Multinational Association of Supportive Care in Cancer (MASCC) clinical practice guidelines for the prevention and management of acute radiation dermatitis: international Delphi consensus-based recommendations

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MASCC Clinical Practice Guidelines for the Prevention and Management of Acute Radiation Dermatitis: Part 2) International Delphi Consensus-Based Recommendations

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Unstructured Summary

Acute radiation dermatitis (ARD) is a frequent adverse effect of radiotherapy, but standardization of modalities for ARD care is currently lacking. Due to the conflicting evidence and variability in current guidelines, a four-round Delphi consensus process was employed to compile opinions of 42 international experts on ARD care based on the evidence in existing literature. Interventions for ARD prevention or management that reached ≥75% consensus were recommended for clinical use. Six interventions could be recommended for the prevention of ARD, including photobiomodulation therapy and Mepitel® film (in breast cancer patients), Hydrofilm®, mometasone furoate, betamethasone, and olive oil. Mepilex® Lite dressings were recommended for the management of ARD. Most interventions were not recommended due to insufficient evidence, conflicting evidence, or lack of consensus to support use, suggesting a need for further research. Clinicians may consider implementing recommended interventions in their practice to prevent and manage ARD until additional evidence becomes available.

Keywords: Radiation dermatitis; guidelines; skin toxicity; Delphi consensus; skin care

1. Introduction

Acute radiation dermatitis (ARD) is a frequent adverse effect of radiotherapy (RT) in cancer patients, with common occurrences in patients receiving RT for breast and head and neck cancers. An abundance of literature has been published on the prevention and management of ARD in the last few decades. Nevertheless, ARD remains a highly prevalent issue that can contribute to a negative patient experience, reduce health-related quality of life, and lead to poor compliance with administered treatment (1–3). Clinical decision-making on ARD skin care is highly variable across institutions and often relies on the treating clinicians' personal expertise and opinions (4). A "gold-standard" treatment for ARD prevention and management has yet to be established, despite the vast available evidence on many different therapeutic regimens for ARD care.

In Part One of the Clinical Practice Guidelines for the Prevention and Management of ARD by the Multinational Association of Supportive Care in Cancer (MASCC) Oncodermatology Study Group, a comprehensive systematic review was conducted to summarize existing evidence on ARD care and identify interventions that have been evaluated for the prevention and management of ARD. Despite the wide evidence base, some interventions had insufficient, conflicting, or doubtful quality of evidence supporting their efficacy, making it challenging to develop recommendations for their use. To generate skin care recommendation guidelines, a modified Delphi consensus method (5) was conducted among an international interdisciplinary panel of ARD experts (42 individuals) to compile opinions and establish a possible consensus on ARD care based on evidence from existing literature. This study (Part Two of the guideline development) reports on the resulting evidence-based skin care recommendations for ARD from the international expert consensus.

2. Materials and Methods

2.1 Objectives

The purpose of this modified Delphi consensus method (5) is to develop consensus-based recommendations on ARD care and to answer the following research questions:

1. What interventions should be recommended in the *prevention* of ARD?
2. What interventions should be recommended in the *management* of ARD?

2.2 Steering Committee

A steering committee was convened within the MASCC ARD Clinical Practice Guidelines Working Group, consisting of five MASCC members (T.B., J.R.W., E.C., P.B., and C.v.d.H.). Committee members reviewed the results of the initial literature review and deemed a Delphi consensus process was necessary to develop consensus-based recommendations on ARD care. Committee members were involved in survey planning, data analysis, and interpretation of findings. Survey development was additionally completed by five members (T.B., P.P., S.F., L.K., and J.R.W.).

2.3 Expert Panel

To establish a panel of experts to participate in the Delphi consensus process, members of the MASCC Oncodermatology Study Group were invited to participate in the Delphi process if they had an interest in ARD research. Corresponding authors of studies included in the systematic review were additionally invited to encompass a broad range of experts on ARD care across the world. Fifty-six potential international expert panel members in the fields of dermatology, medical oncology, radiation oncology/therapy, palliative care, pharmacology, surgical oncology, nursing, and clinical research were invited to participate to ensure representation across all disciplines involved in the care of ARD. Those who expressed interest were included in the survey email list, and all communications within the expert panel were conducted by email. If respondents volunteered to participate in the survey, they were later asked to provide the following demographic information: name, institution, country of origin, and area of expertise.

2.4 Delphi Consensus Process

A four-round modified Delphi consensus process was conducted over seven months (May to December 2021). Exemption from formal ethics review was granted by the University of Rochester Research Subjects Review Board (Study ID #STUDY00006152). All surveys were developed through the SurveyMonkey® web-based survey development tool (6). Responses of individual participants were anonymized to protect participant confidentiality. No patients were included in or consulted to complete the survey.

The stages of the modified Delphi consensus process have been outlined in Figure 1. To confirm participant eligibility in each survey round, all expert panel members were required to self-declare that they are a practicing health care professional and/or researcher involved in the

care or research of ARD. In rounds 2, 3, and 4, participants were additionally asked to confirm that they had participated in previous rounds of the survey.

2.4.1 Round 1

In round 1 of the consensus process, panelists were presented with results of the initial literature review (from Part One of the guideline development). The survey was split into two parts: 1) prevention methods for ARD care and 2) management methods for ARD care. Interventions were classified according to treatment category: natural and miscellaneous agents, laser therapy, barrier films and dressings, growth factors, topical non-steroidal agents, topical corticosteroids, oral agents, antibiotics, alternative therapies, multi-component therapies, antiperspirant/deodorant, and general skin hygiene. Participants were presented with summary tables of all studies that were identified for each intervention, listing the following information for each study: author/year, study design, route of administration (e.g., topical versus oral), cancer sites studied, comparison group (if applicable), primary outcome assessed, indication (for management interventions only), quality of evidence, and level of evidence. An effectiveness indicator of "yes", "no", or "indeterminate" was included for each outcome assessed by study, where "yes" indicated that the outcome had reached statistical significance, "no" indicated that no statistical significance had been reached, and "indeterminate" indicated that statistical superiority or inferiority could not be discerned.

Based on the given information for each product type, participants were asked to assign one of five recommendations: recommendation in *support* of the use of the product, suggestion in *support* of the use of the product, recommendation *against* the use of the product, suggestion *against* the use of the product, or no guideline possible in *support* of or *against* the use of the product. The five recommendation options were derived from the guideline categories listed in the MASCC Guidelines Policy (Appendix A) (7).

2.4.2 Rounds 2 and 3

In round 2 of the consensus process, the steering committee chose to refine the answer choices offered to expert panel members to simplify the process of achieving consensus. Additionally, based on requests by panel members to alter the format of the questions in round 1, modifications were made to ask more specific questions for given interventions (e.g., asking for

recommendations specific to different cancer sites or modes of administration). If any errors or areas requiring clarification were noted by panel members in round 1, this was brought to the attention of the steering committee and questions were therefore modified in round 2. As such, participants were presented again with summary tables for each intervention, along with the response results from round 1. Based on the given information, respondents were asked to respond to the question "Would you recommend this product in your clinical practice?" with either "Yes, I would recommend this product" or "No, I would not recommend this product" for each intervention. For any questions that were modified in round 2 according to requests by the expert panel, respondents were in round 3 once again asked to respond to the question "Would you recommend this product in your clinical practice?" with either "Yes" or "No" (Appendix B).

2.4.3 Round 4

The results of rounds 2 and 3 were compiled and presented to the expert panel as final consensus-based recommendations. For any given intervention, if ≥75% of respondents selected "Yes, I would recommend this product" in rounds 2 or 3, this represented a recommendation on behalf of the panel for the prevention or management of ARD. If ≥75% of respondents selected "No, I would not recommend this product", this represented that the intervention would not be recommended on behalf of the panel. If a 75% consensus could not be reached for either "Yes" or "No" questions, the panel was deemed unable to make a recommendation for the intervention due to a lack of consensus. The consensus threshold was chosen to be 75% as this has been reported to be the median threshold for defining consensus across existing Delphi studies (5). Respondents were asked to only comment in round 4 if they strongly opposed any of the final recommendations presented.

2.5 Guideline Disclaimer

The recommendations provided in this publication reflect the majority opinion of experts involved in the guideline development expert panel. While the recommendations are meant to guide clinical decision-making, they should not be considered as accurate or inclusive of every possible method to prevent or manage ARD and ARD-associated symptoms. With novel evidence constantly emerging, these guidelines may not be reflective of all the latest evidence on interventions for ARD care. Additionally, it should be noted that these recommendations may only

apply to ARD caused by RT administered for the purpose of cancer care, and therefore should not be applied to other settings, populations, or disease types. These consensus-based recommendations are intended for use by general practitioners, dermatologists, radiation oncologists, medical oncologists, surgical oncologists, oncology nurses, oncology pharmacists, and radiation therapists, but skin care recommendations for each patient should ultimately be made at the discretion of the treating clinician and based on patients' unique needs and shared decision making.

3. Results

Four Delphi consensus rounds were completed. Forty-eight experts agreed to participate in the Delphi consensus process, of which 42 participated in at least one survey round and were included as members of the expert panel (Table 1). Among the expert panel, 15 countries were represented, including the United States (n=12), Italy (n=9), Canada (n=5), Brazil (n=2), and others. The panel comprised radiation oncologists (n=19), dermatologists (n=8), nurses (n=4), and others. In round 1, 42 of 48 (87.5%) respondents participated. In round 2, 40 of 42 (95.2%) expert panel members completed the survey. Thirty-five of 42 (83.3%) expert Panel members completed round 3, and 36 of 42 (85.7%) completed round 4. Generally, the response rate was considered high (>80%) across all rounds. Round 1 and 2 results have been outlined in Appendix C. A summary of interventions that achieved either ≥75% consensus to be recommended or near-consensus (60-74.99%) has been provided in Table 2, with all detailed Delphi consensus statements listed in Tables 3 and 4.

3.1 ARD Prevention

Among topical non-steroidal agents, the majority of interventions were not recommended for ARD prevention or could not be recommended due to a lack of consensus. No topical non-steroidal agents reached a ≥75% consensus for recommendation by the panel. The most highly recommended topical non-steroidal agents included aqueous creams (51.52%, n=17), hyaluronic acid/hyaluronan (39.39%, n=13), heparinoid (Hirudoid ®), melatonin (36.36%, n=12), and urea (35.29%, n=12), but all demonstrated low agreement among panel members. Among topical corticosteroids, betamethasone (96.97%, n=32) and mometasone furoate (94.12%, n=32) were recommended by the panel due to a high level of consensus. No recommendation could be made

for other corticosteroids, such as hydrocortisone (33.33%, n=11), beclomethasone (42.42%, n=14), and methylprednisolone aceponate (48.48%, n=16), due to a lack of consensus.

Recommendations for barrier films and dressings were varied, but recommendations could be made by the panel for the use of polyurethane film (Hydrofilm ®) (93.94,% n=31) and silicone-based polyurethane (Mepitel ® film) in breast cancer patients (76.47%, n=26). The use of Mepitel film reached a near-consensus in head and neck cancer patients (73.53%, n=25) and silver leaf nylon dressing (72.73%, n=24). All other forms of barrier films and dressings, such as topical film-forming gel (StrataXRT ®), soft silicone dressing, and 3M ™ Cavilon ™ No Sting barrier film, were either not recommended or could not be recommended due to a lack of consensus.

Two types of laser therapy were evaluated for the prevention of ARD, and a recommendation was made by the panel toward the use of photobiomodulation (low-level laser) therapy in breast cancer patients (79.41%, n=27). However, a near-consensus was reached in recommending against the use of this treatment in head and neck cancer patients (73.53%, n=25). Strong recommendation was made by the panel against the use of photo-magnetic therapy (96.97%, n=32).

Forty-two natural and miscellaneous agents were evaluated for use in ARD prevention, the majority of which were strongly recommended against or could not be recommended due to a lack of consensus. Based on the evidence, over 90% of panel members recommended against the use of aloe vera-based, glutamine-based, honey-based, and vitamin-based products, as well as several other natural products. The only natural intervention that was recommended by the panel members was olive oil (78.79%, n=26).

Silver sulfadiazine, a topical antibiotic, achieved near-consensus for a recommendation for ARD prevention (72.73%, n=24). The use of most oral agents, including celecoxib, sucralfate, and antihistamines, and epidermal growth factor-based cream was strongly recommended against by the expert panel (>87%). The use of antiperspirant and deodorant, both aluminum and non-aluminum, was not recommended by the panel for the purpose of preventing ARD.

