="radio"/> Probably increased</li> <li><input type="radio"/> Increased</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	No research evidence identified.	The panel determined that accessibility to curcumin supplements may be reduced because of cost, which would reduce health equity.

Acceptability		
Is the intervention acceptable to key stakeholders?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<input type="radio"/> No <input type="radio"/> Probably no <input type="radio"/> Probably yes <input checked="" type="radio"/> Yes <input type="radio"/> Varies <input type="radio"/> Don't know	No research evidence identified	The panel determined that both clinicians and patients would find curcumin acceptable.

Feasibility		
Is the intervention feasible to implement?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<input type="radio"/> No <input type="radio"/> Probably no <input checked="" type="radio"/> Probably yes <input type="radio"/> Yes <input type="radio"/> Varies <input type="radio"/> Don't know	No research evidence identified	The panel determined that there are some concerns with the feasibility of taking curcumin: 1) there is no standard formulation or dosing, 2) the drug-drug interactions are not known, and 3) the patients may experience pill fatigue taking 4 pills 3 times a day, especially when combined with other medical regimens.

## SUMMARY OF JUDGEMENTS

PROBLEM	JUDGEMENT						
	No	Probably no	Probably yes	Yes		Varies	Don't know
DESIRABLE EFFECTS	Trivial	<b>Small</b>	Moderate	Large		Varies	Don't know
UNDESIRABLE EFFECTS	Large	Moderate	Small	<b>Trivial</b>		Varies	Don't know
CERTAINTY OF EVIDENCE	<b>Very low</b>	Low	Moderate	High			No included studies
VALUES	Important uncertainty or variability	Possibly important uncertainty or variability	<b>Probably no important uncertainty or variability</b>	No important uncertainty or variability			
BALANCE OF EFFECTS	Favors the comparison	Probably favors the comparison	Does not favor either the intervention or the comparison	Probably favors the intervention	Favors the intervention	Varies	<b>Don't know</b>
RESOURCES REQUIRED	Large costs	<b>Moderate costs</b>	Negligible costs and savings	Moderate savings	Large savings	Varies	Don't know

	JUDGEMENT						
CERTAINTY OF EVIDENCE OF REQUIRED RESOURCES	Very low	Low	Moderate	High			No included studies
COST EFFECTIVENESS	Favors the comparison	Probably favors the comparison	Does not favor either the intervention or the comparison	Probably favors the intervention	Favors the intervention	Varies	No included studies
EQUITY	Reduced	<b>Probably reduced</b>	Probably no impact	Probably increased	Increased	Varies	Don't know
ACCEPTABILITY	No	Probably no	Probably yes	<b>Yes</b>		Varies	Don't know
FEASIBILITY	No	Probably no	<b>Probably yes</b>	Yes		Varies	Don't know

## TYPE OF RECOMMENDATION

Strong recommendation against the intervention ○	Conditional recommendation against the intervention ○	Conditional recommendation for either the intervention or the comparison ○	Conditional recommendation for the intervention ○	Strong recommendation for the intervention ○
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## CONCLUSIONS

### Recommendation

Among individuals receiving radiation therapy for cancer, the ONS Guidelines panel recommends oral curcumin *only in the context of a clinical trial* (no recommendation, knowledge gap).

### Justification

The panel acknowledged the measurement of moist desquamation concerns in the studies and the potential for harms, particularly interactions with other medications used for cancer treatment. Based on this evidence, the ONS Guidelines panel made no recommendation for curcumin and identified this intervention as an evidence gap.

## Subgroup considerations

No subgroup considerations

## Implementation considerations

No implementation considerations

## Monitoring and evaluation

No monitoring and evaluation considerations.

## Research priorities

Standardized formulation is required

### IN-TEXT CITED REFERENCES

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## Should specialty topical nonsteroidal interventions (e.g., creams, lotions, ointments) vs. standard of care

### RECOMMENDATION

Should specialty topical nonsteroidal interventions (e.g., creams, lotions, ointments, etc.) rather than standard of care be used to minimize radiodermatitis?	
<b>POPULATION:</b>	Individuals with cancer receiving radiation therapy without symptoms of radiodermatitis
<b>INTERVENTION:</b>	Specialty topical non-steroidal interventions (e.g., creams, lotions, ointments)
<b>COMPARISON:</b>	Standard of care
<b>MAIN OUTCOMES:</b>	Pain; pruritis; dry skin; quality of life; cost; time to development of radiodermatitis; intervention adherence and fidelity; symptom severity; breaks/discontinuation in radiation treatment; secondary infections; time to resolution of radiodermatitis; protocol adherence and fidelity
<b>SETTING:</b>	Clinical care
<b>PERSPECTIVE:</b>	Clinical recommendation - Population perspective
<b>BACKGROUND:</b>	Radiation-induced skin reactions can have minimal to significant impact on a patient’s quality of life and may also have associated out of pocket costs (Schnur et al., 2012).



**CONFLICT OF INTERESTS:**

ONS conflict of interest declaration and management policies were applied and the following panel members were voting panel members (determining the direction and strength of the recommendation): Tracy Gosselin, PhD, RN, AOCN®, NEA-BC, FAAN, Susan D. Bruce, MSN, RN, OCN®, AOCNS®, Andrea Hutton, Carol M. Marquez, MD, FACR, Anne Shaftic, DNP, RN, NP-C, AOCNP®, Lauren V. Suarez, MSN, RN, OCN®, CBCN®

Panel members recused as a result of risk of conflicts of interest: None

**ASSESSMENT**

**Problem**

Is the problem a priority?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> No</li> <li><input type="radio"/> Probably no</li> <li><input type="radio"/> Probably yes</li> <li><input checked="" type="radio"/> Yes</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	<p>In the year 2000 about 24% of cancer survivors received radiation, and in 2020 that number is expected to increase to 29% (Bryant et al., 2017). This increase was seen across cancer sites with the largest increases for patients being treated for breast or prostate cancer (Bryant et al., 2017). Radiation induced skin reactions are one of the most commonly reported side effects of radiation therapy that can impact up to 95% of patients, and it is known to vary across treatment sites (Gewandter, Walker, Heckler, Morrow, &amp; Ryan, 2013; Gosselin, Schneider, Plambeck, Rowe, 2010). Due to this high risk, interventions for radiodermatitis are aimed at minimizing the severity or delaying progression to higher grades, rather than prevention.</p> <p>Skin changes from radiation are caused by disruption to the normal process of cell division and repair due to ionizing radiation therapy (Bray et al., 2016). Radiodermatitis can range from mild erythema to dry desquamation and moist desquamation (Singh et al., 2016). These skin changes usually manifest within two to three weeks of radiation initiation and can persist for up to four weeks following the completion of treatment (Naylor &amp; Mallett, 2001). Radiodermatitis can be painful and uncomfortable to patients and affects quality of life (Aistars, 2006; Vaz et al, 2007). If severe, it can also lead to changes in radiation treatment schedules (McQuestion, 2006).</p>	<p>This question is addressing all topical non-steroidal skin treatments: NOCA / 3M Cavilon Durable Barrier Cream / Daivonex (vitamin D)</p> <p>When discussing the standard of care arms, the panel noted that in Gosselin, Schneider, Plambeck, &amp; Rowe (2010), no difference was found between Aquaphor and water/placebo (n = 106: 53 vs 49) in the proportion of grade 2 – 4 progression from week 3 to 6. So then in the recent studies of cream, aqueous cream and sorbolene would be a comparable comparison group without rating down for indirectness.</p>

**Desirable Effects**

How substantial are the desirable anticipated effects?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS																	
<ul style="list-style-type: none"> <li><input checked="" type="radio"/> Trivial</li> <li><input type="radio"/> Small</li> <li><input type="radio"/> Moderate</li> <li><input type="radio"/> Large</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	<table border="1"> <thead> <tr> <th>Outcomes</th> <th>No of participants (studies) Follow up</th> <th>Certainty of the evidence (GRADE)</th> <th>Relative effect (95% CI)</th> <th>Anticipated absolute effects* (95% CI)</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td> <table border="1"> <tr> <td>Risk with placebo</td> <td>Risk difference with Topical nonsteroidal</td> </tr> </table> </td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>Study population</td> </tr> </tbody> </table>	Outcomes	No of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects* (95% CI)					<table border="1"> <tr> <td>Risk with placebo</td> <td>Risk difference with Topical nonsteroidal</td> </tr> </table>	Risk with placebo	Risk difference with Topical nonsteroidal					Study population	<p>The panel considered the effects on relief of itching and moist desquamation (benefit found in the chest wall region) when deciding upon trivial effect.</p>
Outcomes	No of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects* (95% CI)															
				<table border="1"> <tr> <td>Risk with placebo</td> <td>Risk difference with Topical nonsteroidal</td> </tr> </table>	Risk with placebo	Risk difference with Topical nonsteroidal													
Risk with placebo	Risk difference with Topical nonsteroidal																		
				Study population															

Development of RD grade 2 or higher	682 (3 RCTs <sup>1,3</sup> )	⊕⊕⊕○ MODERATE <sup>a</sup>	<b>RR 1.29</b> (1.06 to 1.57)	680 per 1,000	<b>197 more per 1,000</b> (41 more to 388 more)
Moist desquamation	245 (1 RCT <sup>2</sup> )	⊕○○○ VERY LOW <sup>b,c,d</sup>	<b>RR 0.84</b> (0.46 to 1.56)	Study population	
				160 per 1,000	<b>26 fewer per 1,000</b> (86 fewer to 90 more)
Pruritis	881 (3 RCTs <sup>1,2</sup> )	⊕⊕○○ LOW <sup>b,e</sup>	<b>RR 1.09</b> (0.95 to 1.24)	Study population	
				387 per 1,000	<b>35 more per 1,000</b> (19 fewer to 93 more)
Pain	636 (2 RCTs <sup>1</sup> )	⊕⊕⊕○ MODERATE <sup>c</sup>	<b>RR 1.10</b> (0.90 to 1.35)	Study population	
				349 per 1,000	<b>35 more per 1,000</b> (35 fewer to 122 more)
Relief of itching	176 (1 RCT <sup>2</sup> )	⊕○○○ VERY LOW <sup>b,d,f</sup>	<b>RR 0.85</b> (0.73 to 0.99)	Study population	
				849 per 1,000	<b>127 fewer per 1,000</b> (229 fewer to 8 fewer)

