Scalp Cooling (Hypothermia) to Prevent Hair Loss During Chemotherapy

Aetna considers scalp cooling (i.e., using ice-filled bags/bandages, cryogel packs, or specially designed products (e.g., Chemo Cold Cap, DigniCap, ElastoGel, Paxman Scalp Cooling System and Penguin Cold Cap)) medically necessary as a means to prevent hair loss during chemotherapy.

**Note:** Cooling caps and other products for scalp cooling are considered incidental to the chemotherapy administration and are not separately reimbursed. Cooling caps and other scalp cooling products purchased by the member are considered supplies that are generally excluded from coverage under plans that exclude supplies. See benefit plan descriptions.

**Policy History**

- **Last Review**: 10/10/2019
- **Effective**: 10/13/1998
- **Next Review**: 03/13/2020

**Definitions**

**Additional Information**

- [Clinical Policy Bulletin](#)
- [Notes](#)
Hair loss is a potentially distressing side effect of several cytotoxic drugs. Scalp cooling has been suggested to prevent hair loss.

A Medicare National Coverage Determination explains that keeping the scalp cool during chemotherapy has been noted to reduce the risk of hair loss. The cooling may be done by packing the scalp with ice-filled bags or bandages, or by specially-designed devices filled with cold-producing chemicals activated during chemotherapy. The NCD states that while ice-filled bags or bandages or other devices used for scalp hypothermia during chemotherapy may be covered as supplies of the kind commonly furnished without a separate charge, no separate charge for them would be recognized.

Breast cancer guidelines from the National Comprehensive Cancer Network (NCCN, 2019) recommend "Consider scalp cooling to reduce incidence of chemotherapy-induced alopecia for patients receiving chemotherapy. Results may be less effective with anthracycline-containing regimens."

In a review of the literature, Tollenaar and associates (1994) noted that scalp hypothermia might prevent alopecia only in a cytotoxic regimen containing an anthracycline as the sole alopecia-inducing agent. With current adjuvant chemotherapy for breast cancer, in which a combination of cyclophosphamide and an anthracycline is often used, there is no place for scalp hypothermia. In this regard, Christodoulou et al (2002) reported that the MSC cold cap system is effective in preventing alopecia from anthracycline, etoposide or taxane, but not from anthracycline-taxane combinations or ifosfamide-containing regimens. Protiere et al (2002) reported on the results of scalp cooling in 105 women with breast cancer receiving adjuvant chemotherapy with mitoxantrone and cyclophosphamide compared with 109 similarly treated women who were not offered scalp cooling. Although the nurses and subjects reported less hair loss with scalp cooling, study subjects were not randomly assigned to treatment groups, and
the study did not include a sham control so that neither the study subjects nor the nurse assessors were blinded to treatment allocation.

In a non-randomized pilot study, Ridderheim et al (2003) reported that a new digitized scalp-cooling system is safe and effective in preventing chemotherapy-induced alopecia in female patients (n = 74). The authors concluded that this new system makes it suitable for use in future randomized clinical trials designed to explore optimal temperatures and durations of cooling for different chemotherapy regimens in hopes of broadening the application of hypothermia for alopecia prevention in cancer patients. The authors stated that more data is needed on adjuvant treatment of breast cancer patients and long-term effects.

In a randomized controlled study, Macduff et al (2003) examined the effectiveness of scalp cooling in preventing alopecia for breast cancer patients (n = 30) receiving the combination chemotherapy of epirubicin and docetaxel. The authors concluded that the benefits of scalp cooling in patients treated with taxanes and anthracycline drugs are clearly marginal and less impressive than for some single drug breast cancer chemotherapy regimens. Despite the limitations of small numbers of patients and high dropout (n = 9), this study has been useful in establishing the extent, and illuminating the nature, of the marginal benefits and disadvantages of having this treatment. In addition, exploratory analyses have raised further questions regarding the criteria for clinical significance and how to prospectively identify individual patients who may do well in scalp cooling treatment.

In a review on the prevention of chemotherapy-induced hair loss by scalp cooling, Grevelman and Breed (2005) stated that scalp cooling is effective but not for all chemotherapy patients. These investigators noted that further psychological, clinical and biophysical research is needed to ascertain the exact indications for cooling and to improve the effect, tolerance,
side-effects and the cooling procedure. The authors stated that multi-center clinical studies should be performed to gather this information.