Numerous alternative therapies, such as massage therapy, laughter therapy, and amifostine, were strongly recommended against by the panel (>90%). A split consensus was reached for the recommendation of washing with water and soap, with 48.48% (n=16) in support and 51.52% (n=17) against this practice. Thus, no recommendation could be made due to a lack of consensus. A lotion product, combining 3% urea, polidocanol, and hyaluronic acid, achieved near-consensus

(63.64%, n=21), but could not be recommended due to a lack of consensus by the panel. Other multi-component therapies could not be recommended due to a lack of consensus by the panel, or were not recommended due to strong consensus against the intervention's use.

3.2 ARD Management

Among 58 interventions used for the management of ARD and associated symptoms, only Mepilex ® Lite Dressings could be recommended (84.85%, n=28). Silicone-based polyurethane (Mepitel film) and two topical non-steroidal agents (doxepin and hydroactive colloid gel) reached near-consensus support by the expert panel, but no recommendation could be made. All other interventions were recommended against use or no consensus could be achieved. Notably, some interventions that were strongly recommended for ARD prevention could not be recommended for ARD management due to a lack of evidence evaluating the agent in the context of symptom management, such as mometasone furoate, olive oil, Hydrofilm, and others.

4. Discussion

To our knowledge, few attempts have been made to develop consensus-based recommendations on ARD care (8). Currently, the prevention and management of ARD in clinical settings is heterogeneous due to the lack of high-quality data or conflicting findings across studies, as highlighted through the systematic review associated with this work. As such, there is an unmet need to provide guidance to clinicians on appropriate ARD prevention and management to ensure optimal supportive care. Through the combined approach of a systematic review and Delphi consensus process, the MASCC Clinical Practice Guidelines for ARD prevention and management reflect the opinions of experts worldwide based on the current state of evidence. The recommendations put forth in this publication will help to inform clinical practice for the care of ARD, as well as identify gaps in current knowledge and areas for future oncodermatology research.

Previous guidelines have been published by cancer care agencies to guide clinical practice on ARD, such as the Society and College of Radiographers (8), the Oncology Nursing Society (ONS) (9), the International Society of Nurses in Cancer Care (ISNCC) (10), and MASCC (in 2013) (4,11). While these guidelines have been beneficial in informing clinical practice, the recommendations put forth by each agency are discrepant, likely due to variability in approaches used in the development of recommendations. Each organization used comprehensive literature

searching and employed interdisciplinary panels in the development of recommendations, but the use of a formal Delphi consensus process (5) was unique to our methodology. Some of the consensus-based recommendations outlined here may therefore differ from these pre-existing guidelines due to our inclusion of a Delphi consensus methodology (5) and a relatively large panel of experts worldwide.

For interventions that merely surpassed the 75% consensus threshold (i.e., 75-80% support), the expert panel expresses caution to clinicians when using interventions that were only slightly over the 75% threshold, despite majority support. Additionally, the expert panel believes that interventions that received support just below the 75% consensus (i.e., 60-75% support) and could not be recommended due to a lack of consensus have a high potential for efficacy and should therefore be further investigated to determine efficacy. For example, Mepitel film was recommended for the prevention of ARD in breast cancer patients, (76.47%, n=26) but failed to reach consensus in head and neck cancer patients (73.53%, n=25), thus highlighting a critical need for additional research in head and neck cancer patients.

While numerous interventions received very strong recommendations against their use, future research on these agents should not be dismissed. For the majority of interventions, the available evidence was limited due to a low number of studies and/or low quality of evidence (e.g., small sample size, lack of blinding, retrospective study design). Given the current state of evidence, these interventions should not be recommended for ARD care at this time, but future research may be necessary to confirm effectiveness and safety. Additionally, it is possible that certain interventions were less likely to reach consensus for reasons other than the limited high-quality evidence available. Certain interventions that were near-consensus, but could not be recommended include curcumin- and silymarin-based products for the prevention of ARD and Mepitel film and hydroactive colloid gel for the management of ARD. Notably, studies supporting the use of these interventions were mostly published within the last decade and have therefore only recently been introduced to the field. As such, the panel was likely unable to reach a consensus on these interventions due to the recency of evidence, highlighting that more research is needed to demonstrate efficacy in the coming years.

It is important to recognize that the Delphi consensus, while a comprehensive method with high confidence that is representative of the expertise of numerous clinicians, is considered to be level V evidence due to its subjective nature. There were several instances where panel members

reported severe oppositions toward consensus-based recommendations; however, to maintain transparency, the steering committee decided against altering the recommendations. For example, while olive oil reached a consensus to be recommended for the prevention of ARD by the expert panel (78.79%, n=26), several panel members expressed hesitancy against the recommendation due to 1) anecdotal observations that oil-based formulations lead to greater erythema, and 2) concerns that existing studies on olive oil have high heterogeneity and cannot support efficacy. Similarly, with laser therapies in general, one panel member expressed a negative experience with this type of intervention, while another commented that active trials are in place to confirm efficacy in preventing ARD (12). While photobiomodulation therapy was recommended in patients with breast cancer, one panel member highlighted the potential for efficacy in head and neck cancer patients as well. However, due to a lack of consensus, more research is needed to support a recommendation in this group of patients.

Additionally, one panel member expressed that although curcumin-based products could not be recommended for the prevention of ARD due to a lack of consensus, further research is highly warranted to determine efficacy as the evidence supporting curcumin use outweighs the evidence against it. While the use of pentoxifylline was recommended against for the management of ARD, one panel member expressed that this intervention is more suitable for late effects of RT, such as fibrosis. Silver sulfadiazine reached a near-consensus recommendation for the prevention of ARD, but no concrete recommendation could be made because the 75% threshold was not met. Recommendations for silver sulfadiazine use vary across clinical practice guidelines, whereby MASCC (11), British Columbia Cancer Agency (BCCA) (13), CancerCare Manitoba (CCMB) (14), SCoR (8), and ONS (9) recommend its use for prevention and/or management of ARD, while ISNCC (10) does not make a recommendation due to insufficient evidence supporting its use (4). While silver sulfadiazine may demonstrate efficacy in preventing secondary infection once moist desquamation arises, there is limited evidence supporting the use of this intervention in the primary prevention of ARD, which highlights why our panel was unable to reach a consensus in recommending this product.

For recommendations on antiperspirant/deodorant use, bra use (for breast cancer patients), and washing with water and/or soap, panel members alerted the steering committee regarding the need for a clear distinction between general skin care recommendations and recommendations specific to the prevention and management of ARD. For example, the panel reached a consensus

against recommending antiperspirant/deodorant use for the prevention of ARD because the aim of the Delphi consensus was to develop recommendations specific to ARD prevention or management. While antiperspirant/deodorant and washing are not preventative modalities for ARD, its use should not be contraindicated during RT according to the expert panel.

Certain barriers may reduce clinicians' likelihood of recommending a given intervention for ARD care. Some interventions cannot be accessed at all institutions due to excessive material and infrastructure required for implementation. For example, photobiomodulation therapy and Mepitel film, while recommended by the panel for ARD prevention in breast cancer patients, bear additional costs and time associated with the treatment itself and its administration, which may result in reduced uptake by clinicians (15,16).

4.1 Strengths and Limitations

There were evident strengths in the methodology employed in the development of consensus-based recommendations on ARD care, such as the representation of many countries and disciplines in the expert panel. The use of a Delphi process to gather expert opinions allowed for experts to express opinions in an anonymized manner, thus reducing bias in responses; additionally, by informing expert panel members of the results of a prior systematic review, they were given the information required to make an informed recommendation on each intervention's use. The response rate was also relatively high across all four rounds of the Delphi process, thus enhancing the study's validity. The clear distinction between recommendations for ARD prevention and management provides additional clinical utility.

Nevertheless, there are several limitations to address. First, the use of an online multiple-choice format might have made it challenging for respondents to express their feedback on each question; as such, an "other" free-text option was always provided for concerns and/or suggestions. Next, panel members were required to self-declare their expertise in ARD care and/or research at the start of each survey, but since there was no attempt to objectively measure their level of expertise, it is difficult to ensure that all members of the panel had adequate expertise in clinical care and/or research on ARD to contribute to recommendations. Despite this potential limitation, we considered majority support (≥75%) in the development of all recommendations, such that variability in the subjective views of a few panel members would have minimal effect on the final recommendations. Moreover, due to the sheer amount of studies available, it was not feasible to

provide the expert panel with a detailed overview of each study's findings; as such, findings were simplified at the discretion of the steering committee to be presented in easy-to-understand tables for the expert panel. This may have therefore introduced selection bias in the outcomes presented to the panel members during the process of guideline development. The use of concurrent systematic therapies, dose and target volumes, and treatment scheduling are examples of treatment-related factors that can impact ARD severity and may have differed between study populations, but these study variabilities were not presented to the expert panel for the sake of simplicity and to minimize survey burden.

Furthermore, aside from the explored interventions for ARD prevention and management, there have been recent advancements in RT modalities that have shown benefit in reducing skin toxicities, such as the use of intensity-modulated RT (in breast and head and neck patients) (17,18), prone positioning (in breast patients) (19), or skin dose limiting techniques (20). These RT techniques were not included in the scope of interventions evaluated, despite their relative importance in improving patients' skin outcomes. Lastly, we acknowledge that certain interventions may be solely effective in caring for ARD in certain cancer sites or relieving specific symptoms, but not all; since the majority of studies included in the Delphi consensus evaluated ARD in breast and head and neck cancer patients, it is difficult to generalize recommendations to other cancer sites. Since the consensus-based recommendations outlined in this study unfortunately do not provide site- or symptom-specific guidance, we recommend that further research be conducted to develop site- and symptom-specific recommendations as they will surely have great clinical applicability.

5. Conclusions

Through a combined literature review and Delphi process, the consensus-based recommendations outlined form the clinical practice guidelines for ARD prevention and management in patients undergoing treatment for cancer. Betamethasone, mometasone furoate, Mepitel film (in breast cancer patients), Hydrofilm, photobiomodulation therapy (in breast cancer patients), and olive oil were recommended for the prevention of ARD, while Mepilex Lite dressings were recommended for the management of ARD. However, the remaining interventions could not be recommended due to a lack of consensus or were recommended against due to a lack of evidence supporting their use in clinical practice. Future research is highly encouraged before

recommendations can be made supporting the use of interventions that were not recommended, particularly among those that reached near-consensus. In the meantime, these recommendations will guide clinicians on the best practices for preventing and managing ARD given the current state of evidence and opinions of the expert panel. As new evidence emerges on ARD care methods, the MASCC Oncodermatology Study Group intends to update these clinical practice guidelines periodically.