#### Explanations

- Nasser 2017 has concerns with allocation concealment, blinding of participants and outcome assessors, and incomplete outcome data. Possibly this contributes to or explains the heterogeneity ( $I^2=78%$ ) in the analysis.
- Laffin 2015 has some concerns with blinding of outcome assessors and selective reporting.
- The 95% CI includes the potential for both benefit and harm.
- Few events reported do not meet the optimal information size and suggest fragility in the estimate.
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	<p>f. The 95% CI may not include meaningful benefit.</p> <p><b>References:</b></p> <p>1. Chan, R.J., Mann, J., Tripcony, L., Keller, J., Cheuk, R., Blades, R., ... Walsh, C. (2014). Natural oil-based emulsion containing allantoin versus aqueous cream for managing radiation-induced skin reactions in patients with cancer: A phase 3, double-blind, randomized, controlled trial. <i>International Journal of Radiation Oncology* Biology* Physics</i>, 90, 756–764. <a href="https://doi.org/10.1016/j.ijrobp.2014.06.034">https://doi.org/10.1016/j.ijrobp.2014.06.034</a></p> <p>2. Laffin, N., Smyth, W., Heyer, E., Fasugba, O., Abernethy, G., &amp; Gardner, A. (2015). Effectiveness and acceptability of a moisturizing cream and a barrier cream during radiation therapy for breast cancer in the tropics: A randomized controlled trial. <i>Cancer Nursing</i>, 38, 205–214. <a href="https://doi.org/10.1097/NCC.0000000000000161">https://doi.org/10.1097/NCC.0000000000000161</a></p> <p>3. Nasser, N. J., Fenig, S., Ravid, A., Nouriel, A., Ozery, N., Gardyn, S., ... Fenig, E. (2017). Vitamin D ointment for prevention of radiation dermatitis in breast cancer patients. <i>NPI Breast Cancer</i>, 3, 10. <a href="https://doi.org/10.1038/s41523-017-0006-x">https://doi.org/10.1038/s41523-017-0006-x</a></p>	
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## Undesirable Effects

How substantial are the undesirable anticipated effects?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS																												
<ul style="list-style-type: none"> <li><input type="radio"/> Large</li> <li><input checked="" type="radio"/> Moderate</li> <li><input type="radio"/> Small</li> <li><input type="radio"/> Trivial</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #2e75b6; color: white;"> <th style="width: 15%;">Outcomes</th> <th style="width: 15%;">No of participants (studies) Follow up</th> <th style="width: 15%;">Certainty of the evidence (GRADE)</th> <th style="width: 10%;">Relative effect (95% CI)</th> <th colspan="2" style="width: 45%;">Anticipated absolute effects* (95% CI)</th> </tr> <tr style="background-color: #e6f2ff;"> <th colspan="4"></th> <th style="width: 15%;">Risk with placebo</th> <th style="width: 30%;">Risk difference with Topical nonsteroidal</th> </tr> </thead> <tbody> <tr> <td rowspan="2" style="vertical-align: top;">Development of RD grade 2 or higher</td> <td rowspan="2" style="vertical-align: top;">682 (3 RCTs<sup>1,3</sup>)</td> <td rowspan="2" style="vertical-align: top;">⊕⊕⊕○ MODERATE<sup>a</sup></td> <td rowspan="2" style="vertical-align: top;">RR 1.29 (1.06 to 1.57)</td> <td colspan="2" style="text-align: center;">Study population</td> </tr> <tr> <td style="text-align: center;">680 per 1,000</td> <td style="text-align: center;"><b>197 more per 1,000</b> (41 more to 388 more)</td> </tr> <tr> <td rowspan="2" style="vertical-align: top;">Moist desquamation</td> <td rowspan="2" style="vertical-align: top;">245 (1 RCT<sup>2</sup>)</td> <td rowspan="2" style="vertical-align: top;">⊕○○○ VERY LOW<sup>b,c,d</sup></td> <td rowspan="2" style="vertical-align: top;">RR 0.84 (0.46 to 1.56)</td> <td colspan="2" style="text-align: center;">Study population</td> </tr> <tr> <td style="text-align: center;">160 per 1,000</td> <td style="text-align: center;"><b>26 fewer per 1,000</b> (86 fewer to 90 more)</td> </tr> </tbody> </table>	Outcomes	No of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects* (95% CI)						Risk with placebo	Risk difference with Topical nonsteroidal	Development of RD grade 2 or higher	682 (3 RCTs <sup>1,3</sup> )	⊕⊕⊕○ MODERATE <sup>a</sup>	RR 1.29 (1.06 to 1.57)	Study population		680 per 1,000	<b>197 more per 1,000</b> (41 more to 388 more)	Moist desquamation	245 (1 RCT <sup>2</sup> )	⊕○○○ VERY LOW <sup>b,c,d</sup>	RR 0.84 (0.46 to 1.56)	Study population		160 per 1,000	<b>26 fewer per 1,000</b> (86 fewer to 90 more)	<p>This consideration is led by development of grade 2 radiodermatitis (other benefits include less relief of itching, pruritis).</p>
Outcomes	No of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects* (95% CI)																										
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Pruritis	881 (3 RCTs <sup>1,2</sup> )	⊕⊕○○ LOW <sup>b,e</sup>	<b>RR 1.09</b> (0.95 to 1.24)	Study population	
				387 per 1,000	<b>35 more per 1,000</b> (19 fewer to 93 more)
Pain	636 (2 RCTs <sup>1</sup> )	⊕⊕⊕○ MODERATE <sup>c</sup>	<b>RR 1.10</b> (0.90 to 1.35)	Study population	
				349 per 1,000	<b>35 more per 1,000</b> (35 fewer to 122 more)
Relief of itching	176 (1 RCT <sup>2</sup> )	⊕○○○ VERY LOW <sup>b,d,f</sup>	<b>RR 0.85</b> (0.73 to 0.99)	Study population	
				849 per 1,000	<b>127 fewer per 1,000</b> (229 fewer to 8 fewer)

#### Explanations

- a. Nasser 2017 has concerns with allocation concealment, blinding of participants and outcome assessors, and incomplete outcome data. Possibly this contributes or explains the heterogeneity ( $I^2=78%$ ) in the analysis.
- b. Laffin 2015 has some concerns with blinding of outcome assessors and selective reporting.
- c. The 95% CI includes the potential for both benefit and harm.
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- f. The 95% CI may not include meaningful benefit.

#### References:

1. Chan, R.J., Mann, J., Tripcony, L., Keller, J., Cheuk, R., Blades, R., ... Walsh, C. (2014). Natural oil-based emulsion containing allantoin versus aqueous cream for managing radiation-induced skin reactions in patients with cancer: A phase 3, double-blind, randomized, controlled trial. *International Journal of Radiation Oncology\* Biology\* Physics*, 90, 756–764. <https://doi.org/10.1016/j.ijrobp.2014.06.034>
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	<p>the tropics: A randomized controlled trial. <i>Cancer Nursing</i>, 38, 205–214.  <a href="https://doi.org/10.1097/NCC.0000000000000161">https://doi.org/10.1097/NCC.0000000000000161</a></p> <p>3. Nasser, N. J., Fenig, S., Ravid, A., Nouriel, A., Ozery, N., Gardyn, S., ... Fenig, E. (2017). Vitamin D ointment for prevention of radiation dermatitis in breast cancer patients. <i>NPJ Breast Cancer</i>, 3, 10.  <a href="https://doi.org/10.1038/s41523-017-0006-x">https://doi.org/10.1038/s41523-017-0006-x</a></p>	
<h3>Certainty of evidence</h3> <p>What is the overall certainty of the evidence of effects?</p>		
<b>JUDGEMENT</b>	<b>RESEARCH EVIDENCE</b>	<b>ADDITIONAL CONSIDERATIONS</b>
<ul style="list-style-type: none"> <li><input type="radio"/> Very low</li> <li><input type="radio"/> Low</li> <li><input checked="" type="radio"/> Moderate</li> <li><input type="radio"/> High</li> <li><input type="radio"/> No included studies</li> </ul>		The panel judged the certainty in the overall evidence of effects to be moderate due to the harm of developing grade 2 radiodermatitis or higher.
<h3>Values</h3> <p>Is there important uncertainty about or variability in how much people value the main outcomes?</p>		
<b>JUDGEMENT</b>	<b>RESEARCH EVIDENCE</b>	<b>ADDITIONAL CONSIDERATIONS</b>
<ul style="list-style-type: none"> <li><input type="radio"/> Important uncertainty or variability</li> <li><input type="radio"/> Possibly important uncertainty or variability</li> <li><input checked="" type="radio"/> Probably no important uncertainty or variability</li> <li><input type="radio"/> No important uncertainty or variability</li> </ul>	No research evidence identified	The panel decided that there would be variability in patient preferences: some patients may want to actively do something (use cream), and some patients may favor doing nothing until the presentation of radiodermatitis.
<h3>Balance of effects</h3> <p>Does the balance between desirable and undesirable effects favor the intervention or the comparison?</p>		
<b>JUDGEMENT</b>	<b>RESEARCH EVIDENCE</b>	<b>ADDITIONAL CONSIDERATIONS</b>
<ul style="list-style-type: none"> <li><input checked="" type="radio"/> Favors the comparison</li> <li><input type="radio"/> Probably favors the comparison</li> <li><input type="radio"/> Does not favor either the intervention or the comparison</li> <li><input type="radio"/> Probably favors the intervention</li> <li><input type="radio"/> Favors the intervention</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>		The panel considered the intervention's trivial benefits, moderate harms, and moderate certainty in those outcomes when determining the balance of effects.