An assessment of scalp cooling by the Swedish Council on Technology Assessment in Health Care (SBU, 2005) concluded that "[f]urther studies of patient benefit, risks, and cost effectiveness are needed". Spaeth et al (2006) stated that "scalp cooling (helmets or continuous cooling systems) can avoid or diminish hair loss in selected chemotherapy regimens but tolerance can be fair and long harmlessness needs to be confirmed by prospective studies".

In a systematic review on non-pharmacological strategies for managing common chemotherapy adverse effects, Lotfi-Jam et al (2008) stated that findings from randomized controlled trials (RCTs) of reasonable quality provided limited support for cognitive distraction, exercise, hypnosis, relaxation, and systematic desensitization to reduce nausea and vomiting, psycho-education for fatigue, and scalp cooling to reduce hair loss. The authors concluded that although some strategies seem promising, the quality of the RCTs was generally quite low, making it difficult to draw conclusions about the effectiveness of self-care strategies. Future studies with better design and reporting of methodological issues are needed to establish evidence-based self-care recommendations for people receiving chemotherapy.

Mols et al (2009) described the effectiveness and burden of scalp cooling and the satisfaction with wigs, with hair regrowth, and with body image. Breast cancer patients treated with (n = 98) and without (n = 168) scalp cooling completed questionnaires before chemotherapy and 3 weeks and 6 months after completion of chemotherapy. Scalp cooling was effective in preventing chemotherapy-induced hair loss in 32 of 62 available patients (52 %). Even though patients knew hair loss was temporary, it was a burden to 54 % of them (n = 100). Scalp cooling was a burden for only 17 out of 51
patients (33%). Most patients who used a wig or head cover were satisfied with it (82%, n = 126). Patients were moderately satisfied with the regrowth of their hair after chemotherapy. Successfully cooled patients rated their hair as less important for their body image compared to patients who did experience hair loss (p = 0.014). The authors concluded that chemotherapy-induced hair loss is perceived as burdensome. It may be prevented by offering scalp cooling which is often an effective method to prevent this form of hair loss and is well-tolerated by patients. However, if possible, scalp-cooling techniques should be improved and their effectiveness should be increased because if scalp cooling is unsuccessful, patients' rate their hair loss as more burdensome compared to non-cooled patients.

In a review on chemotherapy-induced alopecia (CIA), Trueb (2009) stated that the major approach to minimize CIA is by scalp cooling. Unfortunately, most published data on scalp cooling are of poor quality. Several experimental approaches to the development of pharmacologic agents are under evaluation and include drug-specific antibodies, hair growth cycle modifiers, cytokines and growth factors, anti-oxidants, inhibitors of apoptosis, as well as cell-cycle and proliferation modifiers. Ultimately, the protection should be selective to the hair follicle (e.g., topical application such that the anti-cancer effectiveness of chemotherapy is not hampered). Among the few agents that have been evaluated so far in humans, AS101 and minoxidil were able to reduce the severity or shorten the duration of CIA, but could not prevent CIA.

Auvinen and colleagues (2010) analyzed the effectiveness of scalp cooling caps in preventing CIA among 64 patients. Subjects were given one of the following chemotherapeutic treatments: (i) doxorubicin 60 mg/m², (ii) docetaxel 80 mg/m², (iii) FEC (5-fluorouracil 600 mg/m², epirubicin 60 mg/m², cyclophosphamide 600 mg/m²) or (iv) the combination of 3 cycles of docetaxel (80 mg/m²) followed
by 3 cycles of FEC (5-fluorouracil 600 mg/m2, epirubicin 60 mg/m2, cyclophosphamide 600 mg/m2). All the chemotherapy treatments were given in a thrice-weekly schedule. Patients with early stage disease were given 6 adjuvant chemotherapy cycles, while patients with metastatic disease were given 9 chemotherapy cycles. Patients were provided with detailed instructions on how to treat the hair at home for 1 to 3 days following the chemotherapy treatment. Hair loss was evaluated after the 3rd, 6th and final treatments. In the final results, major hair loss was avoided in all patients given doxorubicin treatment, in 83.3% of patients given docetaxel treatment, in 76.5% of patients given FEC treatment, and in 78% of patients given docetaxel followed by FEC. In the final evaluation, 87.5% of the patients considered the avoidance of hair loss to be important. Only 20.3% of the patients needed to use a wig. The authors concluded that these findings showed that all the patient groups studied gained some benefit by using scalp cooling caps. The findings of this small study need to be validated by well-designed studies.