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Figure 1. Delphi Consensus Process Stages

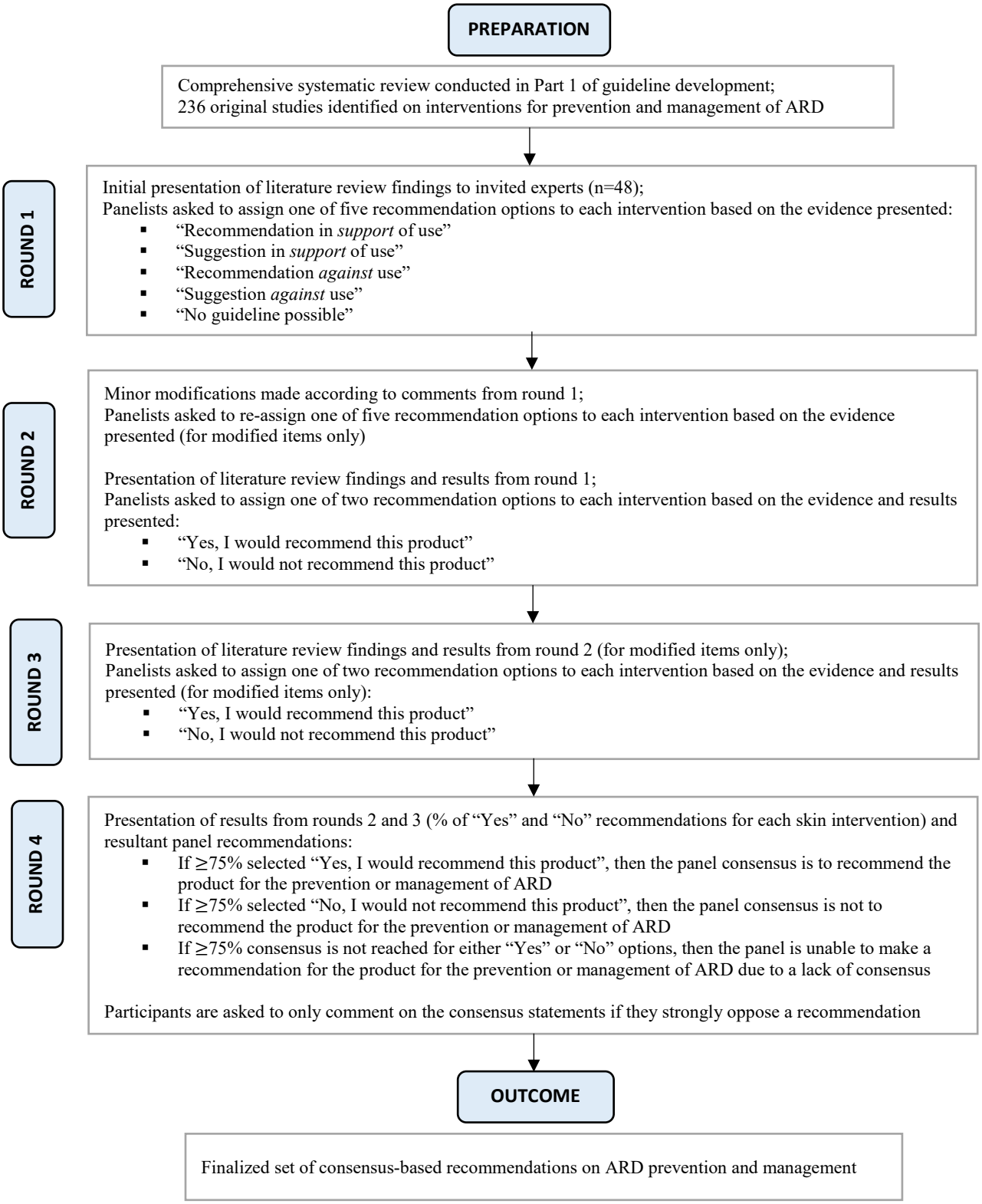

Table 1. Expert Panel

Name	Position	Affiliation/Institution
Dr. Manjeshwar Shrinath Baliga, PhD	Senior Radiobiologist	Department of Radiation Oncology, Mangalore Institute of Oncology, Mangalore, Karnataka, India,
Suvam Banerjee, MBBS	Medical Doctor and Researcher	Burdwan Medical College and Hospital, West Bengal, India Department of Health and Family Welfare, Government of West Bengal, India The West Bengal University of Health Sciences
Dr. Elaine Barros Ferreira, PhD RN	Researcher & Nurse	Department of Nursing, School of Health Sciences, University of Brasília, Brasília, Brazil
Dr. Carlotta Becherini, MD	Radiation Oncologist	Department of Radiation Oncology, University of Florence, Azienda Ospedaliera-Universitaria Careggi, Florence, Italy
Dr. Christine Boers-Doets, PhD	Side Effects Specialist	CancerMed Side Effects Institute & Impaqtt Foundation, Wormer, Netherlands
Dr. Pierluigi Bonomo, MD	Radiation Oncologist	Department of Radiation Oncology, University of Florence, Azienda Ospedaliera-Universitaria Careggi, Florence, Italy
Dr. Luisa Caprara, MD	Radiation Oncologist	Department of Radiation Oncology, University of Florence, Azienda Ospedaliera-Universitaria Careggi, Florence, Italy
Dr. Marta Carlesimo, MD	Medical Physicist	Sapienza University, Rome, Italy
Dr. Gemma Caro, MD	Researcher	Unit of Dermatology, Department of Clinical Internal, Anesthesiological and Cardiovascular Sciences, Sapienza University, Rome, Italy
Dr. Maria Caterina Fortuna, MD	Medical Physicist	Sapienza University, Rome, Italy
Dr. Edward Chow, MBBS PhD	Radiation Oncologist	Department of Radiation Oncology, Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada
Dr. Jennifer Croke, MD	Radiation Oncologist	Radiation Medicine Program, Princess Margaret Cancer Centre, University Health Network; Department of Radiation Oncology, University of Toronto, Toronto, Ontario, Canada
Dr. Sughosh Dhakal, MD	Radiation Oncologist	Department of Radiation Oncology, Wilmot Cancer Institute, University of Rochester Medical Center, Rochester, New York, USA
Dr. Paula Elaine Diniz dos Reis, PhD RN	Researcher & Nurse	Department of Nursing, School of Health Sciences, University of Brasília, Brasília, Brazil

Dr. Lorraine Drapek, DNP-FNP-BC AOCNP	Oncology Nurse Practitioner & Researcher	Department of Radiation Oncology, Mass General Cancer Center, Boston, Massachusetts, USA
Dr. Azael Freites-Martinez, MD	Dermatologist	Oncodermatology Clinic Hospital Ruber Juan Bravo and Universidad Europea, Madrid, Spain
Dr. Jesper Grau Eriksen, MD PhD	Oncologist	Experimental Clinical Oncology, Department of Oncology, Aarhus University Hospital, Aarhus, Denmark
Dr. Alice Y Ho, MD, MBA	Radiation Oncologist	Department of Radiation Oncology, Massachusetts General Hospital, Boston, Massachusetts, USA
Dr. Patries M Herst, PhD	Researcher	Department of Radiation Therapy, University of Otago, New Zealand
Dr. Satoshi Hirakawa, MD	Dermatologist	Department of Supportive Care in Cancer, Seirei Hamamatsu General Hospital, Hamamatsu, Japan
Dr. Emily Hoffman Smith, MD	Dermatologist	University of Missouri, Department of Dermatology, Ellis Fischel Cancer Center, Columbia, Missouri, USA
Dr. Nicola Alessandro Iacovelli, MD	Radiation Oncologist	Radiation Oncology, Fondazione IRCCS Istituto Nazionale dei Tumori di Milano, Milan, Italy
Prof. Youlia M Kirova, MD	Radiation Oncologist	Department of Radiation Oncology, Institut Curie, 75005 Paris, France
Dr. Bernice Kwong, MD	Dermatologist	Department of Dermatology, Stanford University, Stanford, California, USA
Dr. Michael Lock, MD	Radiation Oncologist	Division of Radiation Oncology, London Health Sciences Centre, Western University, London, Ontario, Canada
Dr. Alina Markova, MD	Dermatologist	Memorial Sloan Kettering Cancer Centre, Weill Cornell Medical College, New York City, New York, USA
Maurene McQuestion, RN, BA, BScN, MSc, CON(C)	Researcher & Registered Nurse	Princess Margaret Cancer Centre, University Health Network, Toronto, Ontario, Canada (now retired)
Dr. Robert Miller, MD	Radiation Oncologist	Mayo Clinic, Rochester, Minnesota, 55905, US
Dr. Gustavo Nader Marta, MD, PhD	Radiation Oncologist	Department of Radiation Oncology, Hospital Sírio-Libanês, Sao Paulo, Brazil
Dr. Mami Ogita, MD	Radiation Oncologist	Department of Radiology, The University of Tokyo Hospital, Bunkyo, Tokyo, Japan
Dr. Silvina Pugliese, MD	Dermatologist	Department of Dermatology, Stanford University, California, USA
Dr. Claire Marie Reyes-Habito, MD	Dermatologist	Asian Cancer Institute, Asian Hospital and Medical Center, Alabang, Muntinlupa, Philippines
Dr. Jolien Robijns, PhD	Researcher	Hasselt University, Faculty of Medicine & Life Sciences-Linburg Clinical Research Center, Hasselt, Belgium

Dr. Alfredo Rossi, MD PhD	Researcher	Department of Internal Medicine and Medical Specialties, Sapienza University of Rome, Rome, Italy
Dr. Julie Ryan Wolf, MPH PhD	Researcher	Departments of Dermatology & Radiation Oncology, University of Rochester Medical Center, Rochester, New York, USA
Dr. Viola Salvestrini, MD	Radiation Oncologist	Department of Radiation Oncology, University of Florence, Azienda Ospedaliera-Universitaria Careggi, Florence, Italy
Dr. Leonard Christopher Schmeel, MD	Radiation Oncologist	University Hospital Bonn, Department of Radiation Oncology, Bonn, Germany
Dr. Neil Shear, MD	Dermatologist	Division of Dermatology, Sunnybrook Health Sciences Centre, University of Toronto, Toronto, Ontario, Canada
Dr. Mateusz Spałek, MD PhD	Radiation Oncologist	Department of Soft Tissue/Bone Sarcoma and Melanoma, Maria Sklodowska-Curie National Research Institute of Oncology, Warsaw, Poland
Dr. Jon Strasser, MD	Radiation Oncologist	Delaware/Christiana Care NCORP, Newark, Delaware, USA
Dr. Mark Trombetta, MD	Radiation Oncologist	Drexel University College of Medicine, Allegheny Health Network Cancer Institute, Division of Radiation Oncology, Pittsburgh, Pennsylvania, USA
Dr. Haoming (Carl) Qiu, MD	Radiation Oncologist	Department of Radiation Oncology, Wilmot Cancer Institute, University of Rochester Medical Center, Rochester, New York, USA

Table 2. Summary of Interventions Reaching Consensus and Near-Consensus for the Prevention and Management of ARD

Intervention Category	Guideline Statements	
Prevention of ARD		
Topical non-steroidal agents	Consensus to recommend (≥75%)	None
	Near-consensus supporting recommendation (60-74.99%)	None
Topical corticosteroids	Consensus to recommend (≥75%)	Mometasone furoate; Betamethasone
	Near-consensus supporting recommendation (60-74.99%)	None
Barrier films and dressings	Consensus to recommend (≥75%)	Silicone-based polyurethane (Mepitel ® film) (breast cancer); Polyurethane film (Hydrofilm ®)
	Near-consensus supporting recommendation (60-74.99%)	Silicone-based polyurethane (Mepitel ® film) (head and neck cancer); Silver nylon dressing
Laser therapy	Consensus to recommend (≥75%)	Photobiomodulation/low-level laser therapy (breast cancer)
	Near-consensus supporting recommendation (60-74.99%)	None
Natural and miscellaneous agents	Consensus to recommend (≥75%)	Olive oil
	Near-consensus supporting recommendation (60-74.99%)	Curcumin (turmeric)-based products; Silymarin-based products
Growth factors and oral agents	Consensus to recommend (≥75%)	None
	Near-consensus supporting recommendation (60-74.99%)	Enzyme mixture (papain, trypsin, chymotrypsin)
Antibiotics	Consensus to recommend (≥75%)	None
	Near-consensus supporting recommendation (60-74.99%)	Silver sulfadiazine/flamazine
Antiperspirant/deodorant	Consensus to recommend (≥75%)	None
	Near-consensus supporting recommendation (60-74.99%)	None
Alternative and multi-component therapies	Consensus to recommend (≥75%)	None
	Near-consensus supporting recommendation (60-74.99%)	Lotion (3% urea, polidocanol and hyaluronic acid)
Management of ARD		
Topical non-steroidal agents	Consensus to recommend (≥75%)	None
	Near-consensus supporting recommendation (60-74.99%)	Doxepin; Hydroactive colloid gel
Topical corticosteroids	Consensus to recommend (≥75%)	None
	Near-consensus supporting recommendation (60-74.99%)	None
Barrier films and dressings	Consensus to recommend (≥75%)	Foam dressings (Mepilex® Lite)

	Near-consensus supporting recommendation (60-74.99%)	Silicone-based polyurethane (Mepitel ® film)
Laser therapy	Consensus to recommend (≥75%)	None
	Near-consensus supporting recommendation (60-74.99%)	None
Natural and miscellaneous agents	Consensus to recommend (≥75%)	None
	Near-consensus supporting recommendation (60-74.99%)	None
Growth factors and oral agents	Consensus to recommend (≥75%)	None
	Near-consensus supporting recommendation (60-74.99%)	None
Alternative and multi-component therapies	Consensus to recommend (≥75%)	None
	Near-consensus supporting recommendation (60-74.99%)	None

Table 3. Delphi Consensus Statements: Prevention of Acute Radiation Dermatitis

Intervention	Percentage of Responses "Yes, I would recommend this product in my clinical practice"	Percentage of Responses "No, I would not recommend this product in my clinical practice"	Consensus Statement
Natural and Miscellaneous Agents			
Aloe vera-based products	6.06% (n=2)	93.94% (n=31)	The panel does not recommend the use of aloe vera-based products for the prevention of ARD.
Calendula (marigold)-based products	29.41% (n=10)	70.59% (n=24)	The panel is unable to make a recommendation for the use of calendula (marigold)-based products for the prevention of ARD due to a lack of consensus.
Curcumin (turmeric)-based products	64.71% (n=22)	35.29% (n=12)	The panel is unable to make a recommendation for the use of curcumin (turmeric)-based products for the prevention of ARD due to a lack of consensus.
Glutamine products	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of glutamine products for the prevention of ARD.
Beta-hydroxy-beta-methylbutyrate/arginine/glutamine	30.30% (n=10)	69.70% (n=23)	The panel is unable to make a recommendation for the use of Beta-hydroxy-beta-methylbutyrate/arginine/glutamine for the prevention of ARD due to a lack of consensus.
Honey-based products	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of honey-based products for the prevention of ARD.
Chamomilla recutita	35.29% (n=12)	64.71% (n=22)	The panel is unable to make a recommendation for the use of chamomilla recutita for the prevention of ARD due to a lack of consensus.
Silymarin-based products	60.61% (n=20)	39.39% (n=13)	The panel is unable to make a recommendation for the use of silymarin-based products for the prevention of ARD due to a lack of consensus.
Vitamin C	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of Vitamin C for the prevention of ARD.