Resources required		
How large are the resource requirements (costs)?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Large costs</li> <li><input checked="" type="radio"/> Moderate costs</li> <li><input type="radio"/> Negligible costs and savings</li> <li><input type="radio"/> Moderate savings</li> <li><input type="radio"/> Large savings</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	No research evidence identified	The panel decided there would be moderate savings if the standard of care (potentially water) were recommended.
Certainty of evidence of required resources		
What is the certainty of the evidence of resource requirements (costs)?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Very low</li> <li><input type="radio"/> Low</li> <li><input type="radio"/> Moderate</li> <li><input type="radio"/> High</li> <li><input checked="" type="radio"/> No included studies</li> </ul>	No research evidence identified	
Cost effectiveness		
Does the cost-effectiveness of the intervention favor the intervention or the comparison?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Favors the comparison</li> <li><input type="radio"/> Probably favors the comparison</li> <li><input type="radio"/> Does not favor either the intervention or the comparison</li> <li><input type="radio"/> Probably favors the intervention</li> <li><input type="radio"/> Favors the intervention</li> <li><input type="radio"/> Varies</li> <li><input checked="" type="radio"/> No included studies</li> </ul>	No research evidence identified	

Equity		
What would be the impact on health equity?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Reduced</li> <li><input checked="" type="radio"/> Probably reduced</li> <li><input type="radio"/> Probably no impact</li> <li><input type="radio"/> Probably increased</li> <li><input type="radio"/> Increased</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	No research evidence identified	The panel determined that the standard of care may increase equity (It could potentially be water.).
Acceptability		
Is the intervention acceptable to key stakeholders?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> No</li> <li><input type="radio"/> Probably no</li> <li><input checked="" type="radio"/> Probably yes</li> <li><input type="radio"/> Yes</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	In an Australian randomized controlled trial (Laffin et al., 2015) on the effectiveness and acceptability of Sorbolene moisturizing cream and Cavilon barrier cream, patients completed an acceptability survey. Data analysis was based on 245 participants. Cavilon (95.8%) had higher acceptability than Sorbolene (85.7%). Sixty-five percent of the Cavilon users found it easy to apply versus 45% of the Sorbolene users. A small portion (6.4%) of Cavilon users said it built up on the skin versus 27.9% of Sorbolene users. At follow-up, 42.3% of Cavilon of users found it acceptable versus 28.9% of Sorbolene users.	The panel decided that doing nothing would be acceptable to patients if they are provided with the information and reassurance that doing nothing is appropriate. The panel decided that clinicians and radiation therapy technicians would probably accept doing nothing.
Feasibility		
Is the intervention feasible to implement?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> No</li> <li><input type="radio"/> Probably no</li> <li><input type="radio"/> Probably yes</li> <li><input checked="" type="radio"/> Yes</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	No research evidence identified	The panel decided that doing nothing would be easy to implement with the correction education.

## SUMMARY OF JUDGEMENTS

	JUDGEMENT						
PROBLEM	No	Probably no	Probably yes	Yes		Varies	Don't know
DESIRABLE EFFECTS	Trivial	Small	Moderate	Large		Varies	Don't know

JUDGEMENT							
UNDESIRABLE EFFECTS	Large	<b>Moderate</b>	Small	Trivial		Varies	Don't know
CERTAINTY OF EVIDENCE	Very low	Low	<b>Moderate</b>	High			No included studies
VALUES	Important uncertainty or variability	Possibly important uncertainty or variability	<b>Probably no important uncertainty or variability</b>	No important uncertainty or variability			
BALANCE OF EFFECTS	<b>Favors the comparison</b>	Probably favors the comparison	Does not favor either the intervention or the comparison	Probably favors the intervention	Favors the intervention	Varies	Don't know
RESOURCES REQUIRED	Large costs	<b>Moderate costs</b>	Negligible costs and savings	Moderate savings	Large savings	Varies	Don't know
CERTAINTY OF EVIDENCE OF REQUIRED RESOURCES	Very low	Low	Moderate	High			<b>No included studies</b>
COST EFFECTIVENESS	Favors the comparison	Probably favors the comparison	Does not favor either the intervention or the comparison	Probably favors the intervention	Favors the intervention	Varies	<b>No included studies</b>
EQUITY	Reduced	<b>Probably reduced</b>	Probably no impact	Probably increased	Increased	Varies	Don't know
ACCEPTABILITY	No	Probably no	<b>Probably yes</b>	Yes		Varies	Don't know
FEASIBILITY	No	Probably no	Probably yes	<b>Yes</b>		Varies	Don't know

## TYPE OF RECOMMENDATION

Strong recommendation against the intervention ●	Conditional recommendation against the intervention ○	Conditional recommendation for either the intervention or the comparison ○	Conditional recommendation for the intervention ○	Strong recommendation for the intervention ○
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## CONCLUSIONS

### Recommendation

Among individuals with cancer receiving radiation therapy without symptoms of radiodermatitis, the ONS Guidelines panel *recommends* standard washing and skin care regimen rather than specialty topical nonsteroidal interventions to minimize radiodermatitis (strong recommendation, moderate certainty in the evidence).

**Remark:** This evidence for this recommendation evaluated specialty topical interventions. General emollient creams and lotions are part of a standard washing and skin care regimen.

### Justification

The panel acknowledged there is sufficient evidence to identify important differences between topical non-steroidal creams to minimize the development of radiodermatitis and standard washing/skin care. Based on this evidence, the ONS Guidelines panel issued a strong recommendation suggesting standard washing/skin care rather than topical non-steroidal creams to minimize the development of radiodermatitis. The panel considered that general emollient creams can be used as part of standard washing and skin care, but specialty/barrier creams demonstrated harms, added additional expense, and can lead to inequity due to increased cost.

### Subgroup considerations

No subgroup considerations

### Implementation considerations

Preparation for a change in practice would be needed.

### Monitoring and evaluation

No monitoring and evaluation considerations.

## Research priorities

No research priorities

### IN-TEXT CITED REFERENCES

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- Laffin, N., Smyth, W., Heyer, E., Fasugba, O., Abernethy, G., & Gardner, A. (2015). Effectiveness and acceptability of a moisturizing cream and a barrier cream during radiation therapy for breast cancer in the tropics: A randomized controlled trial. *Cancer Nursing*, 38, 205–214. <https://doi.org/10.1097/NCC.0000000000000161>
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- Vaz, A., Pinto-Neto, A., Conde, D., Costa-Palva, L., Morais, S., & Esteves, S. (2007). Quality of life of women with gynecologic cancer: Associated factors. *Archives of Gynecology and Obstetrics*, 276, 583–589. <https://doi.org/10.1007/s00404-007-0397-2>

### Calendula vs. standard of care

### RECOMMENDATION

#### Should calendula rather than standard of care be used to minimize the development of radiodermatitis?

POPULATION:	Individuals receiving radiation therapy for cancer
INTERVENTION:	Calendula

<b>COMPARISON:</b>	Standard of care
<b>MAIN OUTCOMES:</b>	Pain; pruritis; dry skin; quality of life; cost; time to development of radiodermatitis; intervention adherence and fidelity
<b>SETTING:</b>	Clinical care
<b>PERSPECTIVE:</b>	Clinical recommendation - Population perspective
<b>BACKGROUND:</b>	Radiation-induced skin reactions can have minimal to significant impact on a patient's quality of life and may also have associated out of pocket costs (Schnur et al., 2012).
<b>CONFLICT OF INTERESTS:</b>	ONS conflict of interest declaration and management policies were applied and the following panel members were voting panel members (determining the direction and strength of the recommendation): Tracy Gosselin, PhD, RN, AOCN®, NEA-BC, FAAN, Susan D. Bruce, MSN, RN, OCN®, AOCNS®, Andrea Hutton, Carol M. Marquez, MD, FACR, Anne Shaftic, DNP, RN, NP-C, AOCNP®, Lauren V. Suarez, MSN, RN, OCN®, CBCN®  Panel members recused as a result of risk of conflicts of interest: None

## ASSESSMENT

<b>Problem</b> Is the problem a priority?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<input type="radio"/> No <input type="radio"/> Probably no <input type="radio"/> Probably yes <input checked="" type="radio"/> Yes <input type="radio"/> Varies <input type="radio"/> Don't know	<p>In the year 2000 about 24% of cancer survivors received radiation, and in 2020 that number is expected to increase to 29% (Bryant et al., 2017). This increase was seen across cancer sites with the largest increases for patients being treated for breast or prostate cancer (Bryant et al., 2017). Radiation-induced skin reactions are one of the most commonly reported side effects of radiation therapy that can impact up to 95% of patients, and it is known to vary across treatment sites (Gewandter, Walker, Heckler, Morrow, &amp; Ryan, 2013; Gosselin, Schneider, Plambeck, Rowe, 2010). Due to this high risk, interventions for radiodermatitis are aimed at minimizing the severity or delaying progression to higher grades, rather than prevention.</p> <p>Skin changes from radiation are caused by disruption to the normal process of cell division and repair due to ionizing radiation therapy (Bray et al., 2016). Radiodermatitis can range from mild erythema to dry desquamation and moist desquamation (Singh et al., 2016). These skin changes usually manifest within two to three weeks of radiation initiation and can persist for up to four weeks following the completion of treatment (Naylor &amp; Mallett, 2001). Radiodermatitis can be painful and uncomfortable to patients and affects quality of life (Aistars, 2006; Vaz et al, 2007). If severe, it can also lead to changes in radiation treatment schedules (McQuestion, 2006).</p>	The panel noted that a standardized formula for calendula is needed.

## Desirable Effects

How substantial are the desirable anticipated effects?

JUDGEMENT	RESEARCH EVIDENCE					ADDITIONAL CONSIDERATIONS																								
<ul style="list-style-type: none"> <li>○ Trivial</li> <li>○ Small</li> <li>○ Moderate</li> <li>○ Large</li> <li>○ Varies</li> <li>● Don't know</li> </ul>	<table border="1"> <thead> <tr> <th data-bbox="520 240 720 475">Outcomes</th> <th data-bbox="720 240 856 475">No of participants (studies) Follow up</th> <th data-bbox="856 240 997 475">Certainty of the evidence (GRADE)</th> <th data-bbox="997 240 1106 475">Relative effect (95% CI)</th> <th colspan="2" data-bbox="1106 240 1417 345">Anticipated absolute effects* (95% CI)</th> </tr> <tr> <td colspan="2"></td> <td></td> <td></td> <th data-bbox="1106 345 1247 475">Risk with standard of care</th> <th data-bbox="1247 345 1417 475">Risk difference with Calendula</th> </tr> </thead> <tbody> <tr> <td data-bbox="520 475 720 703">Development of Grade 2 or greater</td> <td data-bbox="720 475 856 703">462 (2 RCTs<sup>1,2</sup>)</td> <td data-bbox="856 475 997 703">⊕⊕○○ LOW<sup>a,b</sup></td> <td data-bbox="997 475 1106 703">RR 1.21 (0.83 to 1.77)</td> <td colspan="2" data-bbox="1106 475 1417 548">Study population</td> </tr> <tr> <td colspan="2"></td> <td></td> <td></td> <td data-bbox="1106 548 1247 703">170 per 1,000</td> <td data-bbox="1247 548 1417 703"><b>36 more per 1,000</b> (29 fewer to 131 more)</td> </tr> </tbody> </table>	Outcomes	No of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects* (95% CI)						Risk with standard of care	Risk difference with Calendula	Development of Grade 2 or greater	462 (2 RCTs <sup>1,2</sup> )	⊕⊕○○ LOW <sup>a,b</sup>	RR 1.21 (0.83 to 1.77)	Study population						170 per 1,000	<b>36 more per 1,000</b> (29 fewer to 131 more)					<p>No studies identified reported on benefits, so the panel could not judge their substantial nature.</p>
Outcomes	No of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects* (95% CI)																										
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# Undesirable Effects

How substantial are the undesirable anticipated effects?