van den Hurk and associates (2010) evaluated the effect of scalp cooling on well-being of breast cancer patients with CIA. A prospective multi-center study was performed in 13 hospitals. Breast cancer patients treated with (n = 98) and without (n = 168) scalp cooling completed questionnaires (EORTC QLQ-C30 and EORTC-QLQ-BR23, BIS, MBA, HADS) before chemotherapy, and 3 weeks and 6 months following the last chemotherapy cycle were included in this analysis. Scalp cooling was effective in 52% of the cases. Alopecia was considered among the most distressing problems at all 3 moments of measurement. A trend towards higher well-being was found in successfully scalp-cooled patients, as indicated by a general better health-related quality of life and better body image, whereas unsuccessfully scalp-cooled patients reported lowest well-being. The authors concluded that scalp cooling contributes not only to the well-
being of successfully scalp-cooled patients but also seems to cause additional distress when patients lose their hair despite scalp cooling. This might be related to disappointment due to alopecia despite scalp cooling or possibly to a general higher biological availability of cytostatics. The authors recommended additional support for patients when scalp cooling is not successful and to spend more effort to maximise the effectiveness of scalp cooling.

In a review on CIA, Trueb (2010) stated that 47 % of female patients consider hair loss the most traumatic aspect of chemotherapy, and 8 % would decline chemotherapy because of fear of hair loss. On the basis of the current understanding of the underlying pathobiology, a number of agents have been evaluated in the treatment of this condition. Among the agents that have been evaluated, topical minoxidil was able to reduce the severity or shorten the duration but could not prevent hair loss. The major approach to minimize CIA is by scalp cooling, although most published data on scalp cooling are of poor quality. Because chemotherapy-induced toxicity has been associated with nutritional status, nutritional assessment and support might confer beneficial effects. Several experimental approaches to the development of pharmacological agents are under evaluation including: anti-oxidants, cytokines and growth factors, cell cycle and proliferation modifiers, and inhibitors of apoptosis. The author concluded that at present, no approved pharmacologic treatment of CIA exists. The incidence and severity of the condition are variable and related to the particular chemo-therapeutic protocol. They noted that CIA is mostly reversible, and appropriate hair and scalp care and temporarily wearing a wig may be the most effective coping strategy.

An UpToDate review on “Chemotherapy-induced alopecia “ (Payne, 2013) stated that “Although scalp protection through cooling or tourniquet has been reported to minimize delivery of chemotherapeutic agents to the scalp thereby potentially decreasing the risk of hair loss, case reports of cutaneous
metastases or spread in these settings prevent general recommendation for their use. Because chemotherapy-associated hair loss is transient and usually (although not always) completely reversible after cessation of therapy, adequate counseling and psychological support before and during therapy should take precedence over the use of such devices”.

Komen et al (2013) stated that the success of scalp cooling in preventing or reducing CIA is highly variable between patients and chemotherapy regimens. The outcome of hair preservation is often unpredictable and depends on various factors. These investigators performed a structured search of literature published from 1970 to February 2012 for articles that reported on factors influencing the effectiveness of scalp cooling to prevent CIA in patients with cancer. The literature search identified 192 reports, of which 32 studies were considered relevant. Randomized studies on scalp cooling are scarce and there is little information on the determinants of the result. The effectiveness of scalp cooling for hair preservation depends on dose and type of chemotherapy, with less favorable results at higher doses. Temperature seems to be an important determinant. Various studies suggested that a subcutaneous scalp temperature less than 22 °C is required for hair preservation. The authors concluded that the effectiveness of scalp cooling for hair preservation varies by chemotherapy type and dose, and probably by the degree and duration of cooling.

