NO. 91599

IRREVERSIBLE ELECTROPORATION(IRE)/NANOKNIFE

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Instructions for use: This document is for informational purposes only. Coverage is subject to member's specific benefits. Group specific policy will supersede this policy when applicable. Eligibility and benefit coverage are determined in accordance with the terms of the member's plan in effect as of the date services are rendered. It is not an authorization, certification, explanation of benefits, or contract. Receipt of benefits is subject to satisfaction of all terms and conditions of coverage. Priority Health's medical policies are developed with the assistance of medical professionals and are based upon a review of published and unpublished information including, but not limited to, current medical literature, guidelines published by public health and health research agencies, and community medical practices in the treatment and diagnosis of disease. Because medical practice, information, and technology are constantly changing, Priority Health reserves the right to review and update its medical policies at its discretion. Priority Health's medical policies are intended to serve as a resource to the plan. They are not intended to limit the plan's ability to interpret plan language as deemed appropriate. Physicians and other providers are solely responsible for all aspects of medical care and treatment, including the type, quality, and levels of care and treatment they choose to provide.

Policy scope: This policy addresses the use of **irreversible electroporation (IRE), including the NanoKnife® system, for the ablation of soft tissue and malignant lesions**.

Related policies:

- None

I. MEDICAL NECESSITY CRITERIA

A. Irreversible electroporation (IRE) or NanoKnife® use for ablation of cancer is considered experimental and investigational due to insufficient evidence in the peer-reviewed literature.

II. CENTERS FOR MEDICARE & MEDICAID SERVICES (CMS) COVERAGE DETERMINATION

Any applicable federal or state mandates will take precedence over this medical coverage policy.

Medicare: Refer to the CMS Online Manual System (IOMs) and Transmittals.
For the most current applicable CMS National Coverage Determination (NCD)/Local Coverage Determination (LCD)/Local Coverage Article (LCA) refer to CMS Medicare Coverage Database.

The information below is current as of the review date for this policy. However, the coverage issues and policies maintained by CMS are updated and/or revised periodically. Therefore, the most current CMS information may not be contained in this document. MAC jurisdiction for purposes of local coverage determinations is governed by the geographic service area where the Medicare Advantage plan is contracted to provide the service. Please refer to the Medicare Coverage Database website for the most current applicable NCD, LCD, LCA, and CMS Online Manual System/Transmittals.

National Coverage Determinations (NCDs)	
None identified	
Local Coverage Determinations (LCDs)	
CGS Administrators, LLC	None identified
First Coast Service Options, Inc.	None identified
National Government Services, Inc.	None identified
Noridian Healthcare Solutions	None identified
Novitas Solutions, Inc.	None identified
Palmetto GBA	Proposed LCD: Irreversible Electroporation for Cancer-**DL40205** Proposed LCD - Irreversible Electroporation for Cancer (DL40205)
WPS Insurance Corporation	None identified

III. BACKGROUND

In electroporation, direct-current electrical fields are applied to soft tissue, creating nanoscale defects in the cell membranes. In reversible electroporation, which is being used in conjunction with chemotherapeutic drugs for cancer treatment (electrochemotherapy), the defects are temporary. In irreversible electroporation, electrical fields are delivered at an energy level and duration that causes cell death in the targeted tissue. Because irreversible electroporation does not require the use of drugs, it has been proposed as advantageous in immunocompromised patients compared with electrochemotherapy.

A prospective registry (Cannon, 2013) of patients undergoing IRE for hepatic tumors over a 2-year period analyzed factors included patient and tumor characteristics, treatment related complications, and local recurrence free survival (LRFS) for ablated lesions. LRFS was calculated according to Kaplan-Meier, with secondary analyses stratified by procedural approach (laparotomy, laparoscopy, and percutaneous) and tumor histology. Forty-four patients undergoing 48 total IRE procedures, 20 colorectal metastasis, 14 hepatocellular, and 10 other metastasis. Initial success was achieved in 46 (100%) treatments. Five patients had 9 adverse events, with all complications resolving within 30 days. LRFS at 3, 6, and 12 months was 97.4%, 94.6%, and 59.5%. There was a trend toward higher recurrence rates for tumors over 4 cm (HR 3.236, 95% CI: 0.585-17.891; P = 0.178). The authors conclude that IRE appears to be a safe treatment for hepatic tumors in proximity to vital structures. Further prospective evaluation is needed to determine the optimal effectiveness of IRE in relation to size and technique for IRE of the liver.