JUDGEMENT	RESEARCH EVIDENCE					ADDITIONAL CONSIDERATIONS																								
<ul style="list-style-type: none"> <li><input type="radio"/> Large</li> <li><input type="radio"/> Moderate</li> <li><input type="radio"/> Small</li> <li><input checked="" type="radio"/> Trivial</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	<table border="1"> <thead> <tr> <th data-bbox="520 240 720 475">Outcomes</th> <th data-bbox="720 240 856 475">No of participants (studies) Follow up</th> <th data-bbox="856 240 997 475">Certainty of the evidence (GRADE)</th> <th data-bbox="997 240 1106 475">Relative effect (95% CI)</th> <th colspan="2" data-bbox="1106 240 1417 345">Anticipated absolute effects* (95% CI)</th> </tr> <tr> <td colspan="2"></td> <td></td> <td></td> <th data-bbox="1106 345 1247 475">Risk with standard of care</th> <th data-bbox="1247 345 1417 475">Risk difference with Calendula</th> </tr> </thead> <tbody> <tr> <td data-bbox="520 475 720 703">Development of Grade 2 or greater</td> <td data-bbox="720 475 856 703">462 (2 RCTs<sup>1,2</sup>)</td> <td data-bbox="856 475 997 703">⊕⊕○○ LOW<sup>a,b</sup></td> <td data-bbox="997 475 1106 703">RR 1.21 (0.83 to 1.77)</td> <td colspan="2" data-bbox="1106 475 1417 548">Study population</td> </tr> <tr> <td colspan="2"></td> <td></td> <td></td> <td data-bbox="1106 548 1247 703">170 per 1,000</td> <td data-bbox="1247 548 1417 703">36 more per 1,000 (29 fewer to 131 more)</td> </tr> </tbody> </table>	Outcomes	No of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects* (95% CI)						Risk with standard of care	Risk difference with Calendula	Development of Grade 2 or greater	462 (2 RCTs <sup>1,2</sup> )	⊕⊕○○ LOW <sup>a,b</sup>	RR 1.21 (0.83 to 1.77)	Study population						170 per 1,000	36 more per 1,000 (29 fewer to 131 more)					<p>The panel based their decision on the development of grade 2+ radiodermatitis.</p>
Outcomes	No of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects* (95% CI)																										
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	quit using the intervention due to that difficulty. More trolamine (1.62 times more) was used than calendula.	
<h3>Certainty of evidence</h3> <p>What is the overall certainty of the evidence of effects?</p>		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<input type="radio"/> Very low <input checked="" type="radio"/> Low <input type="radio"/> Moderate <input type="radio"/> High <input type="radio"/> No included studies		The panel judged the certainty in the overall evidence of effects to be low due to concerns with imprecision and the potential for both benefits and harms.
<h3>Values</h3> <p>Is there important uncertainty about or variability in how much people value the main outcomes?</p>		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<input type="radio"/> Important uncertainty or variability <input type="radio"/> Possibly important uncertainty or variability <input checked="" type="radio"/> Probably no important uncertainty or variability <input type="radio"/> No important uncertainty or variability	No research evidence identified	
<h3>Balance of effects</h3> <p>Does the balance between desirable and undesirable effects favor the intervention or the comparison?</p>		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<input type="radio"/> Favors the comparison <input checked="" type="radio"/> Probably favors the comparison <input type="radio"/> Does not favor either the intervention or the comparison <input type="radio"/> Probably favors the intervention <input type="radio"/> Favors the intervention <input type="radio"/> Varies <input type="radio"/> Don't know		The panel decided that, based on the harms for calendula, the balance of effects probably favors the comparison.

Resources required		
How large are the resource requirements (costs)?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<input type="radio"/> Large costs <input type="radio"/> Moderate costs <input checked="" type="radio"/> Negligible costs and savings <input type="radio"/> Moderate savings <input type="radio"/> Large savings <input type="radio"/> Varies <input type="radio"/> Don't know	The cost of calendula cream was estimated from results found in an Internet search.	The panel based their judgement on an approximate cost of \$11 for 2.5 oz. of calendula cream.
Certainty of evidence of required resources		
What is the certainty of the evidence of resource requirements (costs)?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<input type="radio"/> Very low <input type="radio"/> Low <input type="radio"/> Moderate <input type="radio"/> High <input checked="" type="radio"/> No included studies	No research evidence identified	
Cost effectiveness		
Does the cost-effectiveness of the intervention favor the intervention or the comparison?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<input type="radio"/> Favors the comparison <input type="radio"/> Probably favors the comparison <input type="radio"/> Does not favor either the intervention or the comparison <input type="radio"/> Probably favors the intervention <input type="radio"/> Favors the intervention <input type="radio"/> Varies <input checked="" type="radio"/> No included studies	No research evidence identified	
Equity		
What would be the impact on health equity?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<input type="radio"/> Reduced <input checked="" type="radio"/> Probably reduced <input type="radio"/> Probably no impact		The panel determined that equity would probably be reduced because the calendula would be an out-of-pocket cost.

<input type="radio"/> Probably increased <input type="radio"/> Increased <input type="radio"/> Varies <input type="radio"/> Don't know		
<b>Acceptability</b> Is the intervention acceptable to key stakeholders?		
<b>JUDGEMENT</b>	<b>RESEARCH EVIDENCE</b>	<b>ADDITIONAL CONSIDERATIONS</b>
<input type="radio"/> No <input type="radio"/> Probably no <input checked="" type="radio"/> Probably yes <input type="radio"/> Yes <input type="radio"/> Varies <input type="radio"/> Don't know	No research evidence identified	The panel decided that patients would find calendula acceptable and that clinicians would probably find it acceptable (There would be some geographic variability.).
<b>Feasibility</b> Is the intervention feasible to implement?		
<b>JUDGEMENT</b>	<b>RESEARCH EVIDENCE</b>	<b>ADDITIONAL CONSIDERATIONS</b>
<input type="radio"/> No <input type="radio"/> Probably no <input type="radio"/> Probably yes <input checked="" type="radio"/> Yes <input type="radio"/> Varies <input type="radio"/> Don't know	No research evidence identified.	The panel judged calendula to be feasible because it is available in stores and online.

## SUMMARY OF JUDGEMENTS

	JUDGEMENT						
<b>PROBLEM</b>	No	Probably no	Probably yes	<b>Yes</b>		Varies	Don't know
<b>DESIRABLE EFFECTS</b>	Trivial	Small	Moderate	Large		Varies	<b>Don't know</b>
<b>UNDESIRABLE EFFECTS</b>	Large	Moderate	Small	<b>Trivial</b>		Varies	Don't know
<b>CERTAINTY OF EVIDENCE</b>	Very low	<b>Low</b>	Moderate	High			No included studies
<b>VALUES</b>	Important uncertainty or variability	Possibly important uncertainty or variability	<b>Probably no important uncertainty or variability</b>	No important uncertainty or variability			



JUDGEMENT							
<b>BALANCE OF EFFECTS</b>	Favors the comparison	<b>Probably favors the comparison</b>	Does not favor either the intervention or the comparison	Probably favors the intervention	Favors the intervention	Varies	Don't know
<b>RESOURCES REQUIRED</b>	Large costs	Moderate costs	<b>Negligible costs and savings</b>	Moderate savings	Large savings	Varies	Don't know
<b>CERTAINTY OF EVIDENCE OF REQUIRED RESOURCES</b>	Very low	Low	Moderate	High			<b>No included studies</b>
<b>COST EFFECTIVENESS</b>	Favors the comparison	Probably favors the comparison	Does not favor either the intervention or the comparison	Probably favors the intervention	Favors the intervention	Varies	<b>No included studies</b>
<b>EQUITY</b>	Reduced	<b>Probably reduced</b>	Probably no impact	Probably increased	Increased	Varies	Don't know
<b>ACCEPTABILITY</b>	No	Probably no	<b>Probably yes</b>	Yes		Varies	Don't know
<b>FEASIBILITY</b>	No	Probably no	Probably yes	<b>Yes</b>		Varies	Don't know

## TYPE OF RECOMMENDATION

Strong recommendation against the intervention ○	Conditional recommendation against the intervention ●	Conditional recommendation for either the intervention or the comparison ○	Conditional recommendation for the intervention ○	Strong recommendation for the intervention ○
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## CONCLUSIONS

### Recommendation

Among individuals receiving radiation therapy for cancer, the ONS Guidelines panel *suggests* against calendula in addition to a standard washing/skincare regimen to minimize the development of radiodermatitis (conditional recommendation, low certainty of evidence).

## Justification

The panel acknowledged the limited evidence for calendula and the unknown benefits with trivial harms. In addition, calendula may have moderate cost, possibly reduced accessibility, acceptability, and feasibility of implementation. Based on this evidence, the ONS Guidelines panel issued a conditional recommendation suggesting standard of care rather than calendula for the management of radiodermatitis in patients with cancer receiving radiation therapy.

## Subgroup considerations

No subgroup considerations

## Implementation considerations

No implementation considerations.

## Monitoring and evaluation

No monitoring and evaluation considerations.

## Research priorities

Consistent product formulation

### IN-TEXT CITED REFERENCES

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Singh, M., Alavi, A., Wong, R., & Akita, S. (2016). Radiodermatitis: A review of our current understanding. *American Journal of Clinical Dermatology, 17*, 277–292. <https://doi.org/10.1007/s40257-016-0186-4>

Vaz, A., Pinto-Neto, A., Conde, D., Costa-Palva, L., Morais, S., & Esteves, S. (2007). Quality of life of women with gynecologic cancer: Associated factors. *Archives of Gynecology and Obstetrics, 276*, 583–589. <https://doi.org/10.1007/s00404-007-0397-2>

## Semipermeable dressings vs. standard of care

### RECOMMENDATION

Should semipermeable dressings rather than standard of care be used to minimize the development of radiodermatitis?	
<b>POPULATION:</b>	Individuals receiving radiation therapy
<b>INTERVENTION:</b>	Semipermeable dressings
<b>COMPARISON:</b>	Standard of care
<b>MAIN OUTCOMES:</b>	Pain; pruritis; dry skin; quality of life; cost; time to develop radiodermatitis; intervention adherence and fidelity; symptom severity; breaks/discontinuation in radiation treatment; secondary infections; time to resolution of radiodermatitis
<b>SETTING:</b>	Clinical care
<b>PERSPECTIVE:</b>	Clinical recommendation - Population perspective
<b>BACKGROUND:</b>	Radiation-induced skin reactions can have minimal to significant impact on a patient’s quality of life and may also have associated out of pocket costs (Schnur et al., 2012).
<b>CONFLICT OF INTERESTS:</b>	ONS conflict of interest declaration and management policies were applied and the following panel members were voting panel members (determining the direction and strength of the recommendation): Tracy Gosselin, PhD, RN, AOCN®, NEA-BC, FAAN, Susan D. Bruce, MSN, RN, OCN®, AOCNS®, Andrea Hutton, Carol M. Marquez, MD, FACR, Anne Shaftic, DNP, RN, NP-C, AOCNP®, Lauren V. Suarez, MSN, RN, OCN®, CBCN®