Intervention	Percentage of Responses "Yes, I would recommend this product in my clinical practice"	Percentage of Responses "No, I would not recommend this product in my clinical practice"	Consensus Statement
Vitamin D (Daivonex ®)	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of Vitamin D (Daivonex ®) for the prevention of ARD.
NS 21 skin repair treatment	9.09% (n=3)	90.91% (n=30)	The panel does not recommend the use of NS 21 skin repair treatment for the prevention of ARD.
Adlay bran extract	57.58% (n=19)	42.42% (n=14)	The panel is unable to make a recommendation for the use of adlay bran extract for the prevention of ARD due to a lack of consensus.
Jaungo (Shiunko)	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of Jaungo (Shiunko) for the prevention of ARD.
Zinc	30.30% (n=10)	69.70% (n=23)	The panel is unable to make a recommendation for the use of zinc for the prevention of ARD due to a lack of consensus.
Elaeagnus angustifolia	15.15% (n=5)	84.85% (n=28)	The panel does not recommend the use of Elaeagnus angustifolia for the prevention of ARD.
Essential oil mixture (containing helichrysum, frankincense, lavender, & geranium)	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of essential oil mixture for the prevention of ARD.
Emu oil	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of emu oil for the prevention of ARD.
Centella asiatica (Asiatic pennywort)	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of Centella asiatica (Asiatic pennywort) for the prevention of ARD.
Oil-in-water emulsion (containing capparis spinosa, opuntia coccinellifera and olive leaf extracts)	47.06% (n=16)	52.94% (n=18)	The panel is unable to make a recommendation for the use of oil-in-water emulsion for the prevention of ARD due to a lack of consensus.
Cucumis sativus (cucumber)	9.09% (n=3)	84.85% (n=28)	The panel does not recommend the use of Cucumis sativus (cucumber) for the prevention of ARD.

Intervention	Percentage of Responses "Yes, I would recommend this product in my clinical practice"	Percentage of Responses "No, I would not recommend this product in my clinical practice"	Consensus Statement
Thunbergia laurifolia (laurel clockvine)	6.06% (n=2)	93.94% (n=31)	The panel does not recommend the use of Thunbergia laurifolia for the prevention of ARD.
Boswellic acids	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of Boswellic acids for the prevention of ARD.
Kamillosan cream (containing chamomile)	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of Kamillosan cream for the prevention of ARD.
Olive oil	78.79% (n=26)	21.21% (n=7)	The panel recommends the use of olive oil for the prevention of ARD.
Nigella sativa L. extract	45.45% (n=15)	54.55% (n=18)	The panel is unable to make a recommendation for the use of Nigella sativa L. extract for the prevention of ARD due to a lack of consensus.
Lianbai	30.30% (n=10)	69.70% (n=23)	The panel is unable to make a recommendation for the use of Lianbai for the prevention of ARD due to a lack of consensus.
Oil-based emulsion (containing Allantoin)	57.58% (n=19)	42.42% (n=14)	The panel is unable to make a recommendation for the use of Lianbai for the prevention of ARD due to a lack of consensus.
Three-step herbal formulation: **1. Aloe Vera Gel, Calendula Officinalis and Hypericum Perforatum/St. John's-wort Oil Extracts [cream]** **2. Beeswax, Extra Virgin Olive Oil, and Calendula Officinalis and Hypericum Perforatum Oil Extracts [ointment]**	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of three-step formulation for the prevention of ARD.

Intervention	Percentage of Responses "Yes, I would recommend this product in my clinical practice"	Percentage of Responses "No, I would not recommend this product in my clinical practice"	Consensus Statement
3. Aloe Vera Gel, Calendula Officinalis and Hypericum Perforatum/St. John's-wort Oil Extracts [shower gel]			
Cryptomphalus aspersa secretion (containing antioxidant ingredients: green coffee oil, olive oil, ectoine, hyaluronic acid, and peptides)	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of Cryptomphalus aspersa secretion for the prevention of ARD.
Camellia sinensis nonfermentatum extract	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of Camellia sinensis nonfermentatum extract for the prevention of ARD.
Thixotropic gel (containing tea tree oil)	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of Thixotropic gel (containing tea tree oil) for the prevention of ARD.
Alcoholic wine (in addition to Biafine ® and topical steroids)	12.12% (n=4)	87.88% (n=29)	The panel does not recommend the use of alcoholic wine for the prevention of ARD.
Pomegranate extract	6.06% (n=2)	93.94% (n=31)	The panel does not recommend the use of pomegranate extract for the prevention of ARD.
Pure vitamin E (Vea ® lipogel)	12.12% (n=4)	87.88% (n=29)	The panel does not recommend the use of pure vitamin E for the prevention of ARD.
Omega-3,6,9 (Quinovit ®)	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of Omega-3,6,9 for the prevention of ARD.
Natural triglycerides fitosterols-polyethyleneglycol (Xderit)	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of natural triglycerides fitosterols-polyethyleneglycol for the prevention of ARD.

Intervention	Percentage of Responses "Yes, I would recommend this product in my clinical practice"	Percentage of Responses "No, I would not recommend this product in my clinical practice"	Consensus Statement
Betaglucan and sodium hyaluronate (Neoviderm)	6.06% (n=2)	93.94% (n=31)	The panel does not recommend the use of betaglucan and sodium hyaluronate for the prevention of ARD.
Vitis vinifera A.s-I-M.t-O.dij (Ixoderm®)	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of Vitis vinifera A.s-I-M.t-O. for the prevention of ARD.
Laser Therapy			
Photobiomodulation/low-level laser therapy (breast cancer)	79.41% (n=27)	20.59% (n=7)	The panel recommends the use of photobiomodulation/low-level laser therapy for the prevention of ARD in breast cancer patients.
Photobiomodulation/low-level laser therapy (head and neck cancer)	26.47% (n=9)	73.53% (n=25)	The panel is unable to make a recommendation for the use of photobiomodulation/low-level laser therapy for the prevention of ARD in head and neck cancer patients due to a lack of consensus.
Photo-magnetic therapy	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of photo-magnetic therapy for the prevention of ARD.
Barrier Films and Dressings			
Silicone-based polyurethane (Mepitel ® film) (breast cancer)	76.47% (n=26)	23.53% (n=8)	The panel recommends the use of silicone-based polyurethane (Mepitel ® film) for the prevention of ARD in breast cancer patients.
Silicone-based polyurethane (Mepitel ® film) (head and neck cancer)	73.53% (n=25)	26.47% (n=9)	The panel is unable to make a recommendation for the use of silicone-based polyurethane (Mepitel ® film) for the prevention of ARD in head and neck cancer patients due to a lack of consensus.
Polyurethane film (Hydrofilm ®)	93.94% (n=31)	6.06% (n=2)	The panel recommends the use of Polyurethane film (Hydrofilm ®) for the prevention of ARD.
Topical film-forming gel (StrataXRT ®)	33.33% (n=11)	66.67% (n=22)	The panel is unable to make a recommendation for the use of topical film-forming gel (StrataXRT ®) for the prevention of ARD due to a lack of consensus.

Intervention	Percentage of Responses "Yes, I would recommend this product in my clinical practice"	Percentage of Responses "No, I would not recommend this product in my clinical practice"	Consensus Statement
3M ™ Cavilon ™ No Sting barrier film	9.09% (n=3)	90.91% (n=30)	The panel does not recommend the use of 3M ™ Cavilon ™ No Sting barrier film for the prevention of ARD.
Silver leaf nylon dressing	72.73% (n=24)	27.27% (n=9)	The panel is unable to make a recommendation for the use of silver leaf nylon dressing for the prevention of ARD due to a lack of consensus.
Airwall film dressing	21.21% (n=7)	78.79 (n=26)	The panel does not recommend the use of Airwall film dressing for the prevention of ARD.
Transparent film dressing (Beekley stickers)	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of transparent film dressing (Beekley stickers) for the prevention of ARD.
Soft silicone dressing	15.15% (n=5)	84.85% (n=28)	The panel does not recommend the use of soft silicone dressing for the prevention of ARD.
Non-alcohol barrier film	11.76% (n=4)	88.24% (n=30)	The panel does not recommend the use of non-alcohol barrier film for the prevention of ARD.
Growth Factors			
Epidermal growth factor	6.06% (n=2)	93.94% (n=31)	The panel does not recommend the use of epidermal growth factor for the prevention of ARD.
Topical Non-Steroidal Agents			
Sucralfate (lotion)	2.94% (n=1)	97.06% (n=33)	The panel does not recommend the use of sucralfate (lotion) for the prevention of ARD.
Sucralfate (gel)	11.76% (n=4)	88.24% (n=30)	The panel does not recommend the use of sucralfate (gel) for the prevention of ARD.
Sucralfate (cream)	29.41% (n=10)	70.59% (n=24)	The panel is unable to make a recommendation for the use of sucralfate (cream) for the prevention of ARD due to a lack of consensus.
Sucralfate (unknown vehicle)	14.71% (n=5)	85.29% (n=29)	The panel is does not recommend the use of sucralfate (unknown vehicle) for the prevention of ARD.

Intervention	Percentage of Responses "Yes, I would recommend this product in my clinical practice"	Percentage of Responses "No, I would not recommend this product in my clinical practice"	Consensus Statement
Trolamine (Biafine ®)	2.94% (n=1)	97.06% (n=33)	The panel does not recommend the use of Trolamine (Biafine ®) for the prevention of ARD.
Urea	35.29% (n=12)	64.71% (n=22)	The panel is unable to make a recommendation for the use of urea for the prevention of ARD due to a lack of consensus.
3M ™ Cavilon ™ Durable barrier cream	11.76% (n=4)	88.24% (n=30)	The panel does not recommend the use of Cavilon ™ barrier cream for the prevention of ARD.
Xonrid ®	18.18% (n=6)	81.82% (n=27)	The panel does not recommend the use of Xonrid ® for the prevention of ARD.
Petrolatum-based ointment (Aquaphor ®)	6.06% (n=2)	93.94% (n=31)	The panel does not recommend the use of petrolatum for the prevention of ARD.
RadiaCare ™ gel	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of RadiaCare ™ for the prevention of ARD.
Hyaluronic acid/hyaluronan	39.39% (n=13)	60.61% (n=20)	The panel is unable to make a recommendation for the use of hyaluronic acid/hyaluronan for the prevention of ARD due to a lack of consensus.
Dexpanthenol (Bepanthen ®)	15.15% (n=5)	84.85% (n=28)	The panel does not recommend the use of dexpanthenol (Bepanthen ®) for the prevention of ARD.
Heparinoid (Hirudoid ®)	36.36% (n=12)	63.64% (n=21)	The panel is unable to make a recommendation for the use of heparinoid (Hirudoid ®) for the prevention of ARD due to a lack of consensus.
Boron-based gel	21.21% (n=7)	78.79 (n=26)	The panel does not recommend the use of boron-based gel for the prevention of ARD.
Polideoxyribonucleotides-based cream	12.12% (n=4)	87.88% (n=29)	The panel does not recommend the use of polideoxyribonucleotides-based cream for the prevention of ARD.

