

Seasonal and Geographical Trends in Photodynamic Therapy and Cryosurgery Utilization in the United States: A Cross-Sectional Study From 2015-2022

Dawn Merritt, DO, FAAD¹, Jon Lyons, PhD, MBA², Mouna Mikati, PhD², Todd Schlesinger, MD, FAAD³

¹OhioHealth, Columbus, OH, USA, ²Biofrontera Inc. Medical Affairs, Woburn, MA, USA, ³Clinical Research Center of the Carolinas, South Carolina, USA

Introduction

- Actinic keratoses (AKs) have malignant transformation potential, so treatment must be effective and prevent against future recurrences.¹
- Cryosurgery has been widely used for treatment of skin lesions such as AKs. It is a short in-office procedure, has low infection risk and minimal wound care.²
- Photodynamic therapy (PDT) is an effective and safe treatment for actinic keratosis.³
- PDT is an ideal option for patients: minimally invasive with no long-term side effects, can be conveniently administered at a physician's office and yields good cosmetic results.¹
- Efficacy of PDT is well documented in published studies but anecdotal HCP insights suggest that it may not be utilized at the same rate year-round.^{1,3}

Objective

- To investigate whether PDT and cryosurgery usage on premalignant skin lesions is affected by season and geographic location in the United States.

Methods

Database of aggregate of closed and open medical claims (CPT & HCPCS) from a broad selection of commercial payers and CMS.

7.91 million patient records extracted through CPT codes from 50 states and 4 territories between 2015 – 2022.

Cryosurgery
CPT codes 17000, 07003 & 17004

PDT
CPT codes 96567, 96573 and 96574

Stratified using location & meteorologically defined seasons⁴
Winter: Dec 1 – Feb 28; Spring: Mar 1 – May 31,
Summer: Jun 1 – Aug 31; Fall: Sep 1 – Nov 30

Demographics

Majority of patients were between ages 65-88 for both PDT & cryosurgery.

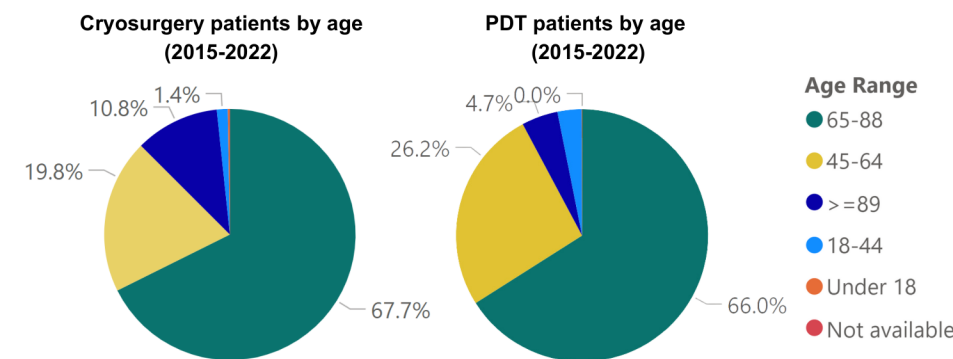


Figure 1. Patients stratified by age for cryosurgery and PDT between 2015-2022.

Results

Top 15 states according to cryosurgery and PDT procedural claims

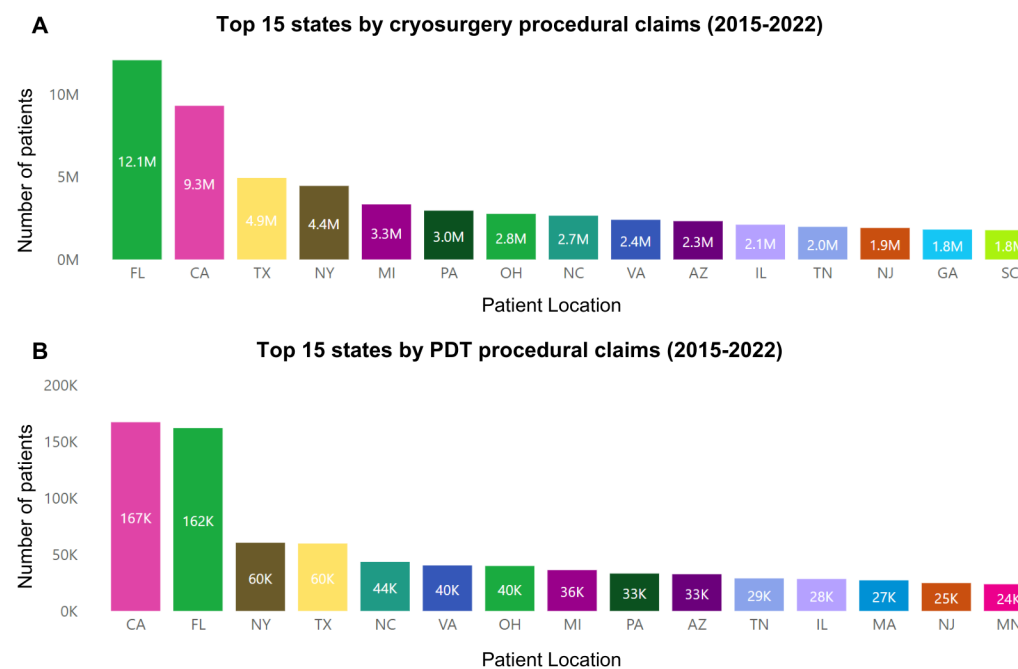


Figure 2. Top 15 states by (a) cryosurgery and (b) PDT procedural claims between 2015-2022.