## ASSESSMENT

Problem																														
Is the problem a priority?																														
JUDGEMENT		RESEARCH EVIDENCE			ADDITIONAL CONSIDERATIONS																									
<ul style="list-style-type: none"> <li><input type="radio"/> No</li> <li><input type="radio"/> Probably no</li> <li><input type="radio"/> Probably yes</li> <li><input checked="" type="radio"/> Yes</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>		<p>In the year 2000 about 24% of cancer survivors received radiation, and in 2020 that number is expected to increase to 29% (Bryant et al., 2017). This increase was seen across cancer sites with the largest increases for patients being treated for breast or prostate cancer (Bryant et al., 2017). Radiation induced skin reactions are one of the most commonly reported side effects of radiation therapy that can impact up to 95% of patients, and it is known to vary across treatment sites (Gewandter, Walker, Heckler, Morrow, &amp; Ryan, 2013; Gosselin, Schneider, Plambeck, Rowe, 2010). Due to this high risk, interventions for radiodermatitis are aimed at minimizing the severity or delaying progression to higher grades, rather than prevention.</p> <p>Skin changes from radiation are caused by disruption to the normal process of cell division and repair due to ionizing radiation therapy (Bray et al., 2016). Radiodermatitis can range from mild erythema to dry desquamation and moist desquamation (Singh et al., 2016). These skin changes usually manifest within two to three weeks of radiation initiation and can persist for up to four weeks following the completion of treatment (Naylor &amp; Mallett, 2001). Radiodermatitis can be painful and uncomfortable to patients and affects quality of life (Aistars, 2006; Vaz et al, 2007). If severe, it can also lead to changes in radiation treatment schedules (McQuestion, 2006).</p>																												
Desirable Effects																														
How substantial are the desirable anticipated effects?																														
JUDGEMENT		RESEARCH EVIDENCE			ADDITIONAL CONSIDERATIONS																									
<ul style="list-style-type: none"> <li><input type="radio"/> Trivial</li> <li><input type="radio"/> Small</li> <li><input type="radio"/> Moderate</li> <li><input checked="" type="radio"/> Large</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>		<table border="1"> <thead> <tr> <th>Outcomes</th> <th>No of participants (studies) Follow up</th> <th>Certainty of the evidence (GRADE)</th> <th>Relative effect (95% CI)</th> <th colspan="2">Anticipated absolute effects* (95% CI)</th> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <th>Risk with standard of care</th> <th>Risk difference with Dressings</th> </tr> </thead> <tbody> <tr> <td>Development of RD grade 2 or higher</td> <td>706 (7 RCTs 2,3,4,6,7)</td> <td>⊕⊕○○ LOW<sup>a,b,c,d,e,f</sup></td> <td>RR 0.52 (0.26 to 1.03)</td> <td>Study population</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>467 per 1,000</td> <td>224 fewer per 1,000</td> </tr> </tbody> </table>			Outcomes	No of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects* (95% CI)						Risk with standard of care	Risk difference with Dressings	Development of RD grade 2 or higher	706 (7 RCTs 2,3,4,6,7)	⊕⊕○○ LOW <sup>a,b,c,d,e,f</sup>	RR 0.52 (0.26 to 1.03)	Study population						467 per 1,000	224 fewer per 1,000	<p>The panel decided that the size of the desirable effects for the recommendation for minimization is large based on the reduction in the development of radiodermatitis grade 2 or higher and the reduction in development of moist desquamation. The panel made this decision by lumping the results from the outcome of development of grade 3 radiodermatitis from Chan et al., 2019.</p>	
Outcomes	No of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects* (95% CI)																										
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				467 per 1,000	224 fewer per 1,000																									

					(346 fewer to 14 more)
Development of moist desquamation	528 (5 RCTs <sup>1,2,6,7</sup> )	⊕⊕○○ LOW <sup>d,f,g</sup>	RR 0.43 (0.32 to 0.58)	Study population	
				359 per 1,000	<b>205 fewer per 1,000</b> (244 fewer to 151 fewer)
Tenderness, discomfort, or pain	156 (1 RCT <sup>4</sup> )	⊕⊕○○ LOW <sup>e,h</sup>	RR 0.35 (0.16 to 0.78)	Study population	
				256 per 1,000	<b>167 fewer per 1,000</b> (215 fewer to 56 fewer)
Pruritis	154 (1 RCT <sup>4</sup> )	⊕○○○ VERY LOW <sup>a,e,h</sup>	RR 0.69 (0.34 to 1.38)	Study population	
				208 per 1,000	<b>64 fewer per 1,000</b> (137 fewer to 79 more)
Adverse events leading to treatment discontinuation	181 (2 RCTs <sup>5,6</sup> )	⊕⊕⊕○ MODERATE <sup>h,i</sup>	RR 20.40 (2.82 to 147.52)	Study population	
				0 per 1,000	<b>0 fewer per 1,000</b> (0 fewer to 0 fewer)
Patient-reported QoL	66 (2 RCTs <sup>7</sup> )	⊕○○○ VERY LOW <sup>d,h,j</sup>	-	The mean patient-reported QoL was <b>0</b>	<b>MD 0.4 lower</b> (0.75 lower to 0.05 lower)

**Explanations:**

- a. The 95% CI includes the potential for both benefit and harm.
- b. Imprecision likely explained by high heterogeneity and rated down in domain for inconsistency.

- c. Heterogeneity present ( $I^2=93\%$ ), may be explained by difference in cancer site receiving radiation; however, studies within radiation treatment site subgroups also demonstrate heterogeneity. All studies are in the direction of reduced radiodermatitis development within the group receiving dressings.
- d. Wooding 2018 has some concerns with blinding of patients and outcome assessors.
- e. Moller 2018 has some concerns with blinding of patients and outcome assessors.
- f. Herst 2014 and Schmeel 2018 have concerns with allocation concealment and blinding of participants and outcome assessors.
- g. Some heterogeneity present ( $I^2=61\%$ ), may be explained by difference in cancer site receiving radiation
- h. Few events reported do not meet the optimal information size and suggest fragility in the estimate
- i. Schmeel 2018 has some concerns with allocation concealment and blinding of participants and outcome assessors, however, demonstrates a similar, but more conservative, estimate to Rades 2019
- j. The 95% CI may not include a meaningful benefit.

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## Undesirable Effects

How substantial are the undesirable anticipated effects?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS																																				
<ul style="list-style-type: none"> <li>○ Large</li> <li>○ Moderate</li> <li>● Small</li> <li>○ Trivial</li> <li>○ Varies</li> <li>○ Don't know</li> </ul>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #0056b3; color: white;"> <th style="width: 20%;">Outcomes</th> <th style="width: 15%;">No of participants (studies) Follow up</th> <th style="width: 15%;">Certainty of the evidence (GRADE)</th> <th style="width: 10%;">Relative effect (95% CI)</th> <th colspan="2" style="width: 40%;">Anticipated absolute effects* (95% CI)</th> </tr> <tr style="background-color: #e6e6e6;"> <th></th> <th></th> <th></th> <th></th> <th style="width: 15%;">Risk with standard of care</th> <th style="width: 25%;">Risk difference with Dressings</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Development of RD grade 2 or higher</td> <td style="padding: 5px;">706 (7 RCTs 2,3,4,6,7)</td> <td style="padding: 5px;">⊕⊕○○ LOW<sup>a,b,c,d,e,f</sup></td> <td style="padding: 5px;">RR 0.52 (0.26 to 1.03)</td> <td colspan="2" style="padding: 5px;">Study population</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td style="padding: 5px;">467 per 1,000</td> <td style="padding: 5px;"><b>224 fewer per 1,000</b> (346 fewer to 14 more)</td> </tr> <tr> <td style="padding: 5px;">Development of moist desquamation</td> <td style="padding: 5px;">528 (5 RCTs 1,2,6,7)</td> <td style="padding: 5px;">⊕⊕○○ LOW<sup>d,f,g</sup></td> <td style="padding: 5px;">RR 0.43 (0.32 to 0.58)</td> <td colspan="2" style="padding: 5px;">Study population</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td style="padding: 5px;">359 per 1,000</td> <td style="padding: 5px;"><b>205 fewer per 1,000</b></td> </tr> </tbody> </table>	Outcomes	No of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects* (95% CI)						Risk with standard of care	Risk difference with Dressings	Development of RD grade 2 or higher	706 (7 RCTs 2,3,4,6,7)	⊕⊕○○ LOW <sup>a,b,c,d,e,f</sup>	RR 0.52 (0.26 to 1.03)	Study population						467 per 1,000	<b>224 fewer per 1,000</b> (346 fewer to 14 more)	Development of moist desquamation	528 (5 RCTs 1,2,6,7)	⊕⊕○○ LOW <sup>d,f,g</sup>	RR 0.43 (0.32 to 0.58)	Study population						359 per 1,000	<b>205 fewer per 1,000</b>	<p>The panel decided that the size of the effect for the minimization recommendation is small based on the number of patients who discontinued using dressings in the intervention groups (21%).</p>
Outcomes	No of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects* (95% CI)																																		
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				359 per 1,000	<b>205 fewer per 1,000</b>																																	

					(244 fewer to 151 fewer)
Tenderness, discomfort, or pain	156 (1 RCT <sup>4</sup> )	⊕⊕○○ LOW <sup>e,h</sup>	RR 0.35 (0.16 to 0.78)	Study population	
				256 per 1,000	<b>167 fewer per 1,000</b> (215 fewer to 56 fewer)
Pruritis	154 (1 RCT <sup>4</sup> )	⊕○○○ VERY LOW <sup>a,e,h</sup>	RR 0.69 (0.34 to 1.38)	Study population	
				208 per 1,000	<b>64 fewer per 1,000</b> (137 fewer to 79 more)
Adverse events leading to treatment discontinuation	181 (2 RCTs <sup>5,6</sup> )	⊕⊕⊕○ MODERATE <sup>b,i</sup>	RR 20.40 (2.82 to 147.52)	Study population	
				0 per 1,000	<b>0 fewer per 1,000</b> (0 fewer to 0 fewer)
Patient-reported QoL	66 (2 RCTs <sup>7</sup> )	⊕○○○ VERY LOW <sup>d,h,j</sup>	-	The mean patient-reported QoL was <b>0</b>	<b>MD 0.4 lower</b> (0.75 lower to 0.05 lower)

**Explanations:**

- a. The 95% CI includes the potential for both benefit and harm.
- b. Imprecision likely explained by high heterogeneity and rated down in domain for inconsistency.
- c. Heterogeneity present (I<sup>2</sup>=93%), may be explained by difference in cancer site receiving radiation; however, studies within radiation treatment site subgroups also demonstrate heterogeneity. All studies are in the direction of reduced radiodermatitis development within group receiving dressings.
- d. Wooding 2018 has some concerns with blinding of patients and outcome assessors.
- e. Moller 2018 has some concerns with blinding of patients and outcome assessors.
- f. Herst 2014 and Schmeel 2018 have concerns with allocation concealment and blinding of participants and outcome assessors.



