

# Symptom Management Guidelines: PALMAR-PLANTAR ERYTHRODYSESTHESIA (PPE)

[NCI GRADE AND MANAGEMENT](#) | [RESOURCES](#) | [CONTRIBUTING FACTORS](#) | [APPENDIX](#)

Definition	
<ul style="list-style-type: none"> <li><b>Palmar-Plantar Erythrodysesthesia (PPE)</b> – is a dermatologic toxicity induced by some chemotherapy drugs also known as <b>Hand-Foot Syndrome (HFS)</b>, and is characterized by tingling and tenderness developing to symmetrical redness, swelling and pain primarily on the palm of the hand and sole of the foot.</li> <li><b>Hand-Foot Skin Reaction (HFSR)</b> – is a dermatologic toxicity strongly associated with multikinase inhibitors. Initial tingling and burning can develop into bilateral hyperkeratotic, callus-like lesions on an asymmetric erythematous base. This typically occurs to palms and soles as well as areas of friction or pressure.</li> </ul>	
FOCUSED HEALTH ASSESSMENT	
PHYSICAL ASSESSMENT	SYMPTOM ASSESSMENT
<p><b>Vital Signs</b></p> <ul style="list-style-type: none"> <li>Frequency – as clinically indicated</li> </ul> <p><b>Skin Assessment</b></p> <ul style="list-style-type: none"> <li>Ensure adequate light source and gloves if handling non-intact skin</li> <li>Assess all aspect of hands and feet, and cutaneous areas pressure and friction-prone.</li> <li><b>Color-</b> If erythema present, is there uniformity or areas of pallor and asymmetry or hyper-pigmentation?</li> <li><b>Swelling-</b> Degree of swelling</li> <li><b>Thickening-</b> Hyperkeratosis of soles of feet and palmar surfaces</li> <li><b>Moisture-</b> Any accumulation of fluid under the skin</li> <li><b>Integrity-</b> Any presence and size of flaking, peeling rash, blisters and/or ulcer</li> <li><b>Swelling-</b> Degree of swelling</li> <li><b>Sensory changes-</b> Tingling, numbness, pain, pruritus or burning</li> </ul> <p><b>Functional Assessment</b></p> <ul style="list-style-type: none"> <li>How is the patient mobilizing?</li> <li>How are they managing with activities of daily living?</li> </ul>	<p><b>Normal</b></p> <ul style="list-style-type: none"> <li>What was the condition of your skin before treatment</li> </ul> <p><b>Onset</b></p> <ul style="list-style-type: none"> <li>How long after treatment did your symptoms appear?</li> <li>What did they first look like?</li> </ul> <p><b>Provoking / Palliating</b></p> <ul style="list-style-type: none"> <li>What makes the symptoms better? Worse?</li> </ul> <p><b>Quality</b></p> <ul style="list-style-type: none"> <li>Can you describe the sensations in your own words?</li> <li>Do you have any tingling, burning, or pain? Is the sensation constant or intermittent?</li> <li>Do you have any swelling, redness, dryness, cracking, white scaling, thickening, or blistering of your skin?</li> </ul> <p><b>Region / Radiation</b></p> <ul style="list-style-type: none"> <li>What areas are affected? Does it appear the same on both sides of your body or differently?</li> </ul> <p><b>Severity / Other Symptoms</b></p> <ul style="list-style-type: none"> <li>How bothersome is this symptom to you? (0-10 scale) What is it now? At worst? At best? On average?</li> <li>Have you been experiencing any symptoms such as fever, discharge or bleeding from lesions and/or blisters?</li> </ul> <p><b>Treatment</b></p> <ul style="list-style-type: none"> <li>How have you been managing? (Creams, ointments, pain medications, dressings). How effective are they? Any side effects?</li> <li>When was your last cancer treatment?</li> <li>What cancer treatment are you on?</li> </ul> <p><b>Understanding / Impact on You</b></p> <ul style="list-style-type: none"> <li>How is this skin condition impacting your activities of daily living (ADLs)? Do you need any support in understanding or managing your symptoms?</li> </ul> <p><b>Value</b></p> <ul style="list-style-type: none"> <li>What is your comfort goal or acceptable level for this symptom? (0-10)</li> </ul>