The PRESERVE trial was a prospective, nonrandomized, single-arm pivotal trial evaluating the use of NanoKnife in 121 men with treatment-naive intermediate risk-prostate cancer. The study included patients in the USA who met the key inclusion criteria: age >50 yr with organ-confined, grade group 2 or 3 PCa, clinical stage ≤T2c, prostate-specific antigen (PSA) ≤15 ng/ml, or PSA density <0.15 ng/ml^2. The primary endpoints were the rate of local pathological complete response (negative in-field biopsy) and the incidence, type, and severity of adverse events by 12 mo. The secondary endpoints included PSA kinetics, changes in prostate volume, retreatment, and urinary/sexual function. Of the 121 patients treated with IRE, the negative in-field biopsy rate at 12 months was 71% (95% confidence interval [CI]: 62%, 79%). The secondary endpoint of negative in-field biopsy rate defined by the Delphi consensus criterion was 84% (95% CI: 76%, 90%). The time to median PSA nadir was 3.5 months, and the median percent reduction in PSA at 6 months was 68.2%. Urinary function outcomes had a mean change from baseline to 12 months of 3 in the University of California Los Angeles Expanded Prostate Cancer Index Composite urinary domain total score and a mean change of -2 in the International Prostate Symptom Score total symptom score. At 12 months, 84% of patients with good baseline sexual function maintained erections sufficient for penetration. Fourteen (12%) patients experienced Common Terminology Criteria for Adverse Events grade ≥3 and three experienced procedure-related grade 3 adverse events. (George et al., 2026)

In a real-world analysis of safety data of IRE, Xiang and colleagues (2025) reviewed all IRE-related adverse event reports in the Manufacturer and User Facility Device Experience (MAUDE) database, focusing on event types, Clavien-Dindo Grades, the timing of adverse events and temporal trends across cancers. They found that device malfunctions with Nanoknife were a significant issue but have declined recently. In pancreatic cancer, gastrointestinal injuries (mainly hemorrhagic lesions) were most commonly reported. In liver cancer, arrhythmias were frequent, with no new cases in recent years. In prostate cancer, rectal fistula was the most common adverse event, with an increasing number of cases being reported. This review highlighted the need for ongoing attention to device maintenance, treatment standardization, and postoperative management to optimize patient safety.

IV. GUIDELINES / POSITION STATEMENTS

Medical/Professional Society	Guideline
National Comprehensive Cancer Network (NCCN)	Prostate Cancer (2026)
European Association of Urology (EAU)	Prostate Cancer (2025)
National Institute for Health and Care Excellence (NICE)	Irreversible Electroporation for Treating Prostate Cancer (2023)

V. REGULATORY (US FOOD AND DRUG ADMINISTRATION)

See U.S. Food & Drug Administration (FDA) Medical Device Databases for the most current information.

Device	Premarket Approval,	Notice date

	513(f)(2)(De Novo), or 510(k) Number	
ONCOBIONIC SYSTEM WITH 6 PROBE OUTPUT (Oncobionics, Inc.)	K080202	05/08/2008
NanoKnife System (AngioDynamics, Inc.)	K102329	10/24/2011
NanoKnife System (AngioDynamics, Inc.)	K242687	12/06/2024
Aliya(TM) System, Aliya(TM) Generator, Aliya(TM) Needle, Aliya(TM) Electrode (Galvanize Therapeutics, Inc.)	K212871	06/17/2022
Irreversible Electroporation Ablation Generator, Irreversible Electroporation Probe (Zhejiang Curaway Medical Technology Co., Ltd.)	K222001	06/08/2023
Canady Helios Cold Plasma™ XL-1000CP™ Ablation System (XL-1000CPSYS) (Us Medical Innovations, LLC)	K240297	05/03/2024
Electroporation System (N3000) (Surgnova Healthcare Technologies (Zhejiang) Co., Ltd.)	K240376	10/04/2024