- g. Some heterogeneity present ( $I^2=61\%$ ), may be explained by difference in cancer site receiving radiation.
- h. Few events reported do not meet the optimal information size and suggest fragility in the estimate.
- i. Schmeel 2018 has some concerns with allocation concealment and blinding of participants and outcome assessors, however, demonstrates a similar, but more conservative, estimate to Rades 2019.
- j. The 95% CI may not include a meaningful benefit.

**References:**

1. Chan, R.J., Blades, R., Jones, L., Downer, T.R., Peet, S.C., Button, E., ... Yates, P. (2019). A single-blind, randomised controlled trial of StrataXRT®—A silicone-based film-forming gel dressing for prophylaxis and management of radiation dermatitis in patients with head and neck cancer. *Radiotherapy and Oncology*, *139*, 72–78. <https://doi.org/10.1016/j.radonc.2019.07.014>
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5. Rades, D., Narvaez, C. A., Spletstößer, L., Dömer, C., Setter, C., Idel, C., ... Schild, S. E. (2019). A randomized trial (RAREST-01) comparing Mepitel® Film and standard care for prevention of radiation dermatitis in patients irradiated for locally advanced squamous cell carcinoma of the head-and-neck (SCCHN). *Radiotherapy and Oncology*, *139*, 79–82. <https://doi.org/10.1016/j.radonc.2019.07.023>
6. Schmeel, L.C., Koch, D., Stumpf, S., Leitzen, C., Simon, B., Schüller, H., ... Garbe, S. (2018). Prophylactically applied Hydrofilm polyurethane film dressings reduce radiation dermatitis in adjuvant radiation therapy of breast cancer patients. *Acta Oncologica*, *57*, 908–915. <https://doi.org/10.1080/0284186X.2018.1441542>
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In an intra-patient, randomized controlled clinical trial (Herst, 2014) in New Zealand to prevent moist desquamation due to radiotherapy, none of 78 patients experienced moist desquamation in the skin area where Mepitel Film was used. Aqueous cream was the control. An average of 5 film strips per

	<p>patient and 5 – 10 minutes of radiation therapist time per dressing application was used. For moist desquamation that formed in control areas, an additional 11 Mepilex Lite dressings were used.</p> <p>In a prospective, intra-patient controlled, randomized clinical study in Germany (Schmeel et al., 2018), prophylactically Hydrofilm was compared to prophylactic Eucerin Urea Repair PLUS lotion 5% (control). Of 62 patients enrolled, 56 completed the study. The Eucerin-covered breast halves caused more frequent patient visits and required more radiation therapist time because of skin injury. The added cost of topical corticosteroids was involved in six of those cases, and one of those patients needed inpatient treatment because of moist desquamation.</p>	
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## Certainty of evidence

What is the overall certainty of the evidence of effects?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Very low</li> <li><input checked="" type="radio"/> Low</li> <li><input type="radio"/> Moderate</li> <li><input type="radio"/> High</li> <li><input type="radio"/> No included studies</li> </ul>		<p>The panel judged the certainty in the overall evidence of effects for prophylactic use of semipermeable dressings to be low due to concerns with risk of bias and imprecision. The panel judged the certainty in the overall evidence of effects for treatment of moist desquamation with semipermeable dressings to be very low due to concerns with risk of bias, indirectness of the comparison between saline solution to the current standard of care of Silvadene, and imprecision.</p>

## Values

Is there important uncertainty about or variability in how much people value the main outcomes?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Important uncertainty or variability</li> <li><input type="radio"/> Possibly important uncertainty or variability</li> <li><input checked="" type="radio"/> Probably no important uncertainty or variability</li> <li><input type="radio"/> No important uncertainty or variability</li> </ul>	<p>In a Danish intra-patient, randomized multicenter study (Krause Møller et al., 2018) of Mepitel film use during radiotherapy in patients with cancer, there were 79 evaluable patients. Of 19 patients who dropped out of the study, 2 dropped out because of problems handling the Mepitel film; 2 patients wanted to have the film removed.</p> <p>In an intra-patient randomized controlled trial (Wooding et al., 2018) conducted in New Zealand and China on prophylactic and management use of Mepitel film for acute radiation-induced skin reactions in patients with head and neck cancer, 33 patients complied with the protocol. During application of the film by the researcher, care was taken not to stretch or overlap the pieces. If the film curled in small areas, the researcher cut them off. Most of the patients who completed an exit questionnaire favored Mepitel over the control intervention (Sorbolene or Biafine), though problems with film adherence to the skin, itchiness, discomfort, and tightness were issues for some.</p>	<p>The panel determined there was probably no important uncertainty or variability.</p> <p>The panel noted that four patients dropped out of the Krause Møller et al., 2018, study because of problems with Mepitel.</p>

Balance of effects		
Does the balance between desirable and undesirable effects favor the intervention or the comparison?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Favors the comparison</li> <li><input type="radio"/> Probably favors the comparison</li> <li><input type="radio"/> Does not favor either the intervention or the comparison</li> <li><input type="radio"/> Probably favors the intervention</li> <li><input checked="" type="radio"/> Favors the intervention</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>		<p>The panel decided the balance of effects favors the intervention based on the magnitude of the desirable effect, low certainty of evidence, and adverse events.</p>
Resources required		
How large are the resource requirements (costs)?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input checked="" type="radio"/> Large costs</li> <li><input type="radio"/> Moderate costs</li> <li><input type="radio"/> Negligible costs and savings</li> <li><input type="radio"/> Moderate savings</li> <li><input type="radio"/> Large savings</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	<p>The estimated cost of semipermeable dressings was based on Internet search results.</p>	<p>The panel determined that the intervention would cost about \$54 for 1 – 3 days.</p> <p>The panel decided the cost would be large based on the assumption that the entire region is covered for the entirety of treatment.</p>
Certainty of evidence of required resources		
What is the certainty of the evidence of resource requirements (costs)?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Very low</li> <li><input type="radio"/> Low</li> <li><input type="radio"/> Moderate</li> <li><input type="radio"/> High</li> <li><input checked="" type="radio"/> No included studies</li> </ul>	<p>No research evidence identified</p>	

Cost effectiveness		
Does the cost-effectiveness of the intervention favor the intervention or the comparison?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Favors the comparison</li> <li><input type="radio"/> Probably favors the comparison</li> <li><input type="radio"/> Does not favor either the intervention or the comparison</li> <li><input type="radio"/> Probably favors the intervention</li> <li><input type="radio"/> Favors the intervention</li> <li><input checked="" type="radio"/> Varies</li> <li><input type="radio"/> No included studies</li> </ul>	<p>Minimization: No research evidence identified</p> <p>Treatment: Blades et al. (2019) analyzed the cost-effectiveness of StrataXRT. They reported a 36% probability that StrataXRT would be cost-neutral or would lead to net savings for a healthcare organization.</p>	
Equity		
What would be the impact on health equity?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input checked="" type="radio"/> Reduced</li> <li><input type="radio"/> Probably reduced</li> <li><input type="radio"/> Probably no impact</li> <li><input type="radio"/> Probably increased</li> <li><input type="radio"/> Increased</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	<p>No research evidence identified</p>	<p>The panel decided that equity would be reduced because of the cost of the intervention.</p>
Acceptability		
Is the intervention acceptable to key stakeholders?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> No</li> <li><input type="radio"/> Probably no</li> <li><input type="radio"/> Probably yes</li> <li><input type="radio"/> Yes</li> <li><input checked="" type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	<p>No research evidence identified</p>	<p>The panel decided that acceptability of the intervention varies among clinicians, patients, and radiation therapy technicians because of the type of dressing and the type of application (physical film vs cream/dressing).</p>
Feasibility		
Is the intervention feasible to implement?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> No</li> <li><input type="radio"/> Probably no</li> <li><input type="radio"/> Probably yes</li> </ul>	<p>No research evidence identified</p>	<p>The panel decided that feasibility varies based on the type of dressing used (physical film vs cream/dressing).</p>

<input type="radio"/> Yes <input checked="" type="radio"/> Varies <input type="radio"/> Don't know		
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## SUMMARY OF JUDGEMENTS

	JUDGEMENT						
PROBLEM	No	Probably no	Probably yes	<b>Yes</b>		Varies	Don't know
DESIRABLE EFFECTS	Trivial	Small	Moderate	<b>Large</b>		Varies	Don't know
UNDESIRABLE EFFECTS	Large	Moderate	<b>Small</b>	Trivial		Varies	Don't know
CERTAINTY OF EVIDENCE	Very low	<b>Low</b>	Moderate	High			No included studies
VALUES	Important uncertainty or variability	Possibly important uncertainty or variability	<b>Probably no important uncertainty or variability</b>	No important uncertainty or variability			
BALANCE OF EFFECTS	Favors the comparison	Probably favors the comparison	Does not favor either the intervention or the comparison	Probably favors the intervention	<b>Favors the intervention</b>	Varies	Don't know
RESOURCES REQUIRED	<b>Large costs</b>	Moderate costs	Negligible costs and savings	Moderate savings	Large savings	Varies	Don't know
CERTAINTY OF EVIDENCE OF REQUIRED RESOURCES	Very low	Low	Moderate	High			<b>No included studies</b>
COST EFFECTIVENESS	Favors the comparison	Probably favors the comparison	Does not favor either the intervention or the comparison	Probably favors the intervention	Favors the intervention	<b>Varies</b>	No included studies
EQUITY	<b>Reduced</b>	Probably reduced	Probably no impact	Probably increased	Increased	Varies	Don't know
ACCEPTABILITY	No	Probably no	Probably yes	Yes		<b>Varies</b>	Don't know
FEASIBILITY	No	Probably no	Probably yes	Yes		<b>Varies</b>	Don't know

## TYPE OF RECOMMENDATION

Strong recommendation against the intervention <input type="radio"/>	Conditional recommendation against the intervention <input type="radio"/>	Conditional recommendation for either the intervention or the comparison <input type="radio"/>	Conditional recommendation for the intervention <input checked="" type="radio"/>	Strong recommendation for the intervention <input type="radio"/>
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## CONCLUSIONS

### Recommendation

Among individuals receiving radiation therapy, the ONS Guidelines panel *suggests* semipermeable dressings in addition to standard washing/skincare regimen rather than standard washing/skincare regimen alone to minimize the development of radiodermatitis (conditional recommendation, low certainty of evidence)

### Justification

The panel acknowledged the large benefits of dressings and the small harms for minimization of radiodermatitis. Based on this evidence, the ONS Guidelines panel issued a conditional recommendation suggesting semipermeable dressings rather than standard of care for the minimization of radiodermatitis. The panel did not make a recommendation for semipermeable dressings for treatment of moist desquamation due to the lack of evidence that compared dressings to Silvadene which the panel considered standard of care. The panel tabled this recommendation and will reconsider as new evidence becomes available.