**\*\*PALMAR PLANTAR ERYTHRODYSESTHESIA GRADING SCALE**

NCI CTCAE (Version 4.03)

<b>GRADE 1 (Mild)</b>	<b>GRADE 2 (Moderate)</b>	<b>GRADE 3 (Severe)</b>	<b>GRADE 4 (Life - threatening)</b>	<b>GRADE 5</b>
Minimal skin changes or dermatitis (e.g., erythema, edema, or hyperkeratosis) without pain	Skin changes (e.g., peeling, blisters, bleeding, edema, or hyperkeratosis) with pain; limiting instrumental ADL	Severe skin changes (peeling, blisters, bleeding, edema or hyperkeratosis) with pain; limiting self-care ADLs	—	—

**\*\*PPE and HFSR use the same NCI grading scale.**

**\*Step-Up Approach to Symptom Management:**

**Interventions Should Be Based On Current Grade Level and Include Lower Level Grade Interventions As Appropriate**

**NORMAL– GRADE 1**

**SPECIAL CONSIDERATIONS**

Interventions can be drug specific. It is important to know patient’s systemic therapy protocol.



**NON – URGENT:**

**Prevention, support, teaching & follow-up care as required**

**Patient Care and Assessment**

**Complete a focused health assessment**

**Screen for skin changes at first visit; re-assess at each visit**

- Assess for early signs including:
  - Tingling and/or numbness
  - Dry, furrowed skin that develops changes in pigmentation
  - Swelling on the palms of the hands, pads of the fingers, and soles of the feet. In some cases behind the knees, groin, axilla and below the breast.
- Need for patient self-assessment.



***Plantar palmar erythrodysesthesia***

**Hygiene**

- **Avoid** exposure to hot water. Clean hands, feet, and skin fold areas with lukewarm water and gently pat dry
- **Avoid** tight-fitting clothes, shoes, socks, belts and jewelry as well as harsh fabrics
- **Avoid** tight bandages, dressings or adhesive tape to skin
- Wash sweat from skin

<b>Skin Care</b>	<ul style="list-style-type: none"> <li>• <b>When possible PRIOR to beginning treatment</b> it is recommended that any pre-existing calluses are managed by using a pumice stone or receiving a therapeutic pedicure/manicure for callus removal. (This may minimize the manifestation of further problems).</li> <li>• Before any symptoms develop liberal use of NON-urea based creams regularly to soften the skin. <b>Avoid</b> alcohol-based products.</li> <li>• If any grade one symptoms develop, may apply lotions with lanolin frequently and liberally.</li> <li>• <b>See Special skin care considerations below:</b></li> <li>•</li> </ul>
<b>Special Skin Care Considerations (if symptoms appear)</b>	<ul style="list-style-type: none"> <li>• Use keratolytics (urea cream 20-40% and salicylic acid 6%) to loosen and remove any overgrown skin (<b>once on treatment do not use any mechanical debridement</b>)</li> <li>• With pegylated liposomal doxorubicin, capecitabine , and multikinase inhibitors, consider topical steroid cream BID</li> <li>• Some drug specific suggestions to use Sunscreen with Sun Protection Factor (SPF) of 30 or more. <b>Refer to the Cancer Drug Manual <a href="#">here</a></b></li> </ul>
<b>Activity</b>	<ul style="list-style-type: none"> <li>• <b>Avoid</b> sun exposure during treatment- use sun block</li> <li>• <b>Avoid</b> contact with harsh chemicals-use non-rubberized protective gloves</li> <li>• <b>Avoid</b> using hands for activities that might cause abrasion or mechanical stress (clapping, typing), require tight gripping (such as use of tools or musical instruments) and vigorous activities (jogging, aerobics)</li> <li>• <b>Avoid</b> situations that raise body temperature (e.g. steam, saunas, hot baths, heating pads, and vigorous exercise)</li> <li>• Use gel shoe inserts for cushioning and reducing friction</li> <li>• <b>Do not</b> wear rubber gloves for dishwashing as they intensify heat</li> <li>• <b>Do not</b> lean on bony prominences</li> <li>• Sit or lie on padded cushions, raise legs when possible, place pillow between knees or wear pajamas if rubbing of legs occurs during sleep</li> </ul>
<b>Dietary Management</b>	<ul style="list-style-type: none"> <li>• Promote adequate hydration/nutrition during treatment to help prevent skin dryness or desquamation. Recommend daily fluid intake of 8- 12 cups (unless contraindicated)</li> <li>• Promote a well-balanced diet high in protein, vitamins B and C</li> </ul>
<b>Pharmacological Management</b>	<ul style="list-style-type: none"> <li>• Topical cortical steroids if there is inflammation <b>Also see Skin Care</b></li> <li>• Some suggestion to use celecoxib with capecitabine</li> </ul>
<b>Patient Education and Follow-up</b>	<ul style="list-style-type: none"> <li>• Teach patients to conduct daily self-assessment including checking skin daily. Teach to understand early signs including tingling and numbness, areas of dry furrowed skin with any changes in pigmentation</li> <li>• Review correct technique and timing of application of prescribed skin care products</li> <li>• Reinforce when to seek immediate medical attention: temperature greater than or equal to 38° and/or redness, discharge or odor from any open areas. And when unable to perform ADLs, or when pain is not controlled</li> <li>• Communicate and coordinate follow up phone calls to be initiated by nurse or patient</li> </ul>