Lemieux et al (2014) noted that alopecia is a side effect of chemotherapies used in breast cancer. Scalp cooling is a technique preventing alopecia, but its use remains controversial. These researchers conducted a survey about knowledge of scalp cooling and interest in conducting a RCT. An invitation was sent to 1,022 participants and a total of 139 individuals responded to the survey. The majority knew about the existence of scalp cooling; 90 % thought that a RCT was needed and would participate. The survey revealed different
potential problems associated with the increased chair time, limited space, and safety. The authors concluded that a RCT is needed and that the trial must include evaluation on the impact on health care system resources and safety.

Kadakia et al (2014) stated that conventional chemotherapy leads to multiple adverse mucocutaneous complications (e.g., oral mucositis, alopecia, ocular toxicity, and onycholysis). Limited pharmacologic interventions are available for preventing these clinical problems. These investigators reviewed the role of cryotherapy (regional hypothermia) for alleviating these adverse symptoms. A narrative review was performed, with an emphasis on RCTs. A comprehensive search using PubMed, Ovid, Embase, and Medline was completed. References of all cited articles also were reviewed. Data from the review were composed of articles published between 1970 and May 2013. Available evidence suggested that regional hypothermia decreases the burden of chemotherapy-related oral mucositis, alopecia, ocular toxicity, and onycholysis. The major limitations of studies included the absence of blinded control groups and variable clinical end-points. The authors concluded that regional hypothermia decreased the burden of these 4 chemotherapy-induced complications and was well-tolerated. They stated that more research is needed to (i) determine what subgroups of cancer patients are most likely to respond to different types of regional hypothermia, (ii) the ideal duration of cooling needed, and (iii) further improve the ease of use of the cooling devices.

Shin et al (2015) evaluated the effectiveness of various interventions in the prevention of CIA. They searched PubMed, EMBASE and the Cochrane Library, from June 20, 2013 through August 31, 2013. Two of the authors independently reviewed and selected clinical trials that reported the effectiveness of any intervention for prevention of CIA compared with that of controls. Two authors extracted
data independently on dichotomized outcome in terms of CIA occurrence. Relative risks (RRs) and 95% confidential intervals (CIs) were calculated for effectiveness of CIA prevention by using random-effect or fixed-effect models. Out of 691 articles retrieved, a total of 8 RCTs and 9 controlled clinical trials involving 1,098 participants (616 interventions and 482 controls), were included in the final analyses. Scalp cooling, scalp compression, a combination of cooling and compression, topical minoxidil and panicum miliaceum were used as interventions. The participants were mainly breast cancer patients receiving doxorubicin- or epirubicin-containing chemotherapy. Scalp cooling, which is the most popular preventive method, significantly reduced the risk of CIA (RR = 0.38, 95% CI: 0.32 to 0.45), whereas topical 2% minoxidil and other interventions did not significantly reduce the risk of CIA. No serious adverse effects associated with scalp cooling were reported. The authors concluded that these findings suggested that scalp cooling can prevent CIA in patients receiving chemotherapy; however, the long-term safety of scalp cooling should be confirmed in further studies.

On December 8, 2015, the Food and Drug Administration (FDA) cleared for marketing the first cooling cap to reduce alopecia in female breast cancer patients undergoing chemotherapy. The Dignitana DigniCap Cooling System is indicated to reduce the frequency and severity of alopecia during chemotherapy in breast cancer patients in which alopecia-inducing chemotherapeutic agents and doses are used. It is a computer-controlled system that circulates cooled liquid to a head-worn cooling cap during chemotherapy treatment. The cooling cap is covered by a 2nd cap made from neoprene, which holds the cooling cap in place and acts as an insulation cover to prevent loss of cooling. The cooling action is intended to constrict blood vessels in the scalp, which, in theory, reduces the amount of chemotherapy that reaches cells in the hair follicles. The cold also decreases the activity of the hair follicles, which slows down cell division and makes them less affected by chemotherapy. The combined
actions are thought to reduce the effect chemotherapy has on the cells, which may reduce hair loss. DigniCap may not work with some chemotherapy regimens. The effectiveness of the cooling system was studied in 122 Stage I and Stage II women with breast cancer who were undergoing chemotherapy, using recognized chemotherapy regimens that have been associated with hair loss. The data from this study may also be applied to some Stage III and IV breast cancer patients because they may have a benefit-risk profile comparable to the patients enrolled in this study. The primary end-point was a self-assessment of hair loss by the women using standardized photographs at 1 month after the last chemotherapy cycle. More than 66% of patients treated with the DigniCap reported losing less than 50% of their hair.