### Subgroup considerations

No subgroup considerations

### Implementation considerations

No implementation considerations

### Monitoring and evaluation

No monitoring and evaluation considerations

## Research priorities

No research priorities

### IN-TEXT CITED REFERENCES

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## Topical steroid creams vs. standard of care

### RECOMMENDATION

Should topical steroid creams rather than standard of care be used for the minimization or treatment of radiodermatitis?	
<b>POPULATION:</b>	Individuals with cancer receiving radiation therapy (for minimization); Individuals with radiodermatitis symptoms (for treatment)
<b>INTERVENTION:</b>	Topical steroid creams
<b>COMPARISON:</b>	Standard of care
<b>MAIN OUTCOMES:</b>	Pain; pruritis; dry skin; quality of life; cost; time to develop radiodermatitis; intervention adherence and fidelity; symptom severity; breaks/discontinuation in radiation treatment; secondary infections; time to resolution of radiodermatitis
<b>SETTING:</b>	Clinical care
<b>PERSPECTIVE:</b>	Clinical recommendation - Population perspective
<b>BACKGROUND:</b>	Radiation-induced skin reactions can have minimal to significant impact on a patient's quality of life and may also have associated out of pocket costs (Schnur et al., 2012)
<b>CONFLICT OF INTERESTS:</b>	<p>ONS conflict of interest declaration and management policies were applied and the following panel members were voting panel members (determining the direction and strength of the recommendation): Tracy Gosselin, PhD, RN, AOCN®, NEA-BC, FAAN, Susan D. Bruce, MSN, RN, OCN®, AOCNS®, Andrea Hutton, Carol M. Marquez, MD, FACR, Anne Shaftic, DNP, RN, NP-C, AOCNP®, Lauren V. Suarez, MSN, RN, OCN®, CBCN®</p> <p>Panel members recused as a result of risk of conflicts of interest: None</p>

### ASSESSMENT

Problem		
Is the problem a priority?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> No</li> <li><input type="radio"/> Probably no</li> <li><input type="radio"/> Probably yes</li> <li><input checked="" type="radio"/> Yes</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	<p>In the year 2000 about 24% of cancer survivors received radiation, and in 2020 that number is expected to increase to 29% (Bryant et al., 2017). This increase was seen across cancer sites with the largest increases for patients being treated for breast or prostate cancer (Bryant et al., 2017). Radiation induced skin reactions are one of the most commonly reported side effects of radiation therapy that can impact up to 95% of patients, and it is known to vary across treatment sites (Gewandter, Walker, Heckler, Morrow, &amp; Ryan, 2013; Gosselin, Schneider, Plambeck, Rowe, 2010).</p>	<p>The evidence is for the treatment of symptoms related to radiodermatitis and not moist desquamation.</p>



Due to this high risk, interventions for radiodermatitis are aimed at minimizing the severity or delaying progression to higher grades, rather than prevention.

Skin changes from radiation are caused by disruption to the normal process of cell division and repair due to ionizing radiation therapy (Bray et al., 2016). Radiodermatitis can range from mild erythema to dry desquamation and moist desquamation (Singh et al., 2016). These skin changes usually manifest within two to three weeks of radiation initiation and can persist for up to four weeks following the completion of treatment (Naylor & Mallett, 2001). Radiodermatitis can be painful and uncomfortable to patients and affects quality of life (Aistars, 2006; Vaz et al, 2007). If severe, it can also lead to changes in radiation treatment schedules (McQuestion, 2006).

## Desirable Effects

How substantial are the desirable anticipated effects?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS																																																
<ul style="list-style-type: none"> <li><input type="radio"/> Trivial</li> <li><input type="radio"/> Small</li> <li><input type="radio"/> Moderate</li> <li><input checked="" type="radio"/> Large</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #4F81BD; color: white;"> <th style="width: 20%;">Outcomes</th> <th style="width: 15%;">No of participants (studies) Follow up</th> <th style="width: 15%;">Certainty of the evidence (GRADE)</th> <th style="width: 10%;">Relative effect (95% CI)</th> <th colspan="2" style="width: 40%;">Anticipated absolute effects* (95% CI)</th> </tr> <tr style="background-color: #f2f2f2;"> <th></th> <th></th> <th></th> <th></th> <th style="width: 15%;">Risk with standard of care</th> <th style="width: 25%;">Risk difference with Topical steroids</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Development of RD grade 2 or higher</td> <td style="padding: 5px;">783 (6 RCTs 1,2,3,4,5,6)</td> <td style="padding: 5px;">⊕⊕⊕○ MODERATE<sup>a,b</sup></td> <td style="padding: 5px;">RR 0.64 (0.42 to 0.96)</td> <td colspan="2" style="padding: 5px;">Study population</td> </tr> <tr style="background-color: #f2f2f2;"> <td></td> <td></td> <td></td> <td></td> <td style="padding: 5px;">573 per 1,000</td> <td style="padding: 5px;">224 fewer per 1,000 (338 fewer to 57 fewer)</td> </tr> <tr> <td style="padding: 5px;">Moist desquamation</td> <td style="padding: 5px;">395 (3 RCTs 2,3,6)</td> <td style="padding: 5px;">⊕⊕○○ LOW<sup>a,c,d,e</sup></td> <td style="padding: 5px;">RR 0.57 (0.29 to 1.12)</td> <td colspan="2" style="padding: 5px;">Study population</td> </tr> <tr style="background-color: #f2f2f2;"> <td></td> <td></td> <td></td> <td></td> <td style="padding: 5px;">375 per 1,000</td> <td style="padding: 5px;">161 fewer per 1,000 (266 fewer to 45 more)</td> </tr> <tr> <td style="padding: 5px;">Pain during radiation treatment (Severe VAS rating of itching, burning, irritation)</td> <td style="padding: 5px;">200 (1 RCT 6)</td> <td style="padding: 5px;">⊕⊕○○ LOW<sup>e,f</sup></td> <td style="padding: 5px;">RR 0.12 (0.02 to 0.98)</td> <td colspan="2" style="padding: 5px;">Study population</td> </tr> <tr style="background-color: #f2f2f2;"> <td></td> <td></td> <td></td> <td></td> <td style="padding: 5px;">71 per 1,000</td> <td style="padding: 5px;">62 fewer per 1,000</td> </tr> </tbody> </table>	Outcomes	No of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects* (95% CI)						Risk with standard of care	Risk difference with Topical steroids	Development of RD grade 2 or higher	783 (6 RCTs 1,2,3,4,5,6)	⊕⊕⊕○ MODERATE <sup>a,b</sup>	RR 0.64 (0.42 to 0.96)	Study population						573 per 1,000	224 fewer per 1,000 (338 fewer to 57 fewer)	Moist desquamation	395 (3 RCTs 2,3,6)	⊕⊕○○ LOW <sup>a,c,d,e</sup>	RR 0.57 (0.29 to 1.12)	Study population						375 per 1,000	161 fewer per 1,000 (266 fewer to 45 more)	Pain during radiation treatment (Severe VAS rating of itching, burning, irritation)	200 (1 RCT 6)	⊕⊕○○ LOW <sup>e,f</sup>	RR 0.12 (0.02 to 0.98)	Study population						71 per 1,000	62 fewer per 1,000	<p>Minimization:</p> <p>The panel decided that the desirable effects were large based on the reduction in pain after radiation therapy and the decrease of grade 2 or higher radiodermatitis.</p> <p>Treatment:</p> <p>The panel decided that the desirable effects were large based on the reduction in pain after radiation therapy and the decrease of grade 2 or higher radiodermatitis.</p>
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Pain after radiation treatment (Severe VAS rating of itching, burning, irritation)	194 (1 RCT <sup>6</sup> )	⊕⊕⊕○ MODERATE <sup>e</sup>	RR 0.05 (0.01 to 0.39)	Study population	
				188 per 1,000	178 fewer per 1,000 (186 fewer to 114 fewer)
Treatment-related adverse events	50 (1 RCT <sup>3</sup> )	⊕⊕○○ LOW <sup>d,e</sup>	RR 2.35 (0.23 to 24.26)	Study population	
				37 per 1,000	50 more per 1,000 (29 fewer to 861 more)

**Explanations:**

- Ho 2018 has some concerns with blinding of outcome assessors; however, outcome is fairly objective
- Inconsistency present ( $I^2=81\%$ ); however, all studies demonstrate reduction in radiodermatitis with receipt of topical steroids
- Some unexplained inconsistency ( $I^2=60$ ) present.
- The 95% CI includes the potential for both benefit and harm.
- Few events reported do not meet the optimal information size and suggest fragility in the estimate
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**References:**