Intervention	Percentage of Responses "Yes, I would recommend this product in my clinical practice"	Percentage of Responses "No, I would not recommend this product in my clinical practice"	Consensus Statement
Hydroactive colloid gel	9.09% (n=3)	90.91% (n=30)	The panel does not recommend the use of hydroactive colloid gel for the prevention of ARD.
Leniqol cream	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of leniqol for the prevention of ARD.
Glycosaminoglycans/rgta	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of glycosaminoglycans/rgta for the prevention of ARD.
Na-sucrose octasulfate	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of Na-sucrose octasulfate for the prevention of ARD.
Eupilen ®	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of Eupilen ® for the prevention of ARD.
Adrenergic vasoconstrictor	12.12% (n=4)	87.88% (n=29)	The panel does not recommend the use of adrenergic vasoconstrictor for the prevention of ARD.
Melatonin	36.36% (n=12)	63.64% (n=21)	The panel is unable to make a recommendation for the use of melatonin for the prevention of ARD due to a lack of consensus.
Aqueous cream	51.52% (n=17)	48.48% (n=16)	The panel is unable to make a recommendation for the use of aqueous cream for the prevention of ARD due to a lack of consensus.
Atorvastatin	21.21% (n=7)	78.79 (n=26)	The panel does not recommend the use of atorvastatin for the prevention of ARD.
MAS065D (non-steroidal water-in-oil cream) (Xclair ®)	24.24% (n=8)	75.76% (n=25)	The panel does not recommend the use of MAS065D (non-steroidal water-in-oil cream) (Xclair ®) for the prevention of ARD.
Five non-pharmaceutical skin care products: thermal water spray, emollient, cleanser, wound healing cream, sunscreen	27.27% (n=9)	72.73% (n=24)	The panel is unable to make a recommendation for the use of five non-pharmaceutical skin care products for the prevention of ARD due to a lack of consensus.

Intervention	Percentage of Responses "Yes, I would recommend this product in my clinical practice"	Percentage of Responses "No, I would not recommend this product in my clinical practice"	Consensus Statement
Liposomal cream (Capilen)	6.06% (n=2)	93.94% (n=31)	The panel does not recommend the use of liposomal cream (Capilen) for the prevention of ARD.
Oral Agents			
Celecoxib	12.12% (n=4)	87.88% (n=29)	The panel does not recommend the use of celecoxib for the prevention of ARD.
Sucralfate	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of sucralfate for the prevention of ARD.
Pentoxifylline	27.27% (n=9)	72.73% (n=24)	The panel is unable to make a recommendation for the use of pentoxifylline for the prevention of ARD due to a lack of consensus.
Antihistamines	6.06% (n=2)	93.94% (n=31)	The panel does not recommend the use of antihistamines for the prevention of ARD.
Enzyme mixture (papain, trypsin, chymotrypsin)	69.70% (n=23)	30.30% (n=10)	The panel is unable to make a recommendation for the use of enzyme mixture for the prevention of ARD due to a lack of consensus.
Topical Corticosteroids			
Mometasone furoate	94.12% (n=32)	5.88% (n=2)	The panel recommends the use of mometasone furoate for the prevention of ARD.
Hydrocortisone	33.33% (n=11)	66.67% (n=22)	The panel is unable to make a recommendation for the use of hydrocortisone for the prevention of ARD due to a lack of consensus.
Betamethasone	96.97% (n=32)	3.03% (n=1)	The panel recommends the use of betamethasone for the prevention of ARD.
Beclomethasone	42.42% (n=14)	57.58% (n=19)	The panel is unable to make a recommendation for the use of beclomethasone for the prevention of ARD due to a lack of consensus.

Intervention	Percentage of Responses "Yes, I would recommend this product in my clinical practice"	Percentage of Responses "No, I would not recommend this product in my clinical practice"	Consensus Statement
Methylprednisolone aceponate	48.48% (n=16)	51.52% (n=17)	The panel is unable to make a recommendation for the use of methylprednisolone aceponate for the prevention of ARD due to a lack of consensus.
Antibiotics			
Silver sulfadiazine	72.73% (n=24)	27.27% (n=9)	The panel is unable to make a recommendation for the use of silver sulfadiazine/flamazine for the prevention of ARD due to a lack of consensus.
Antiperspirant/Deodorant			
Aluminum/metallic	11.76% (n=4)	88.24% (n=30)	The panel does not recommend the use of aluminum/metallic antiperspirant/deodorant for the prevention of ARD.
Non-aluminum/non-metallic	20.59% (n=7)	79.41% (n=27)	The panel does not recommend the use of non-aluminum/non-metallic antiperspirant/deodorant for the prevention of ARD.
Alternative Therapies			
Massage therapy	9.09% (n=3)	90.91% (n=30)	The panel does not recommend the use of massage therapy for the prevention of ARD.
Laughter therapy	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of laughter therapy for the prevention of ARD.
Hydration therapy	12.12% (n=4)	87.88% (n=29)	The panel does not recommend the use of hydration therapy for the prevention of ARD.
Amifostine	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of amifostine for the prevention of ARD.
Bra use (for breast cancer patients)	24.24% (n=8)	75.76% (n=25)	The panel does not recommend bra use for the prevention of ARD.
Therapeutic touch	6.06% (n=2)	93.94% (n=31)	The panel does not recommend the use of therapeutic touch for the prevention of ARD.

Intervention	Percentage of Responses "Yes, I would recommend this product in my clinical practice"	Percentage of Responses "No, I would not recommend this product in my clinical practice"	Consensus Statement
Washing with water and soap	48.48% (n=16)	51.52% (n=17)	The panel is unable to make a recommendation for the use of washing with water and soap for the prevention of ARD due to a lack of consensus.
Multi-component Therapies			
Emulsion (0.25% hyaluronic acid, 0.25% chondroitin sulfate, aloe vera, carrot oil, vitamin F and vitamin E)	36.36% (n=12)	63.64% (n=21)	The panel is unable to make a recommendation for the use of emulsion for the prevention of ARD due to a lack of consensus.
Repalysyal (thymine-lysine-hyaluronic acid)	30.30% (n=10)	69.70% (n=23)	The panel is unable to make a recommendation for the use of repalysyal for the prevention of ARD due to a lack of consensus.
Lotion (3% urea, polidocanol and hyaluronic acid)	63.64% (n=21)	36.36% (n=12)	The panel is unable to make a recommendation for the use of lotion (3% urea, polidocanol and hyaluronic acid)for the prevention of ARD due to a lack of consensus.
Cream (fusidic acid and betamethasone)	15.15% (n=5)	84.85% (n=28)	The panel does not recommend the use of cream (fusidic acid and betamethasone) for the prevention of ARD.
Dead sea products (Lenom mouthwash & Solaris moisturizing cream)	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of Dead sea products for the prevention of ARD.
Integrative medicine (supplements, diet, exercise) (Radium bromatum, belladonna, alkalizing treatment, calendula, aloe gel)	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of integrative medicine for the prevention of ARD.

Intervention	Percentage of Responses "Yes, I would recommend this product in my clinical practice"	Percentage of Responses "No, I would not recommend this product in my clinical practice"	Consensus Statement
Lactokine-based two-step care system (R1 & R2)	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of lactokine-based two-step care system (R1&R2) for the prevention of ARD.
Resveratrol, lycopene, vitamin C and anthocyanin (Ixor ®)	6.06% (n=2)	93.94% (n=31)	The panel does not recommend the use of Resveratrol, lycopene, vitamin C and anthocyanin (Ixor ®) for the prevention of ARD.
Reduced glutathione and anthocyanins (RayGel)	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of Reduced glutathione and anthocyanins (RayGel) for the prevention of ARD.
CM glucan, hydroxyprolisilan C and matrixyl (Theta cream)	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of CM glucan, hydroxyprolisilan C and matrixyl (Theta cream) for the prevention of ARD.
Hydrofoam dressing with recombinant human epidermal growth factor (rhEGF)	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of CM hydrofoam dressing with recombinant human epidermal growth factor for the prevention of ARD.
Belladonna 7cH and x-ray 15 cH	30.30% (n=10)	69.70% (n=23)	The panel is unable to make a recommendation for the use of Belladonna 7cH and x-ray 15 cH for the prevention of ARD due to a lack of consensus.
Moist skin care regimen (including Ringer's lactate soaks, aloe vera gel, dexpanthenol ointment, cream base (wool wax/sodium alginate), and cortisol if needed)	6.06% (n=2)	93.94% (n=31)	The panel does not recommend the use of moist skin care regimen for the prevention of ARD.

Abbreviations. ARD = radiation dermatitis.

Table 4. Delphi Consensus Statements: Management of Acute Radiation Dermatitis

Product/Intervention	Percentage of Responses "Yes, I would recommend this product in my clinical practice"	Percentage of Responses "No, I would not recommend this product in my clinical practice"	Consensus Statement
Natural and Miscellaneous Agents			
Aloe vera-based products	12.12% (n=4)	87.88% (n=29)	The panel does not recommend the use of aloe vera-based products for the management of ARD.
Honey-based products	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of honey-based products for the management of ARD.
Henna-containing ointment	15.15% (n=5)	84.45% (n=28)	The panel does not recommend the use of henna-containing ointment for the management of ARD.
Oil-in-water emulsion (containing linoleic acid)	24.24% (n=8)	75.76% (n=25)	The panel does not recommend the use of oil-in-water emulsion (containing linoleic acid) for the management of ARD.
Lianbai	39.39% (n=13)	60.61% (n=20)	The panel is unable to make a recommendation for the use of lianbai for the management of ARD due to a lack of consensus.
Holoil ® (containing Hypericum perforatum/St. John's-wort and neem oil)	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of Holoil ® for the management of ARD.
Tea extracts (containing green and black tea)	6.06% (n=2)	93.94% (n=31)	The panel does not recommend the use of tea extracts (containing green and black tea) for the management of ARD.
Liu-he-dan (Chinese herbal paste)	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of Liu-he-dan (Chinese herbal paste)for the management of ARD.
Laser Therapy			

Photobiomodulation therapy/low level laser therapy	15.15% (n=5)	84.45% (n=28)	The panel does not recommend the use of photobiomodulation therapy/low level laser therapy for the management of ARD.
Unspecified laser	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of unspecified laser for the management of ARD.
High-level laser therapy	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of high-level laser therapy for the management of ARD.
Barrier Films and Dressings			
Topical film-forming gel (StrataXRT ®)	9.09% (n=3)	90.91% (n=30)	The panel does not recommend the use of topical film-forming gel (StrataXRT ®) for the management of ARD.
Silicone-based polyurethane (Mepitel ® film)	69.70% (n=23)	30.30% (n=10)	The panel is unable to make a recommendation for the use of silicone-based polyurethane (Mepitel ® film) for the management of ARD due to a lack of consensus.
Hydrosorb ® (hydrogel polyurethane film)	6.06% (n=2)	93.94% (n=31)	The panel does not recommend the use of tea extracts (containing green and black tea) for the management of ARD.
Mepilex® Lite Dressings	84.85% (n=28)	15.15% (n=5)	The panel recommends the use of Mepilex® Lite Dressings for the management of ARD.
Silver leaf nylon dressings	6.06% (n=2)	93.94% (n=31)	The panel does not recommend the use of silver leaf nylon dressing for the management of ARD.
Silver-containing hydrofiber dressing	6.06% (n=2)	93.94% (n=31)	The panel does not recommend the use of silver-containing hydrofiber dressing for the management of ARD.
Calcium alginate dressing	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of calcium alginate dressings for the management of ARD.
PolyMem® (polymeric membrane) dressings	6.06% (n=2)	93.94% (n=31)	The panel does not recommend the use of PolyMem (polymeric membrane) dressings for the management of ARD.
Amniotic membrane	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of amniotic membrane for the management of ARD.