Grevelman and Breed (2015) noted that chemotherapy-induced temporary hair loss is one of the most common and distressing side-effects of cancer therapy. Scalp cooling to reduce this hair loss is a controversial issue for many doctors and nurses. This may be due to inadequate knowledge. These researchers reviewed evidence from 53 publications and 3 personal communications focuses on the effectiveness of the treatment, side-effects, possible disadvantages and the controversies in these areas. Scalp cooling has become an increasingly effective method to prevent hair loss, especially when anthracyclines or taxanes are used. Unfortunately, many studies were small and badly designed and are therefore difficult to compare. There is a considerable variation in the success rates in the various studies. This remains unexplained, but the cooling time, the chemotherapy used and the temperature seem to be influential. The authors stated that scalp cooling should not be used if chemotherapy is given with a curative intent in patients with generalized hematogenic metastases. The majority of patients tolerated cooling very well. The authors concluded that scalp cooling is effective but not for all chemotherapy patients. They stated that further psychological, clinical and biophysical research is needed to determine exact indications for cooling and to
improve the effect, tolerance, side-effects and the cooling procedure; multi-center clinical trials should be performed to gather this information.

An UpToDate review on “Chemotherapy-induced alopecia” (Payne, 2016) states that “The success of scalp cooling for preventing or reducing chemotherapy-induced alopecia is highly variable between patients and chemotherapy regimens. The drugs best suited to this approach include doxorubicin, daunorubicin, paclitaxel, epirubicin, vincristine, vinblastine, actinomycin D and mechlorethamine. Success with combination regimens such as intravenous cyclophosphamide, methotrexate and fluorouracil (CMF) has been reported, but this approach failed with the combination of doxorubicin plus cyclophosphamide. Results are also dose-dependent, with higher doses of anthracyclines being associated with higher rates of alopecia despite the use of scalp cooling. Results of many studies are difficult to interpret secondary to use of multiple cooling systems (ice turban, gel packs, cool caps, thermocirculator, room air conditioner), variable chemotherapy regimens (single versus combined agents), small study populations, and varying definitions of alopecia. Nevertheless, at least 4 randomized controlled trials suggest significantly less hair loss with scalp hypothermia. In general, between 50 and 80% of patients have a good to excellent response with this therapy. A meta-analysis of 8 randomized controlled trials and 9 controlled clinical trials involving 1,098 participants (616 interventions and 482 controls) who received a variety of interventions for prevention of chemotherapy-induced alopecia concluded that scalp cooling was the only intervention that significantly reduced the risk of chemotherapy-induced alopecia (relative risk 0.38, 95% CI: 0.32 to 0.45). No adverse events associated with scalp cooling were reported in the meta-analysis.

Scalp hypothermia may not be as effective in patients with liver dysfunction. This is likely related to delayed drug metabolism, thereby allowing persistence of therapeutic drug levels beyond
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the protective period. Scalp cooling is contraindicated in patients with cold sensitivity, cold agglutinin disease, cryoglobulinemia, and post-traumatic cold dystrophy. In addition, some investigators have raised concerns regarding the possibility of scalp metastasis in association with scalp hypothermia. As an example, one group reported the outcome of a patient with mycosis fungoides who used a cooling cap to prevent alopecia. Following chemotherapy, he developed recurrent disease limited to the scalp. Subsequent treatment without a cooling device resulted in complete clinical remission. However, the clinical significance of these findings is unclear in patients with solid tumors. In one study of 61 patients with disseminated breast cancer receiving chemotherapy who used a cooling cap, 1 patient with underlying liver dysfunction developed cutaneous scalp metastasis. In contrast, 3 separate series, either entirely or predominantly consisting of patients receiving adjuvant treatment for breast cancer reported no increased frequency of scalp metastases in the patients who were treated in conjunction with a scalp cooling device. These case reports suggest that cooling devices may be contraindicated in patients with circulating tumor cells (e.g., lymphoma, leukemia) or in those with liver dysfunction resulting in prolonged drug half-lives. They should be used with caution in patients with breast carcinoma, especially in the setting of adjuvant therapy, as well as other carcinomas associated with risk for cutaneous metastases, such as lung, kidney, stomach, colon, and uterus.