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## Undesirable Effects

How substantial are the undesirable anticipated effects?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS																											
<ul style="list-style-type: none"> <li><input type="radio"/> Large</li> <li><input type="radio"/> Moderate</li> <li><input type="radio"/> Small</li> <li><input checked="" type="radio"/> Trivial</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #0056b3; color: white;"> <th style="width: 15%;">Outcomes</th> <th style="width: 15%;">No of participants (studies) Follow up</th> <th style="width: 15%;">Certainty of the evidence (GRADE)</th> <th style="width: 10%;">Relative effect (95% CI)</th> <th style="width: 45%;">Anticipated absolute effects* (95% CI)</th> </tr> <tr style="background-color: #e6e6e6;"> <th></th> <th></th> <th></th> <th></th> <th style="text-align: center;">Risk with standard of care</th> <th style="text-align: center;">Risk difference with Topical steroids</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Development of RD grade 2 or higher</td> <td rowspan="2">783 (6 RCTs 1,2,3,4,5,6)</td> <td rowspan="2">⊕⊕⊕○ MODERATE<sup>a,b</sup></td> <td rowspan="2">RR 0.64 (0.42 to 0.96)</td> <td colspan="2" style="background-color: #e6e6e6;">Study population</td> </tr> <tr> <td style="text-align: center;">573 per 1,000</td> <td style="text-align: center;">224 fewer per 1,000 (338 fewer to 57 fewer)</td> </tr> <tr> <td rowspan="2">Moist desquamation</td> <td rowspan="2">395 (3 RCTs 2,3,6)</td> <td rowspan="2">⊕⊕○○ LOW<sup>a,c,d,e</sup></td> <td rowspan="2">RR 0.57 (0.29 to 1.12)</td> <td colspan="2" style="background-color: #e6e6e6;">Study population</td> </tr> <tr> <td style="text-align: center;">375 per 1,000</td> <td style="text-align: center;">161 fewer per 1,000</td> </tr> </tbody> </table>	Outcomes	No of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects* (95% CI)					Risk with standard of care	Risk difference with Topical steroids	Development of RD grade 2 or higher	783 (6 RCTs 1,2,3,4,5,6)	⊕⊕⊕○ MODERATE <sup>a,b</sup>	RR 0.64 (0.42 to 0.96)	Study population		573 per 1,000	224 fewer per 1,000 (338 fewer to 57 fewer)	Moist desquamation	395 (3 RCTs 2,3,6)	⊕⊕○○ LOW <sup>a,c,d,e</sup>	RR 0.57 (0.29 to 1.12)	Study population		375 per 1,000	161 fewer per 1,000	<p>Minimization:</p> <p>The panel decided the undesirable effects were trivial based on the intervention-related adverse events.</p> <p>Treatment:</p> <p>The panel decided the undesirable effects were trivial based on the intervention-related adverse events.</p>
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**Certainty of evidence**  
What is the overall certainty of the evidence of effects?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<input type="radio"/> Very low <input checked="" type="radio"/> Low <input type="radio"/> Moderate <input type="radio"/> High <input type="radio"/> No included studies		The panel judged the certainty in the evidence of effects to be low due to inconsistency with data due to blinding of outcome assessors and imprecision in that the confidence interval may not include meaningful data.

**Values**  
Is there important uncertainty about or variability in how much people value the main outcomes?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<input type="radio"/> Important uncertainty or variability <input type="radio"/> Possibly important uncertainty or variability <input checked="" type="radio"/> Probably no important uncertainty or variability	No research evidence identified	Minimization:

<p><input type="radio"/> No important uncertainty or variability</p>		<p>The panel decided there was probably no important uncertainty or variability in values.</p> <p>Treatment:</p> <p>The panel decided there was probably no important uncertainty or variability in values.</p>
<h3>Balance of effects</h3> <p>Does the balance between desirable and undesirable effects favor the intervention or the comparison?</p>		
<p>JUDGEMENT</p>	<p>RESEARCH EVIDENCE</p>	<p>ADDITIONAL CONSIDERATIONS</p>
<p><input type="radio"/> Favors the comparison</p> <p><input type="radio"/> Probably favors the comparison</p> <p><input type="radio"/> Does not favor either the intervention or the comparison</p> <p><input type="radio"/> Probably favors the intervention</p> <p><input checked="" type="radio"/> Favors the intervention</p> <p><input type="radio"/> Varies</p> <p><input type="radio"/> Don't know</p>		<p>Minimization:</p> <p>The panel decided the balance of effects favors the intervention due to the large benefit and trivial harms.</p> <p>Treatment:</p> <p>The panel decided the balance of effects favors the intervention due to the large benefit and trivial harms.</p>
<h3>Resources required</h3> <p>How large are the resource requirements (costs)?</p>		
<p>JUDGEMENT</p>	<p>RESEARCH EVIDENCE</p>	<p>ADDITIONAL CONSIDERATIONS</p>
<p><input type="radio"/> Large costs</p> <p><input checked="" type="radio"/> Moderate costs</p> <p><input type="radio"/> Negligible costs and savings</p> <p><input type="radio"/> Moderate savings</p> <p><input type="radio"/> Large savings</p> <p><input type="radio"/> Varies</p> <p><input type="radio"/> Don't know</p>	<p>The estimated cost of the intervention was based on results of an Internet search.</p>	<p>The cost of steroidal cream was determined to be approximately \$15.</p> <p>The panel noted that consideration was needed as to whether the patient had conventional insurance or Medicare (which would make the intervention more costly for the patient).</p> <p>Minimization:</p> <p>The panel decided that the resources required would be of moderate cost.</p> <p>Treatment:</p> <p>The panel decided that the resources required would be of moderate cost.</p>

Certainty of evidence of required resources		
What is the certainty of the evidence of resource requirements (costs)?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Very low</li> <li><input type="radio"/> Low</li> <li><input type="radio"/> Moderate</li> <li><input type="radio"/> High</li> <li><input checked="" type="radio"/> No included studies</li> </ul>	No research evidence identified	
Cost effectiveness		
Does the cost-effectiveness of the intervention favor the intervention or the comparison?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Favors the comparison</li> <li><input type="radio"/> Probably favors the comparison</li> <li><input type="radio"/> Does not favor either the intervention or the comparison</li> <li><input type="radio"/> Probably favors the intervention</li> <li><input type="radio"/> Favors the intervention</li> <li><input type="radio"/> Varies</li> <li><input checked="" type="radio"/> No included studies</li> </ul>	No research evidence identified	
Equity		
What would be the impact on health equity?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> <li><input type="radio"/> Reduced</li> <li><input type="radio"/> Probably reduced</li> <li><input checked="" type="radio"/> Probably no impact</li> <li><input type="radio"/> Probably increased</li> <li><input type="radio"/> Increased</li> <li><input type="radio"/> Varies</li> <li><input type="radio"/> Don't know</li> </ul>	No research evidence identified	<p><b>Minimization:</b></p> <p>The panel determined that there would probably be no impact on equity because the intervention is accessible.</p> <p><b>Treatment:</b></p> <p>The panel determined that there would probably be no impact on equity because the intervention is accessible.</p>

## Acceptability

Is the intervention acceptable to key stakeholders?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<input type="radio"/> No <input type="radio"/> Probably no <input type="radio"/> Probably yes <input checked="" type="radio"/> Yes <input type="radio"/> Varies <input type="radio"/> Don't know	No research evidence identified	<p><b>Minimization:</b></p> <p>The panel noted that use of steroidal cream for minimization would be a change in practice.</p> <p>The panel decided that clinicians and patients would find the intervention to be acceptable.</p> <p><b>Treatment:</b></p> <p>The panel noted that steroidal cream is currently used for treatment.</p> <p>The panel decided that clinicians and patients would find the intervention to be acceptable.</p>

## Feasibility

Is the intervention feasible to implement?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<input type="radio"/> No <input type="radio"/> Probably no <input type="radio"/> Probably yes <input checked="" type="radio"/> Yes <input type="radio"/> Varies <input type="radio"/> Don't know	No research evidence identified	<p><b>Minimization:</b></p> <p>The panel decided that the intervention would be feasible to implement.</p> <p><b>Treatment:</b></p> <p>The panel decided that the intervention would be feasible to implement.</p>

## SUMMARY OF JUDGEMENTS

	JUDGEMENT						
PROBLEM	No	Probably no	Probably yes	<b>Yes</b>		Varies	Don't know
DESIRABLE EFFECTS	Trivial	Small	Moderate	<b>Large</b>		Varies	Don't know



JUDGEMENT							
UNDESIRABLE EFFECTS	Large	Moderate	Small	<b>Trivial</b>		Varies	Don't know
CERTAINTY OF EVIDENCE	Very low	<b>Low</b>	Moderate	High			No included studies
VALUES	Important uncertainty or variability	Possibly important uncertainty or variability	<b>Probably no important uncertainty or variability</b>	No important uncertainty or variability			
BALANCE OF EFFECTS	Favors the comparison	Probably favors the comparison	Does not favor either the intervention or the comparison	Probably favors the intervention	<b>Favors the intervention</b>	Varies	Don't know
RESOURCES REQUIRED	Large costs	<b>Moderate costs</b>	Negligible costs and savings	Moderate savings	Large savings	Varies	Don't know
CERTAINTY OF EVIDENCE OF REQUIRED RESOURCES	Very low	Low	Moderate	High			<b>No included studies</b>
COST EFFECTIVENESS	Favors the comparison	Probably favors the comparison	Does not favor either the intervention or the comparison	Probably favors the intervention	Favors the intervention	Varies	<b>No included studies</b>
EQUITY	Reduced	Probably reduced	<b>Probably no impact</b>	Probably increased	Increased	Varies	Don't know
ACCEPTABILITY	No	Probably no	Probably yes	<b>Yes</b>		Varies	Don't know
FEASIBILITY	No	Probably no	Probably yes	<b>Yes</b>		Varies	Don't know

## TYPE OF RECOMMENDATION

Strong recommendation against the intervention <input type="radio"/>	Conditional recommendation against the intervention <input type="radio"/>	Conditional recommendation for either the intervention or the comparison <input type="radio"/>	Conditional recommendation for the intervention <input checked="" type="radio"/>	Strong recommendation for the intervention <input type="radio"/>
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## CONCLUSIONS

### Recommendation

**Minimize development** - Among individuals with cancer receiving radiation therapy, the ONS Guidelines panel *suggests* topical steroids in addition to standard washing/skincare regimen rather than standard washing/skincare regimen alone for the minimization of radiodermatitis (conditional recommendation; low certainty of evidence).

**Remarks:** Studies reported on topical steroid creams, both prescription and over-the-counter. If cost is a concern, the over-the-counter option is feasible. If coverage or availability are a concern, then available steroid cream is acceptable.

**Treatment of symptoms** - Among individuals with radiodermatitis symptoms (e.g., pain, itching, etc.), the ONS Guidelines panel *suggests* the addition of topical steroids **to intact skin** with a standard washing/skincare regimen rather than standard washing/skincare regimen alone (conditional recommendation; low certainty of evidence).

**Remarks:** Studies reported on topical steroid creams, both prescription and over-the-counter. If cost is a concern, the over-the-counter option is feasible. If coverage or availability are a concern, then available steroid cream is acceptable.

### Justification

The panel acknowledged the large benefits of topical steroids and the trivial harms for both minimization of radiodermatitis and the treatment of radiodermatitis symptoms. Based on this evidence, the ONS Guidelines panel issued a conditional recommendation suggesting topical steroid creams in addition to standard washing/skin care rather than standard washing/skin care alone for the minimization of radiodermatitis and topical steroid creams (on intact skin only) for the treatment of radiodermatitis symptoms in patients with cancer receiving radiation therapy.

### Subgroup considerations

No subgroup considerations

### Implementation considerations

No implementation considerations

## Monitoring and evaluation

No monitoring and evaluation considerations

## Research priorities

No research priorities

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