Hydrocolloid dressings	33.33% (n=11)	66.67% (n=22)	The panel is unable to make a recommendation for the use of hydrocolloid dressing for the management of ARD due to a lack of consensus.
Dry dressings	54.55% (n=18)	45.45% (n=15)	The panel is unable to make a recommendation for the use of dry dressings for the management of ARD due to a lack of consensus.
Topical Non-Steroidal Agents			
Hyaluronic acid/hyaluronan (cream)	8.82% (n=3)	91.18% (n=31)	The panel does not recommend the use of hyaluronic acid/hyaluronan (cream) for the management of ARD.
Hyaluronic acid/hyaluronan (gel)	2.94% (n=1)	97.06% (n=33)	The panel does not recommend the use of hyaluronic acid/hyaluronan (gel) for the management of ARD.
Doxepin	66.67% (n=22)	33.33% (n=11)	The panel is unable to make a recommendation for the use of doxepin for the management of ARD due to a lack of consensus.
Trolamine (Biafine ®)	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of trolamine (Biafine ®) for the management of ARD.
Remoise barrier cream	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of Remoise barrier cream for the management of ARD.
Heparinoid (Hirudoid ®)	33.33% (n=11)	66.67% (n=22)	The panel is unable to make a recommendation for the use of heparinoid (Hirudoid ®) for the management of ARD due to a lack of consensus.
Hydroactive colloid gel	66.67% (n=22)	33.33% (n=11)	The panel is unable to make a recommendation for the use of hydroactive colloid gel for the management of ARD due to a lack of consensus.
Superoxide dismutase	6.06% (n=2)	93.94% (n=31)	The panel does not recommend the use of superoxide dismutase for the management of ARD.
AKL gel (amitriptyline, ketamine, and lidocaine)	18.18% (n=6)	81.82% (n=27)	The panel does not recommend the use of AKL gel (amitriptyline, ketamine, and lidocaine) for the management of ARD.
Platelet gel	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of platelet gel for the management of ARD.
Gentian violet	6.06% (n=2)	93.94% (n=31)	The panel does not recommend the use of gentian violet for the management of ARD.

Epigallocatechin-3-gallate	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of epigallocatechin-3-gallate for the management of ARD.
Sucralfate	6.06% (n=2)	93.94% (n=31)	The panel does not recommend the use of sucralfate for the management of ARD.
Corticosteroids			
Hydrocortisone	18.18% (n=6)	81.82% (n=27)	The panel does not recommend the use of hydrocortisone for the management of ARD.
Unknown steroid	30.30% (n=10)	69.70% (n=23)	The panel is unable to make a recommendation for the use of unknown steroid for the management of ARD due to a lack of consensus.
Alternative Therapies			
Hydrotherapy	12.12% (n=4)	87.88% (n=29)	The panel does not recommend the use of hydrotherapy for the management of ARD.
Acupuncture	36.36% (n=12)	63.64% (n=21)	The panel is unable to make a recommendation for the use of acupuncture for the management of ARD due to a lack of consensus.
Hyperbaric oxygen therapy	9.09% (n=3)	90.91% (n=30)	The panel does not recommend the use of hyperbaric oxygen therapy for the management of ARD.
Placenta extract (injection Placentrex)	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of placenta extract for the management of ARD.
Polylactide-based copolymer	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of polylactide-based copolymer for the management of ARD.
Multi-component Therapies			
Emulsion (0.25% hyaluronic acid, 0.25% chondroitin sulfate, aloe vera, carrot oil, vitamin F and vitamin E)	42.42% (n=14)	57.58% (n=19)	The panel is unable to make a recommendation for the use of emulsion (0.25% hyaluronic acid, 0.25% chondroitin sulfate, aloe vera, carrot oil, vitamin F and vitamin E) for the management of ARD due to a lack of consensus.
Platelet gel and a hyperbaric chamber	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of platelet gel and a hyperbaric chamber for the management of ARD.
Restitutio restructuring cream (alginates, hyaluronic acid, and beta-glucan)	9.09% (n=3)	90.91% (n=30)	The panel does not recommend the use of Restitutio restructuring cream (alginates, hyaluronic acid, and beta-glucan) for the management of ARD.

Vitamin E acetate in lipophilic gel (Vea Oil®) and oral antibiotics with escarectomy	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of vitamin E acetate and antibiotics for the management of ARD.
Granulocyte-colony stimulating factor (G-CSF)	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of granulocyte-colony stimulating factor (G-CSF) for the management of ARD.
Integrative medicine (Supplements, diet, exercise) (Radium bromatum, belladonna, alkalizing treatment, calendula, aloe gel)	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of integrative medicine for the management of ARD.
Homeopathy (combination)	0.00% (n=0)	100.00% (n=33)	The panel does not recommend the use of homeopathy (combination) for the management of ARD.
Lactokine-based two-step care system (R1 & R2)	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of lactokine-based two-step care system (R1 & R2) for the management of ARD.
Bioshield (stearic acid, propylene glycol, and polyunsaturated alcohols)	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of Bioshield (stearic acid, propylene glycol, and polyunsaturated alcohols) for the management of ARD.
Radiodermatitis protocol from Virgen de la Victoria Hospital in Malaga (Including chamomile infusion, application of protective/regenerative creams (Aloe, oats, hyaluronic acid, zinc sucralfate), dressings, steroids)	3.03% (n=1)	96.97% (n=32)	The panel does not recommend the use of radiodermatitis protocol from Virgen de la Victoria Hospital in Malaga for the management of ARD.

Abbreviations. ARD = radiation dermatitis.

Appendix A. Categories of Guidelines, according to MASCC Guideline Policy

Category	Criteria
Recommendation	Reserved for guidelines that are based on Level I or Level II evidence
Suggestion	Used for guidelines that are based on Level III, Level IV, and Level V evidence; this implies panel consensus on the interpretation of this evidence
No guideline possible	Used when there is insufficient evidence on which to base a guideline; this implies (1) that there is little or no evidence regarding the practice in question, or (2) that the panel lacks consensus on the interpretation of existing evidence

Appendix B. Sample Survey Questions

Below are sample questions asked during each round of the Delphi consensus process, using Beclomethasone as an example.

Round 1

Type of Agent	Route of administration	Cancer Site	Author, Year (UI)	Study Type (n)	Comparison Group	Primary Outcome	Effective (Y/N)	Quality of Evidence (level)
Beclomethasone	Topical (spray)	Breast	Shukla PN, 2006 (46106845)	RCT (60)	No intervention	Moist desquamation	Y: Moist desquamation N: Erythema	Doubtful (II)
Abbreviations. n = sample size; RCT = randomized controlled trial; UI = unique identifier; Y = reached statistical significance (demonstrating efficacy); N = did not reach statistical significance (demonstrating inefficacy)								

Based on the given information for Beclomethasone, would you assign a:

- ☐ Recommendation in SUPPORT of the use of this product
- ☐ Suggestion in SUPPORT of the use of this product
- ☐ Recommendation AGAINST the use of this product
- ☐ Suggestion AGAINST the use of this product
- ☐ No guideline possible in SUPPORT of or AGAINST the use of this product

Round 2/3

Type of Agent	Route of administration	Cancer Site	Author, Year (UI)	Study Type (n)	Comparison Group	Primary Outcome	Effective (Y/N)	Quality of Evidence (level)
Beclomethasone	Topical (spray)	Breast	Shukla PN, 2006 (46106845)	RCT (60)	No intervention	Moist desquamation	Y: Moist desquamation N: Erythema	Doubtful (II)
Abbreviations. n = sample size; RCT = randomized controlled trial; UI = unique identifier; Y = reached statistical significance (demonstrating efficacy); N = did not reach statistical significance (demonstrating inefficacy)								

Table of Results from Round 1

Answer Choices	Responses	
Recommendation in SUPPORT of the use of this product	15.00%	6
Suggestion in SUPPORT of the use of this product	22.50%	9

Recommendation AGAINST the use of this product	5.00%	2
Suggestion AGAINST the use of this product	7.50%	3
No guideline possible in SUPPORT of or AGAINST the use of this product	50.00%	20
Total		40

Based on the given information, would you recommend Beclomethasone in your clinical practice?

- **Yes**, I would recommend this product
- **No**, I would not recommend this product

Round 4

Previous Round Results for Beclomethasone

Answer Choices	**Responses**	
Yes, I would recommend this product	42.42%	14
No, I would not recommend this product	57.58%	19
Total		33

Based on the previous Delphi Consensus rounds, the panel is **unable to make a recommendation** for this product for the prevention of RD due to a lack of consensus.

If you strongly oppose this recommendation, please use the space below to explain your concerns with the recommendation. We may address your comments on a future survey round.

Appendix C. Survey Round Results

Table 1. Round 1 and 2 Survey Results for Radiation Dermatitis Prevention Methods

Intervention	Recommendation in SUPPORT of use	Suggestion in SUPPORT of use	Recommendation AGAINST use	Suggestion AGAINST use	No Guideline Possible
Natural and Miscellaneous Agents					
Aloe vera-based products	4.88% (n=2)	12.20% (n=5)	21.95% (n=9)	21.95% (n=9)	39.02% (n=16)
Calendula (marigold)-based products	5.88% (n=2)	23.53% (n=8)	2.94% (n=1)	14.71% (n=5)	52.94% (n=18)
Curcumin (turmeric)-based products	35.29% (n=12)	35.29% (n=12)	8.82% (n=3)	2.94% (n=1)	17.65% (n=6)
Glutamine products	7.32% (n=3)	4.88% (n=2)	48.78% (n=20)	14.63% (n=6)	24.39% (n=10)
Beta-hydroxy-beta-methylbutyrate/arginine/glutamine	12.20% (n=5)	31.71% (n=13)	7.32% (n=3)	4.88% (n=2)	43.90% (n=18)
Honey-based products	2.44% (n=1)	0.00% (n=0)	34.15% (n=14)	21.95% (n=9)	41.46% (n=17)
Chamomilla recutita	14.71% (n=5)	32.35% (n=11)	2.94% (n=1)	0.00% (n=0)	50.00% (n=17)
Silymarin-based products	26.83% (n=11)	36.59% (n=15)	2.44% (n=1)	0.00% (n=0)	34.15% (n=14)
Vitamin C	4.88% (n=2)	2.44% (n=1)	41.46% (n=17)	21.95% (n=9)	29.27% (n=12)
Vitamin D (Daivonex ®)	7.32% (n=3)	0.00% (n=0)	31.71% (n=13)	29.27% (n=12)	31.71% (n=13)
NS 21 skin repair treatment	9.76% (n=4)	14.63% (n=6)	7.32% (n=3)	9.76% (n=4)	58.54% (n=24)
Adlay bran extract	29.27% (n=12)	31.71% (n=13)	2.44% (n=1)	0.00% (n=0)	36.59% (n=15)
Jaungo (Shiunko)	2.44% (n=1)	2.44% (n=1)	26.83% (n=11)	21.95% (n=9)	46.34% (n=19)
Zinc	12.20% (n=5)	19.51% (n=8)	7.32% (n=3)	2.44% (n=1)	58.54% (n=24)
Elaeagnus angustifolia	12.20% (n=5)	17.07% (n=7)	4.88% (n=2)	7.32% (n=3)	58.54% (n=24)
Essential oil mixture (containing helichrysum, frankincense, lavender, & geranium)	2.44% (n=1)	0.00% (n=0)	31.71% (n=13)	24.39% (n=10)	41.46% (n=17)
Emu oil	4.88% (n=2)	4.88% (n=2)	39.02% (n=16)	19.51% (n=8)	31.71% (n=13)
Centella asiatica (Asiatic pennywort)	2.44% (n=1)	2.44% (n=1)	36.59% (n=15)	24.39% (n=10)	34.15% (n=14)