**URGENT:**

Requires medical attention within 24 hours

**Patient Care and Assessment**

- **Complete a focused health assessment**
- Collaborate with physician regarding:
  - Treatment delays, reductions or discontinuation of treatment.
  - New or change in prescriptions (analgesics, antibiotics, corticosteroids)
  - Lab and Diagnostic tests: CBC and blood cultures if infection suspected



*Plantar Palmar erythrodysesthesia*



*Hand-Foot Skin Reaction*

**Management of Skin Complications**

- Local infection:**
- **Lab tests**, culture any suspect areas, assess temperature
  - Review prescribed medications with patient and collaborate for adjustments if required
- Minor bleeding with trauma (stops after 2 minutes):**
- Review CBC and assess platelets and hemoglobin
- If skin is intact:**
- If not contraindicated, daily foot soaks with lukewarm water and Epsom salts to soften callus formation.
  - Cool packs to palms/soles alternating off/on for 15 minutes may help **pain**
- Alteration in skin integrity:**
- May need to apply dressing to prevent infection to altered area, consider hydrocolloid dressings. Following application of emollients and/or topical medications may need to cover affected areas for proper absorption of medication

**Pharmacological Management**

- **Pain management** –topical or oral agents
- **Antibiotics**- if infection identified

**Special Consideration**

- **Oral Steroids: For pegylated liposomal doxorubicin**- consider oral dexamethasone

**Patient Education**

- Same principles as for previous intervention step

**GRADE 3**  
**OR**  
**Presence of the following:**  
**Temperature greater than or equal to 38°C, uncontrolled pain, blisters and/or desquamation**



<b>EMERGENCY:</b> <b>Requires IMMEDIATE medical attention</b>	
<b>Patient Care and Assessment</b>	<ul style="list-style-type: none"> <li>• <b>Complete a focused health assessment</b></li> <li>• Patients will generally require hospital admission. Notify physician of assessment, facilitate arrangements as necessary</li> <li>• Treatment is usually ordered to restart on an incremental dose basis when symptoms</li> <li>• Nursing Support:               <ul style="list-style-type: none"> <li>- Monitor vital signs as clinically indicated</li> <li>- Pain and symptom assessment and management as appropriate</li> <li>- Frequent skin assessments and dressings as indicated</li> <li>- Communicate and coordinate with inpatient team as required</li> </ul> </li> </ul>
<b>Management of Skin Complications</b>	<p><b>Local or systemic infection:</b></p> <ul style="list-style-type: none"> <li>• Review recent lab tests</li> <li>• Culture: Blood and any suspect area</li> </ul>
<b>Pharmacological Management</b>	<p><b>Pain:</b></p> <ul style="list-style-type: none"> <li>• Increase dose and frequency of analgesics may be indicated</li> </ul> <p><b>Anti-infective Agents:</b></p> <ul style="list-style-type: none"> <li>• May be topical, oral or intravenous antibiotics, antifungals, or antivirals</li> </ul>

