

Symptom Management Guidelines: PALMAR-PLANTAR ERYTHRODYSESTHESIA (PPE)

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

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

****PALMAR PLANTAR ERYTHRODYSESTHESIA SYNDROME GRADING SCALE**


NCI Common Terminology Criteria for Adverse Events (CTCAE) (Version 5.0)

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

***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	<p><u>Complete a focused health assessment</u> <u>Screen for skin changes at first visit; re-assess at each visit</u></p> <ul style="list-style-type: none"> Assess for early signs including: <ul style="list-style-type: none"> 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.
	
	<i>Plantar palmar erythrodysesthesia</i>
Hygiene	<ul style="list-style-type: none"> 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
Skin Care	<ul style="list-style-type: none"> <u>When possible PRIOR to beginning treatment</u> it is recommended that any pre-existing

	<p>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).</p> <ul style="list-style-type: none"> • Before any symptoms develop liberal use of NON-urea based creams regularly to soften the skin. Avoid alcohol-based products. • If any grade one symptoms develop, may apply lotions with lanolin frequently and liberally. • See Special skin care considerations below: •
Special Skin Care Considerations (if symptoms appear)	<ul style="list-style-type: none"> • Use keratolytics (urea cream 20-40% and salicylic acid 6%) to loosen and remove any overgrown skin (once on treatment do not use any mechanical debridement) • With pegylated liposomal doxorubicin, capecitabine , and multikinase inhibitors, consider topical steroid cream BID • Some drug specific suggestions to use Sunscreen with Sun Protection Factor (SPF) of 30 or more. Refer to the Cancer Drug Manual here
Activity	<ul style="list-style-type: none"> • Avoid sun exposure during treatment- use sun block • Avoid contact with harsh chemicals-use non-rubberized protective gloves • Avoid 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) • Avoid situations that raise body temperature (e.g. steam, saunas, hot baths, heating pads, and vigorous exercise) • Use gel shoe inserts for cushioning and reducing friction • Do not wear rubber gloves for dishwashing as they intensify heat • Do not lean on bony prominences • Sit or lie on padded cushions, raise legs when possible, place pillow between knees or wear pajamas if rubbing of legs occurs during sleep
Dietary Management	<ul style="list-style-type: none"> • Promote adequate hydration/nutrition during treatment to help prevent skin dryness or desquamation. Recommend daily fluid intake of 8- 12 cups (unless contraindicated) • Promote a well-balanced diet high in protein, vitamins B and C
Pharmacological Management	<ul style="list-style-type: none"> • Topical cortical steroids if there is inflammation <u>Also see Skin Care</u> • Some suggestion to use celecoxib with capecitabine
Patient Education and Follow-up	<ul style="list-style-type: none"> • 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 • Review correct technique and timing of application of prescribed skin care products • 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 • Communicate and coordinate follow up phone calls to be initiated by nurse or patient

GRADE 2



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

EMERGENT:
Requires IMMEDIATE medical attention

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

RESOURCES & REFERRALS

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

APPENDIX A: Contributing Factors

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

Date of Print:

Revised January, 2019; February 2025 (limited revisions to include new NCI CTCAE scale)

Created: January, 2010

Contributing Authors:

Revised by: Jeevan Dosanjh, RN BScN, Michelle LaFreniere, RN (2025)

Revised by: Michelle Lafreniere, RN BScN (2019)

Revised by: Judy Oliver, BScN, M.Ed.; Lindsay Schwartz, RN, MSc (A); Jagbir Kohli, RN, MN

Created by: Colleen Sherriff, RN; Vanessa Buduha, RN MN; Rosemary Cashman, RN MSc (A), MA (ACNP);

Elizabeth Cooper, RN BScN, CON(c); Karen Levy, RN MSN; Ann Syme RN PhD(C)

Reviewed by:

Katie Hennessy, RN, BScN; Cloe Bailly Vignola Edwards, RN, BScN, CON(c) (2019)

Colleen Sherriff, RN; Stephanie Soon, BSc.P