Oil-in-water emulsion (containing capparis spinosa, opuntia coccinellifera and olive leaf extracts)	8.82% (n=3)	50.00% (n=17)	5.88% (n=2)	5.88% (n=2)	29.41% (n=10)
Cucumis sativus (cucumber)	7.32% (n=3)	12.20% (n=5)	17.07% (n=7)	4.88% (n=2)	58.54% (n=24)
Thunbergia laurifolia (laurel clockvine)	2.44% (n=1)	0.00% (n=0)	29.27% (n=12)	31.71% (n=13)	36.59% (n=15)
Boswellic acids	4.88% (n=2)	4.88% (n=2)	19.51% (n=8)	4.88% (n=2)	65.85% (n=27)
Kamillosan cream (containing chamomile)	2.44% (n=1)	0.00% (n=0)	36.59% (n=15)	21.59% (n=9)	39.02% (n=16)
Olive oil	24.39% (n=10)	39.02% (n=16)	7.32% (n=3)	0.00% (n=0)	29.27% (n=12)
Nigella sativa L. extract	19.51% (n=8)	31.71% (n=13)	4.88% (n=2)	0.00% (n=0)	43.90% (n=18)
Lianbai	17.07% (n=7)	24.39% (n=10)	4.88% (n=2)	2.44% (n=1)	51.22% (n=21)
Oil-based emulsion (containing Allantoin)	24.39% (n=10)	19.51% (n=8)	4.88% (n=2)	0.00% (n=0)	51.22% (n=21)
Three-step herbal formulation: 1. Aloe Vera Gel, Calendula Officinalis and Hypericum Perforatum/St. John's-wort Oil Extracts [cream] 2. Beeswax, Extra Virgin Olive Oil, and Calendula Officinalis and Hypericum Perforatum Oil Extracts [ointment] 3. Aloe Vera Gel, Calendula Officinalis and Hypericum Perforatum/St. John's-wort Oil Extracts [shower gel]	2.44% (n=1)	7.32% (n=3)	9.76% (n=4)	9.76% (n=4)	70.73% (n=29)

Cryptomphalus aspersa secretion (containing antioxidant ingredients: green coffee oil, olive oil, ectoine, hyaluronic acid, and peptides)	4.88% (n=2)	2.44% (n=1)	12.20% (n=5)	9.76% (n=4)	70.73% (n=29)
Camellia sinensis nonfermentatum extract	2.44% (n=1)	2.44% (n=1)	9.76% (n=4)	12.20% (n=5)	73.17% (n=30)
Thixotropic gel (containing tea tree oil)	2.44% (n=1)	2.44% (n=1)	9.76% (n=4)	9.76% (n=4)	75.61% (n=31)
Alcoholic wine (in addition to Biafine ® and topical steroids)	2.44% (n=1)	17.07% (n=7)	7.32% (n=3)	4.88% (n=2)	68.29% (n=28)
Pomegranate extract	2.44% (n=1)	7.32% (n=3)	9.76% (n=4)	7.32% (n=3)	73.17% (n=30)
Pure vitamin E (Vea ® lipogel)	9.76% (n=4)	0.00% (n=0)	9.76% (n=4)	7.32% (n=3)	73.17% (n=30)
Omega-3,6,9 (Quinovit ®)	7.32% (n=3)	2.44% (n=1)	9.76% (n=4)	7.32% (n=3)	73.17% (n=30)
Natural triglycerides fitosterols-polyethyleneglycol (Xderit)	2.44% (n=1)	4.88% (n=2)	9.76% (n=4)	7.32% (n=3)	75.61% (n=31)
Betaglucan and sodium hyaluronate (Neoviderm)	9.76% (n=4)	0.00% (n=0)	9.76% (n=4)	7.32% (n=3)	73.17% (n=30)
Vitis vinifera A.s-I-M.t-O.dij (Ixoderm®)	2.44% (n=1)	7.32% (n=3)	9.76% (n=4)	7.32% (n=3)	73.17% (n=30)
Laser Therapy					
Photobiomodulation/low-level laser therapy (breast cancer)	55.88% (n=19)	35.29% (n=12)	2.94% (n=1)	0.00% (n=0)	5.88% (n=2)
Photobiomodulation/low-level laser therapy (head and neck cancer)	5.88% (n=2)	35.29% (n=12)	2.94% (n=1)	5.88% (n=2)	50.00% (n=17)
Photo-magnetic therapy	7.32% (n=3)	0.00% (n=0)	12.20% (n=5)	4.88% (n=2)	75.61% (n=31)
Barrier Films and Dressings					

Silicone-based polyurethane (Mepitel ® film) (breast cancer)	17.65% (n=6)	70.59% (n=24)	2.94% (n=1)	0.00% (n=0)	8.82% (n=3)
Silicone-based polyurethane (Mepitel ® film) (head and neck cancer)	8.82% (n=3)	70.59% (n=24)	2.94% (n=1)	2.94% (n=1)	14.71% (n=5)
Polyurethane film (Hydrofilm ®)	36.59% (n=15)	39.02% (n=16)	4.88% (n=2)	2.44% (n=1)	17.07% (n=7)
Topical film-forming gel (StrataXRT ®)	9.76% (n=4)	21.95% (n=9)	7.32% (n=3)	2.44% (n=1)	58.54% (n=24)
3M ™ Cavilon ™ No Sting barrier film	2.44% (n=1)	9.76% (n=4)	17.07% (n=7)	17.07% (n=7)	53.66% (n=22)
Silver leaf nylon dressing	17.07% (n=7)	39.02% (n=16)	4.88% (n=2)	7.32% (n=3)	31.71% (n=13)
Airwall film dressing	2.44% (n=1)	21.95% (n=9)	4.88% (n=2)	9.76% (n=4)	60.98% (n=25)
Transparent film dressing (Beekley stickers)	2.44% (n=1)	2.44% (n=1)	7.32% (n=3)	9.76% (n=4)	78.05% (n=32)
Soft silicone dressing	2.44% (n=1)	14.63% (n=6)	4.88% (n=2)	2.44% (n=1)	75.61% (n=31)
Non-alcohol barrier film	2.94% (n=1)	29.41% (n=10)	2.94% (n=1)	0.00% (n=0)	64.71% (n=22)
Growth Factors					
Epidermal growth factor	7.32% (n=3)	12.20% (n=5)	9.76% (n=4)	12.20% (n=5)	58.54% (n=24)
Topical Non-Steroidal Agents					
Sucralfate (lotion)	0.00% (n=0)	2.94% (n=1)	5.88% (n=2)	50.00% (n=17)	41.18% (n=14)
Sucralfate (gel)	0.00% (n=0)	41.18% (n=14)	5.88% (n=2)	2.94% (n=1)	50.00% (n=17)
Sucralfate (cream)	2.94% (n=1)	52.94% (n=18)	5.88% (n=2)	2.94% (n=1)	35.29% (n=12)
Sucralfate (unknown vehicle)	5.88% (n=2)	29.41% (n=10)	0.00% (n=0)	5.88% (n=2)	58.82% (n=20)
Trolamine (Biafine ®)	2.94% (n=1)	2.94% (n=1)	32.35% (n=11)	35.29% (n=12)	26.47% (n=9)
Urea	5.88% (n=2)	50.00% (n=17)	5.88% (n=2)	2.94% (n=1)	35.29% (n=12)
Cavilon ™ barrier cream	5.88% (n=2)	11.76% (n=4)	2.94% (n=1)	8.82% (n=3)	67.65% (n=23)
Xonrid ®	7.50% (n=3)	12.50% (n=5)	5.00% (n=2)	7.50% (n=3)	67.50% (n=27)
Petrolatum	2.50% (n=1)	5.00% (n=2)	52.50% (n=21)	15.00% (n=6)	25.00% (n=10)
RadiaCare ™	5.00% (n=2)	7.50% (n=3)	47.50% (n=19)	17.50% (n=7)	22.50% (n=9)
Hyaluronic acid/hyaluronan	12.50% (n=5)	20.00% (n=8)	7.50% (n=3)	5.00% (n=2)	55.00% (n=22)

Dexpanthenol (Bepanthen ®)	7.50% (n=3)	17.50% (n=7)	12.50% (n=5)	2.50% (n=1)	60.00% (n=24)
Heparinoid (Hirudoid ®)	12.50% (n=5)	35.00% (n=14)	10.00% (n=4)	0.00% (n=0)	42.50% (n=17)
Boron-based gel	10.00% (n=4)	15.00% (n=6)	7.50% (n=3)	2.50% (n=1)	65.00% (n=26)
Polideoxyribonucleotides cream	5.00% (n=2)	27.50% (n=11)	5.00% (n=2)	0.00% (n=0)	62.50% (n=25)
Hydroactive colloid gel	2.50% (n=1)	10.00% (n=4)	10.00% (n=4)	10.00% (n=4)	67.50% (n=27)
Leniqol	2.50% (n=1)	2.50% (n=1)	10.00% (n=4)	12.50% (n=5)	72.50% (n=29)
Glycosaminoglycans/rgta	2.50% (n=1)	2.50% (n=1)	35.00% (n=14)	27.50% (n=11)	32.50% (n=13)
Na-sucrose octasulfate	5.00% (n=2)	5.00% (n=2)	35.00% (n=14)	27.50% (n=11)	27.50% (n=11)
Eupilen ®	2.50% (n=1)	2.50% (n=1)	10.00% (n=4)	12.50% (n=5)	72.50% (n=29)
Adrenergic vasoconstrictor	2.50% (n=1)	27.50% (n=11)	7.50% (n=3)	7.50% (n=3)	55.00% (n=22)
Melatonin	20.00% (n=8)	20.00% (n=8)	2.50% (n=1)	0.00% (n=0)	57.50% (n=23)
Aqueous cream	12.50% (n=5)	30.00% (n=12)	12.50% (n=5)	2.50% (n=1)	42.50% (n=17)
Atorvastatin	10.00% (n=4)	22.50% (n=9)	17.50% (n=7)	5.00% (n=2)	45.00% (n=18)
MAS065D (non-steroidal water-in-oil cream) (Xclair ®)	5.00% (n=2)	20.00% (n=8)	5.00% (n=2)	0.00% (n=0)	70.00% (n=28)
Five non-pharmaceutical skin care products: thermal water spray, emollient, cleanser, wound healing cream, sunscreen	2.50% (n=1)	17.50% (n=7)	5.00% (n=2)	5.00% (n=2)	70.00% (n=28)
Liposomal cream (Capilen)	2.50% (n=1)	0.00% (n=0)	10.00% (n=4)	5.00% (n=2)	82.50% (n=33)
Oral Agents					
Celecoxib	10.00% (n=4)	10.00% (n=4)	7.50% (n=3)	7.50% (n=3)	65.00% (n=26)
Sucralfate	12.50% (n=5)	2.50% (n=1)	37.50% (n=15)	22.50% (n=9)	25.00% (n=10)
Pentoxifylline	10.00% (n=4)	25.00% (n=10)	15.00% (n=6)	5.00% (n=2)	45.00% (n=18)
Antihistamines	2.50% (n=1)	0.00% (n=0)	15.00% (n=6)	5.00% (n=2)	77.50% (n=31)
Enzyme mixture (papain, trypsin, chymotrypsin)	17.50% (n=7)	52.50% (n=21)	5.00% (n=2)	2.50% (n=1)	22.50% (n=9)
Topical Corticosteroids					
Mometasone furoate	73.53% (n=25)	20.59% (n=7)	2.94% (n=1)	0.00% (n=0)	2.94% (n=1)

Hydrocortisone	10.00% (n=4)	20.00% (n=8)	5.00% (n=2)	10.00% (n=4)	55.00% (n=22)
Betamethasone	57.50% (n=23)	27.50% (n=11)	5.00% (n=2)	7.50% (n=3)	2.50% (n=1)
Beclomethasone	15.00% (n=6)	22.50% (n=9)	5.00% (n=2)	7.50% (n=3)	50.00% (n=20)
Methylprednisolone aceponate	17.50% (n=7)	27.50% (n=11)	5.00% (n=2)	7.50% (n=3)	42.50% (n=17)
Antibiotics					
Silver sulfadiazine/flamazine	27.50% (n=11)	27.50% (n=11)	2.50% (n=1)	2.50% (n=1)	40.00% (n=16)
Antiperspirant/Deodorant					
Aluminum/metallic	5.88% (n=2)	17.65% (n=6)	55.88% (n=19)	17.65 (n=6)	2.94% (n=1)
Non-aluminum/non-metallic	2.94% (n=1)	14.71% (n=5)	50.00% (n=17)	23.53% (n=8)	8.82% (n=3)
Alternative Therapies					
Massage therapy	7.50% (n=3)	5.00% (n=2)	10.00% (n=4)	5.00% (n=2)	72.50% (n=29)
Laughter therapy	2.50% (n=1)	0.00% (n=0)	17.50% (n=7)	35.00% (n=14)	45.00% (n=18)
Hydration therapy	10.00% (n=4)	2.50% (n=1)	30.00% (n=12)	27.50% (n=11)	30.00% (n=12)
Amifostine	7.50% (n=3)	10.00% (n=4)	12.50% (n=5)	5.00% (n=2)	65.00% (n=26)
Bra use	2.50% (n=1)	17.50% (n=7)	7.50% (n=3)	10.00% (n=4)	62.50% (n=25)
Therapeutic touch	2.50% (n=1)	2.50% (n=1)	20.00% (n=8)	37.50% (n=15)	37.50% (n=15)
Washing with water and soap	20.00% (n=8)	10.00% (n=4)	12.50% (n=5)	10.00% (n=4)	47.50% (n=19)
Multi-component Therapies					
Emulsion (0.25% hyaluronic acid, 0.25% chondroitin sulfate, aloe vera, carrot oil, vitamin F and vitamin E)	2.50% (n=1)	32.50% (n=13)	2.50% (n=1)	0.00% (n=0)	62.50% (n=25)
Repalysyal (thymine-lysine-hyaluronic acid)	5.00% (n=2)	30.00% (n=12)	5.00% (n=2)	0.00% (n=0)	60.00% (n=24)
Lotion (3% urea, polidocanol and hyaluronic acid)	15.00% (n=6)	50.00% (n=20)	7.50% (n=3)	2.50% (n=1)	25.00% (n=10)
Cream (fusidic acid and betamethasone)	2.50% (n=1)	0.00% (n=0)	17.50% (n=7)	27.50% (n=11)	52.50% (n=21)
Dead sea products (Lenom mouthwash & Solaris moisturizing cream)	10.00% (n=4)	5.00% (n=2)	17.50% (n=7)	15.00% (n=6)	52.50% (n=21)