VI. CODING

ICD-10 Codes that may support medical necessity
All diagnoses are medically necessary

CPT/HCPCS Codes
Not Medically Necessary

0600T	Ablation, irreversible electroporation; 1 or more tumors per organ, including imaging guidance, when performed, percutaneous
0601T	Ablation, irreversible electroporation; 1 or more tumors, including fluoroscopic and ultrasound guidance, when performed, open
47384	Ablation, irreversible electroporation, liver, 1 or more tumors, including imaging guidance, percutaneous
55877	Ablation, irreversible electroporation, prostate, 1 or more tumors, including imaging guidance, percutaneous
C8005	Bronchoscopy, rigid or flexible, non-thermal transbronchial ablation of lesion(s) by pulsed electric field (pef) energy, including fluoroscopic and/or ultrasound guidance, when performed, with computed tomography acquisition(s) and 3d rendering, computer-assisted, image-guided navigation, and endobronchial ultrasound (ebus) guided transtracheal and/or transbronchial sampling (e.g., aspiration[s]/biopsy[ies]) of all mediastinal and/or hilar lymph node stations or structures, and therapeutic intervention(s)

VII. MEDICAL NECESSITY REVIEW

Prior authorization for certain drugs, devices, services and procedures may or may not be required. In cases where prior authorization is required, providers will submit a request demonstrating that a drug, service or procedure is medically necessary. For more information, refer to the Priority Health Provider Manual.

VIII. APPLICATION TO PRODUCTS

Coverage is subject to the member's specific benefits. Group-specific policy will supersede this policy when applicable.

- **HMO/EPO**: This policy applies to insured HMO/EPO plans.
- **POS**: This policy applies to insured POS plans.
- **PPO**: This policy applies to insured PPO plans. Consult individual plan documents as state mandated benefits may apply. If there is a conflict between this policy and a plan document, the provisions of the plan document will govern.
- **ASO**: For self-funded plans, consult individual plan documents. If there is a conflict between this policy and a self-funded plan document, the provisions of the plan document will govern.
- **INDIVIDUAL**: For individual policies, consult the individual insurance policy. If there is a conflict between this medical policy and the individual insurance policy document, the provisions of the individual insurance policy will govern.
- **MEDICARE**: Coverage is determined by the Centers for Medicare and Medicaid Services (CMS); if a coverage determination has not been adopted by CMS, this policy applies.
- **MEDICAID/HEALTHY MICHIGAN PLAN**: For Medicaid/Healthy Michigan Plan members, this policy will apply. Coverage is based on medical necessity criteria being met and the appropriate code(s) from the coding section of this policy being included on the Michigan Medicaid Fee Schedule. If there is a discrepancy between this policy and the Michigan Medicaid Provider Manual, the Michigan Medicaid Provider Manual will govern. If there is a discrepancy or lack of guidance in the Michigan Medicaid Provider Manual, the Priority Health contract with Michigan Medicaid will govern. For Medical Supplies/DME/Prosthetics and Orthotics, please refer to the Michigan Medicaid Fee Schedule to verify coverage.

IX. REFERENCES

Guidelines and Publications

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Hepatocellular Carcinoma

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SUMMARY OF CHANGES

Deletions:

- Removed statement that NanoKnife is not FDA approved for cancer treatment

Additions:

- Updated background and references, including information on the PRESERVE study

Past committee review dates: 04/2012, 04/2013, 05/2014, 05/2015, 05/2016, 05/2017, 05/2018, 05/2019, 05/2020, 05/2021, 05/2022, 05/2023, 05/2024, 05/2025, 05/2026