<b>RESOURCES &amp; REFERRALS</b>	
<b>Referrals</b>	<ul style="list-style-type: none"> <li>• Telephone triage nurse line</li> <li>• Home and Community Care</li> <li>• Physician (medical oncologist or GP)</li> <li>• Pain and Symptom Management/Palliative Care (PSMPC)</li> <li>• Dermatology</li> <li>• Podiatrist</li> <li>• Orthotics or footwear inserts</li> <li>• Pharmacy</li> </ul>
<b>Related Online Resources</b>	<ul style="list-style-type: none"> <li>• <a href="http://www.bccancer.bc.ca/chemotherapy-protocols-site/Documents/Supportive%20Care/SCIMMUNE_Handout.pdf">http://www.bccancer.bc.ca/chemotherapy-protocols-site/Documents/Supportive%20Care/SCIMMUNE_Handout.pdf</a></li> <li>• <a href="http://www.bccancer.bc.ca/health-professionals/clinical-resources/chemotherapy-protocols">http://www.bccancer.bc.ca/health-professionals/clinical-resources/chemotherapy-protocols</a></li> <li>• <a href="http://www.bccancer.bc.ca/health-professionals/clinical-resources/cancer-drug-manual/drug-index">http://www.bccancer.bc.ca/health-professionals/clinical-resources/cancer-drug-manual/drug-index</a></li> <li>• <a href="https://www.cancer.net/navigating-cancer-care/side-effects/skin-reactions-targeted-therapy-and-immunotherapy">https://www.cancer.net/navigating-cancer-care/side-effects/skin-reactions-targeted-therapy-and-immunotherapy</a></li> </ul>
<b>Bibliography List</b>	<ul style="list-style-type: none"> <li>• <a href="http://www.bccancer.bc.ca/health-professionals/professional-resources/nursing/symptom-management">http://www.bccancer.bc.ca/health-professionals/professional-resources/nursing/symptom-management</a></li> </ul>

## APPENDIX A: Contributing Factors

Contributing Factors	
<b>Systemic Therapy Treatment</b>	<ul style="list-style-type: none"> <li>Onset of symptoms may vary with agent, dose, exposure, length of infusion and combination of 2 or more agents.</li> <li><b>Chemotherapy</b> such as: Capecitabine, Fluorouracil (5-FU), Docetaxel and PEGylated liposomal doxorubicin. Less commonly with paclitaxel, etoposide and cytarabine</li> <li><b>Tyrosine Kinase Inhibitors and Multikinase Inhibitors</b> such as: axitinib, cabozantinib, dabrafenib, sorafenib, sunitinib, and regorafenib. Less commonly with vandetanib and vemurafenib</li> </ul>
<b>Relevant Medical History</b>	<ul style="list-style-type: none"> <li>Severe renal dysfunction for drugs metabolized/excreted through the kidneys (e.g. fluorouracil, capecitabine, cytarabine)</li> <li>Severe hepatic dysfunction (elevated bilirubin, AST or alkaline phosphatase) for drugs metabolized/excreted through the liver (e.g. PEGylated liposomal doxorubicin, fluorouracil, cytarabine, docetaxel).</li> <li>Previous dermatological conditions (seborrheic dermatitis, eczema hyperkeratosis, and actinic keratosis)</li> <li>Diabetes</li> <li>Advanced age (over 65 years) and female– more common with infusional fluorouracil</li> <li>Ethnicity – non-white populations may have higher incidence &amp; develop symptoms differently</li> <li>Alcoholism</li> <li>Hypertension</li> </ul>
<b>Activity</b>	<ul style="list-style-type: none"> <li>Any activity that increases body temperature and/or blood flow (hot baths/showers, fever, extreme weather, manual labor and vigorous exercise)</li> <li>Friction or pressure to areas (behind the knees, groin, below the breast and axillae).</li> <li>Sweating may exacerbate symptoms</li> </ul>
Consequences	
<ul style="list-style-type: none"> <li>Increased risk of altered skin integrity and infection</li> <li>Limited use of a potentially effective therapy for cancer</li> <li>Quality of life – pain, physical and/or psychological distress, sleep-wake disturbance, impaired mobility and ability to be independent with activities of daily living.</li> </ul>	

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