Integrative medicine (supplements, diet, exercise) (Radium bromatum, belladonna, alkalizing treatment, calendula, aloe gel)	2.50% (n=1)	0.00% (n=0)	7.50% (n=3)	10.00% (n=4)	80.00% (n=32)
Lactokine-based two-step care system (R1 & R2)	2.50% (n=1)	0.00% (n=0)	7.50% (n=3)	5.00% (n=2)	85.00% (n=34)
Resveratrol, lycopene, vitamin C and anthocyanin (Ixor ®)	2.50% (n=1)	2.50% (n=1)	7.50% (n=3)	15.00% (n=6)	72.50% (n=29)
Reduced glutathione and anthocyanins (RayGel)	5.00% (n=2)	2.50% (n=1)	27.50% (n=11)	22.50% (n=9)	42.50% (n=17)
CM glucan, hydroxyprolisilan C and matrixyl (Theta cream)	2.50% (n=1)	0.00% (n=0)	25.00% (n=10)	25.00% (n=10)	47.50% (n=19)
Hydrofoam dressing with recombinant human epidermal growth factor (rhEGF)	2.50% (n=1)	0.00% (n=0)	25.00% (n=10)	12.50% (n=5)	75.00% (n=30)
Belladonna 7cH and x-ray 15 cH	20.00% (n=8)	30.00% (n=12)	5.00% (n=2)	0.00% (n=0)	45.00% (n=18)
Moist skin care regimen (including Ringer's lactate soaks, aloe vera gel, dexpanthenol ointment, cream base (wool wax/sodium alginate), and cortisol if needed)	5.00% (n=2)	2.50% (n=1)	10.00% (n=4)	10.00% (n=4)	72.50% (n=29)

Table 3. Round 1 and 2 Survey Results for Radiation Dermatitis Management Methods

Intervention	Recommendation in SUPPORT of use	Suggestion in SUPPORT of use	Recommendation AGAINST use	Suggestion AGAINST use	No Guideline Possible
Natural and Miscellaneous Agents					
Aloe vera-based products	7.89% (n=3)	5.26% (n=2)	7.89% (n=3)	13.16% (n=5)	65.79% (n=25)
Honey-based products	2.63% (n=1)	0.00% (n=0)	13.16% (n=5)	10.53% (n=4)	73.68% (n=28)
Henna-containing ointment	15.79% (n=6)	15.79% (n=6)	13.16% (n=5)	5.26% (n=2)	50.00% (n=19)
Oil in water emulsion (containing linoleic acid)	13.16% (n=5)	13.16% (n=5)	15.79% (n=6)	10.53% (n=4)	47.37% (n=18)
Lianbai	21.05% (n=8)	28.95% (n=11)	7.89% (n=3)	0.00% (n=0)	42.11% (n=16)
Holoil (containing Hypericum perforatum/St. John's-wort and neem oil)	2.63% (n=1)	2.63% (n=1)	13.16% (n=5)	10.53% (n=4)	71.05% (n=27)
Tea extracts (containing green and black tea)	2.63% (n=1)	2.63% (n=1)	15.79% (n=6)	5.26% (n=2)	73.68% (n=28)
Liu-he-dan (Chinese herbal paste)	2.63% (n=1)	0.00% (n=0)	13.16% (n=5)	13.16% (n=5)	71.05% (n=27)
Laser Therapy					
Photobiomodulation/low-level laser therapy	10.53% (n=4)	15.79% (n=6)	13.16% (n=5)	18.42% (n=7)	42.11% (n=16)
Unspecified laser	5.26% (n=2)	0.00% (n=0)	15.79% (n=6)	10.53% (n=4)	68.42% (n=26)
High level laser therapy	10.53% (n=4)	0.00% (n=0)	13.16% (n=5)	18.42% (n=7)	57.89% (n=22)
Barrier Films and Dressings					
StrataXRT (topical film-forming gel)	2.63% (n=1)	15.79% (n=6)	5.26% (n=2)	15.79% (n=6)	60.53% (n=23)
Mepitel film (silicone-based polyurethane film)	26.32% (n=10)	31.58% (n=12)	5.26% (n=2)	2.63% (n=1)	34.21% (n=13)
Hydrosorb (hydrogel polyurethane film)	2.63% (n=1)	5.26% (n=2)	28.95% (n=11)	34.21% (n=13)	28.95% (n=11)
Mepilex lite dressings	18.42% (n=7)	47.37% (n=18)	5.26% (n=2)	0.00% (n=0)	28.95% (n=11)
Silver leaf nylon dressing	2.63% (n=1)	2.63% (n=1)	7.89% (n=3)	7.89% (n=3)	78.95% (n=30)

Silver-containing hydrofiber dressing	2.63% (n=1)	2.63% (n=1)	7.89% (n=3)	5.26% (n=2)	81.58% (n=31)
Calcium alignate dressings	2.63% (n=1)	0.00% (n=0)	10.53% (n=4)	10.53% (n=4)	76.32% (n=29)
Polymem (polymeric membrane) dressings	2.63% (n=1)	0.00% (n=0)	7.89% (n=3)	15.79% (n=6)	73.68% (n=28)
Amniotic membrane	2.63% (n=1)	5.26% (n=2)	7.89% (n=3)	15.79% (n=6)	68.42% (n=26)
Hydrocolloid dressing	13.16% (n=5)	26.32% (n=10)	10.53% (n=4)	10.53% (n=4)	39.47% (n=15)
Dry dressings	18.42% (n=7)	31.58% (n=12)	7.89% (n=3)	0.00% (n=0)	42.11% (n=16)
Topical Non-Steroidal Agents					
Doxepin	39.47% (n=15)	26.32% (n=10)	2.63% (n=1)	2.63% (n=1)	28.95% (n=11)
Trolamine/biafine	5.26% (n=2)	2.63% (n=1)	39.47% (n=15)	36.84% (n=14)	15.79% (n=6)
Hyaluronic acid/hyaluronan cream	2.94% (n=1)	0.00% (n=0)	11.76% (n=4)	44.12% (n=15)	41.18% (n=14)
Hyaluronic acid/hyaluronan gel	2.94% (n=1)	0.00% (n=0)	8.82% (n=3)	11.76% (n=4)	76.47% (n=26)
Remoise barrier cream	2.63% (n=1)	5.26% (n=2)	13.16% (n=5)	15.79% (n=6)	63.16% (n=24)
Heparinoid/hirudoid	13.16% (n=5)	31.58% (n=12)	5.26% (n=2)	5.26% (n=2)	44.74% (n=17)
Hydroactive colloid gel	10.53% (n=4)	50.00% (n=19)	5.26% (n=2)	13.16% (n=5)	21.05% (n=8)
Superoxide dismutase	7.89% (n=3)	2.63% (n=1)	10.53% (n=4)	15.79% (n=6)	63.16% (n=24)
AKL gel (amitriptyline, ketamine, and lidocaine)	5.26% (n=2)	21.05% (n=8)	7.89% (n=3)	15.79% (n=6)	50.00% (n=19)
Platelet gel	5.26% (n=2)	5.26% (n=2)	10.53% (n=4)	13.16% (n=5)	65.79% (n=25)
Gentian violet	2.63% (n=1)	0.00% (n=0)	31.58% (n=12)	26.32% (n=10)	39.47% (n=15)
Epigallocatechin-3-gallate	5.26% (n=2)	5.26% (n=2)	7.89% (n=3)	15.79% (n=6)	65.79% (n=25)
Oral Agents					
Sucralfate	13.16% (n=5)	0.00% (n=0)	39.47% (n=15)	26.32% (n=10)	21.05% (n=8)
Pentoxifylline	28.95% (n=11)	26.32% (n=10)	5.26% (n=2)	0.00% (n=0)	39.47% (n=15)
Topical Corticosteroids					
Hydrocortisone	2.63% (n=1)	2.63% (n=1)	13.16% (n=5)	31.58% (n=12)	50.00% (n=19)
Unknown steroid	5.26% (n=2)	26.32% (n=10)	10.53% (n=4)	5.26% (n=2)	52.63% (n=20)
Alternative Therapies					
Hydrotherapy	7.89% (n=3)	15.79% (n=6)	5.26% (n=2)	10.53% (n=4)	60.53% (n=23)

Acupuncture	10.53% (n=4)	26.32% (n=10)	7.89% (n=3)	7.89% (n=3)	47.37% (n=18)
Hyperbaric oxygen therapy	2.63% (n=1)	15.79% (n=6)	7.89% (n=3)	13.16% (n=5)	60.53% (n=23)
Placenta extract	2.63% (n=1)	2.63% (n=1)	10.53% (n=4)	13.16% (n=5)	71.05% (n=27)
Polyactide-based copolymer	2.63% (n=1)	2.63% (n=1)	10.53% (n=4)	7.89% (n=3)	76.32% (n=29)
Combination Therapies					
Emulsion (0.25% hyaluronic acid, 0.25% chondroitin sulfate, aloe vera, carrot oil, vitamin F and vitamin E)	5.26% (n=2)	39.47% (n=15)	2.63% (n=1)	2.63% (n=1)	50.00% (n=19)
Platelet gel and a hyperbaric chamber	2.63% (n=1)	5.26% (n=2)	13.16% (n=5)	7.89% (n=3)	71.05% (n=27)
Restitutio restructuring cream (alginates, hyaluronic acid, and beta-glucan)	5.26% (n=2)	2.63% (n=1)	7.89% (n=3)	7.89% (n=3)	76.32% (n=29)
Vitamin E acetate and antibiotics	7.89% (n=3)	0.00% (n=0)	13.16% (n=5)	7.89% (n=3)	71.05% (n=27)
Granulocyte-colony stimulating factor (G-CSF) and antibiotics	5.26% (n=2)	2.63% (n=1)	10.53% (n=4)	10.53% (n=4)	71.05% (n=27)
Integrative medicine (supplements, diet, exercise) (Radium bromatum, belladonna, alkalizing treatment, calendula, aloe gel)	2.63% (n=1)	0.00% (n=0)	7.89% (n=3)	10.53% (n=4)	78.95% (n=30)
Homeopathy (combination)	0.00% (n=0)	0.00% (n=0)	7.89% (n=3)	18.42% (n=7)	73.68% (n=28)
Two-step care system (R1 and R2, lactokine-based)	2.63% (n=1)	2.63% (n=1)	7.89% (n=3)	7.89% (n=3)	78.95% (n=30)
Pentoxifylline and vitamin E	13.16% (n=5)	42.11% (n=16)	5.26% (n=2)	2.63% (n=1)	36.84% (n=14)
Bioshield (stearic acid, propylene glycol, glycerol, and polyunsaturated alcohols)	2.63% (n=1)	2.63% (n=1)	7.89% (n=3)	15.79% (n=6)	71.05% (n=27)

Radiodermatitis protocol from Virgen de la Victoria Hospital in Málaga	2.63% (n=1)	0.00% (n=0)	5.26% (n=2)	13.16% (n=5)	78.95% (n=30)

Footnote: MASCC does not endorse any brand names of therapeutics identified in this document or in any other documents.