PDT procedural claims show seasonality, peaking during cooler months and decreasing during the warmer months, while cryosurgery procedural claims remain relatively stable year-round

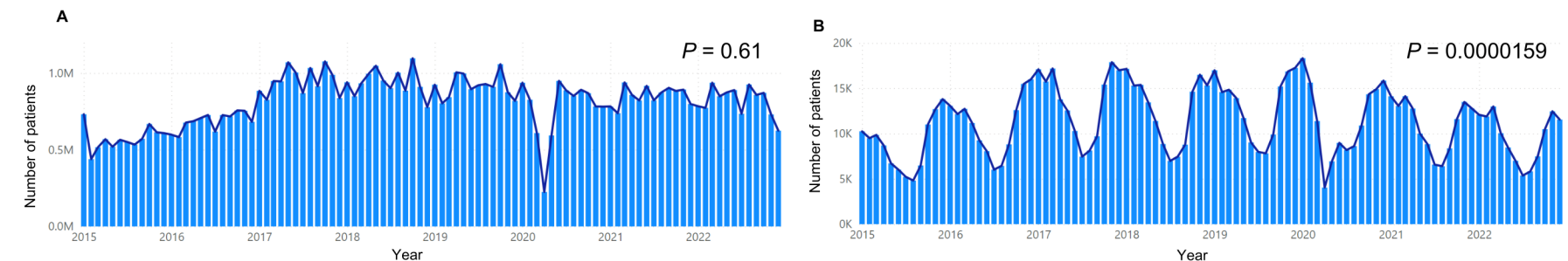


Figure 3. Number of (a) cryosurgery procedural claims and (b) PDT procedural claims in the United States by month between 2015-2022. P-values were calculated through sinusoidal regression and data from 2020 was excluded from the analysis due to the COVID-19 pandemic.

Difference between PDT procedural claims in the winter (Dec-Feb) and summer months (Jun-Aug) varies by geographic location

Cryosurgery procedural claims in winter compared to summer (2015-2022) PDT procedural claims in winter compared to summer (2015-2022)

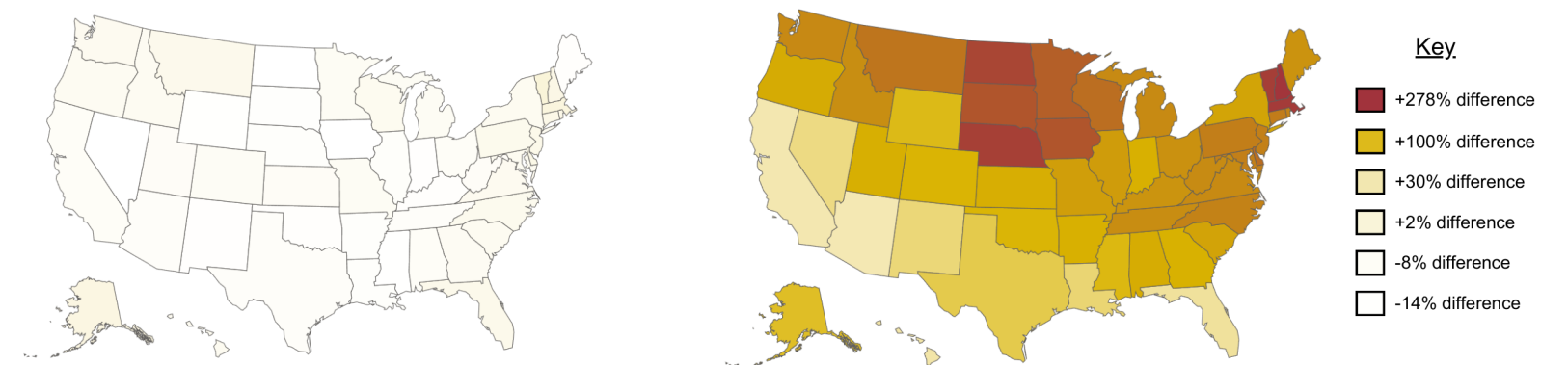


Figure 4. Percentage difference in (a) cryosurgery procedural claims and (b) PDT procedural claims in the winter months vs. summer months stratified by geographic location.

Conclusions

- PDT procedural claims are affected by season, significantly increasing in the cooler months (Sep-Feb) and decreasing in warmer months (Mar-Aug) ($P=0.0000159$).
- PDT procedural claims are correlated by geographic location.
- States with larger seasonal changes have a larger change in PDT claims between cooler and warmer months.
- The reasons for seasonal claims could be theorized as:
 - Patients maximizing sunny days and refusing treatments that limit their enjoyment of outdoor activities.
 - Vacation plans, or,
 - Anecdotal taboos of getting this treatment during sunnier months.
- Cryosurgery procedural claims did not have a significant change between seasons.

References: 1. Martinez-Carpio PA, et al. *Laser Ther.* 2012;21(3):199-208. 2. Andrews MD. *Am Fam Physician.* 2004;69(10):2365-2372. 3. Farberg AS, et al. *Dermatol Ther (Heidelb).* 2023;13(3):689-716. 4. National Oceanic and Atmospheric Administration. Meteorological versus astronomical seasons. Available from <https://www.noaa.gov/news/meteorological-versus-astronomical-seasons>. Accessed Sept 8, 2023.