Although scalp protection through cooling or tourniquet has been reported to minimize delivery of chemotherapeutic agents to the scalp, thereby potentially decreasing the risk of hair loss, case reports of cutaneous metastases or spread in some settings prevent general recommendation for their use. Because chemotherapy-associated hair loss is transient and usually (although not always) completely reversible after cessation of therapy, adequate counseling and psychological support for alopecia both before and during therapy should take precedence over the use of such devices.”
Shaw and colleagues (2016) examined patients' perceptions and experience of scalp cooling. A total of 17 Australian women with a diagnosis of breast cancer participated in a focus group (n = 4) or a semi-structured interview (n = 3). Both scalp-cooled and non-scalp-cooled participant views were sought. Participant perceptions and experiences of scalp cooling were discussed as part of patients' overall chemotherapy experience and a thematic analysis conducted. Five themes emerged from the data: (i) scalp cooling in the context of treatment decision-making discussions, (ii) hair loss expectations versus experiences, (iii) treatment-related expectations versus experiences, (iv) the promise of faster regrowth, and (v) satisfaction with scalp cooling and future scalp cooling decision-making considerations. Information during treatment decision-making was the primary factor that influenced whether patient expectations were met. Faster regrowth was a motivator to continue treatment. Efficacy and tolerability of scalp cooling influenced future hypothetical treatment decision-making for both scalp-cooled and non-scalp-cooled participants. The authors concluded that this study provided the first in-depth exploration of patient attitudes to scalp cooling. They stated that the findings of this study highlighted a need for accurate information regarding efficacy and tolerability as well as hair care information to assist patients with their treatment decision-making.

Belum and associates (2016) reported the occurrence of cold thermal injury (frost-bite) on the scalp, following the use of cold caps for the prevention of CIA. These investigators identified 4 patients who developed cold thermal injuries on the scalp following the application of cold caps. Medical records were analyzed to retrieve the demographic and clinical characteristics. The cold thermal injuries in these patients were grade 1/2 in severity and improved with topical interventions and interruption of cold cap use, although grade 1 persistent alopecia ensued in 3 patients. The true incidence of such injuries in this setting, however, remains unknown.
The authors concluded that cold thermal injuries are likely infrequent and preventable adverse effects (AEs) that may result from improper device application procedures during cold cap use. They noted that although these untoward events were usually mild-to-moderate in severity, the potential occurrence of long-term sequelae (e.g., permanent alopecia and scarring) or the need to discontinue cold cap use, are not known. They stated that prospective studies are needed to further elucidate the risk and standardize healthcare delivery methods, and to improve patient/supportive/healthcare provider education.

Nangia et al (2017) conducted a multicenter randomized clinical trial to assess whether a scalp cooling device is effective at reducing chemotherapy-induced alopecia in women with breast cancer undergoing chemotherapy and to assess adverse treatment effects. Patients were enrolled from December 9, 2013, to September 30, 2016. One interim analysis was planned to allow the study to stop early for efficacy. Data reported are from the interim analysis. This study was conducted at 7 sites in the United States, and 182 women with breast cancer requiring chemotherapy were enrolled and randomized. Participants were randomized to scalp cooling (n = 119) or control (n = 63). Scalp cooling was done using a scalp cooling device. The primary efficacy end points were successful hair preservation assessed using the Common Terminology Criteria for Adverse Events version 4.0 scale (grade 0 [no hair loss] or grade 1 [<50% hair loss not requiring a wig] were considered to have hair preservation) at the end of 4 cycles of chemotherapy by a clinician unaware of treatment assignment, and device safety. Secondary end points included wig use and scores on the European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire-Core 30, Hospital Anxiety and Depression Scale, and a summary scale of the Body Image Scale. At the time of the interim analysis, 142 participants were evaluable. The mean (SD) age of the patients was 52.6 (10.1) years; 36% (n = 51) received anthracycline-based chemotherapy and 64%
(n = 91) received taxane-based chemotherapy. Successful hair preservation was found in 48 of 95 women with cooling (50.5%; 95% CI, 40.7%-60.4%) compared with 0 of 47 women in the control group (0%; 95% CI, 0%-7.6%) (success rate difference, 50.5%; 95% CI, 40.5%-60.6%). Because the 1-tailed P value from the Fisher exact test was <.001, which crossed the superiority boundary (P = .0061), the data and safety monitoring board recommended study termination on September 26, 2016. There were no statistically significant differences in changes in any of the scales of quality of life from baseline to chemotherapy cycle 4 among the scalp cooling and control groups. Only adverse events related to device use were collected; 54 adverse events were reported in the cooling group, all grades 1 and 2. There were no serious adverse device events. The authors concluded that, among women with stage I to II breast cancer receiving chemotherapy with a taxane, anthracycline, or both, those who underwent scalp cooling were significantly more likely to have less than 50% hair loss after the fourth chemotherapy cycle compared with those who received no scalp cooling. The authors stated that further research is needed to assess longer-term efficacy and adverse effects.

Rugo et al (2017) conducted a prospective multicenter cohort study to evaluate whether use of a scalp cooling system is associated with a lower amount of hair loss among women receiving specific chemotherapy regimens for early-stage breast cancer and assess related changes in quality of life. The investigators included women with stage I or II breast cancer receiving adjuvant or neoadjuvant chemotherapy regimens excluding sequential or combination anthracycline and taxane (106 patients in the scalp cooling group and 16 in the control group; 14 matched by both age and chemotherapy regimen). The study was conducted between August 2013 and October 2014 with ongoing annual follow-up for 5 years. Scalp cooling was initiated 30 minutes prior to each chemotherapy cycle, with scalp temperature maintained at 3°C (37°F) throughout chemotherapy and for 90 minutes to 120 minutes
afterward. Self-estimated hair loss using the Dean scale was assessed 4 weeks after the last dose of chemotherapy by unblinded patient review of 5 photographs. A Dean scale score of 0 to 2 (≤50% hair loss) was defined as treatment success. A positive association between scalp cooling and reduced risk of hair loss would be demonstrated if 50% or more of patients in the scalp cooling group achieved treatment success, with the lower bound of the 95% CI greater than 40% of the success proportion. Quality of life was assessed at baseline, at the start of the last chemotherapy cycle, and 1 month later. Median follow-up was 29.5 months. Among the 122 patients in the study, the mean age was 53 years (range, 28-77 years); 77.0% were white, 9.0% were black, and 10.7% were Asian; and the mean duration of chemotherapy was 2.3 months (median, 2.1 months). No participants in the scalp cooling group received anthracyclines. Hair loss of 50% or less (Dean score of 0-2) was seen in 67 of 101 patients (66.3%; 95% CI, 56.2%-75.4%) evaluable for alopecia in the scalp cooling group vs 0 of 16 patients (0%) in the control group (P < .001). Three of 5 quality-of-life measures were significantly better 1 month after the end of chemotherapy in the scalp cooling group. Of patients who underwent scalp cooling, 27.3% (95% CI, 18.0%-36.6%) reported feeling less physically attractive compared with 56.3% (95% CI, 31.9%-80.6%) of patients in the control group (P = .02). Of the 106 patients in the scalp cooling group, 4 (3.8%) experienced the adverse event of mild headache and 3 (2.8%) discontinued scalp cooling due to feeling cold. The investigators concluded that, among women undergoing non-anthracycline-based adjuvant chemotherapy for early-stage breast cancer, the use of scalp cooling vs no scalp cooling was associated with less hair loss at 4 weeks after the last dose of chemotherapy. The investigators stated that further research is needed to assess outcomes after patients receive anthracycline regimens, longer-term measures of alopecia, and adverse effects.
### CPT Codes / HCPCS Codes / ICD-10 Codes

Information in the [brackets] below has been added for clarification purposes. Codes requiring a 7th character are represented by "+":

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<td>CPT codes covered if selection criteria are met:</td>
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<td>Scalp cooling - no specific code:</td>
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<tr>
<td>Z51.11</td>
<td>Encounter for antineoplastic chemotherapy</td>
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The above policy is based on the following references:

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prevention of chemotherapy-induced alopecia.

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AETNA BETTER HEALTH® OF PENNSYLVANIA

Amendment to
Aetna Clinical Policy Bulletin Number: 0290 Scalp Cooling (Hypothermia) to Prevent Hair Loss During Chemotherapy

There are no amendments for Medicaid.