# Advancements in Paclitaxel delivery for breast cancer: Exploring conventional and nano-formulations

Verma V, **Khan S**, Markan R, Khatavkar V, Mishra T, Rastogi M, Gaur A, Nayyar A, Roy A, Daral S, Kukreja I

RWD63

## Background and Objective

- Breast cancer is a prevalent and life-threatening disease affecting millions of women worldwide. Paclitaxel, a potent chemotherapy drug, has shown remarkable efficacy in treating breast cancer.
- This study aims to explore the potential benefits and implications of nano-drug delivery to traditional paclitaxel delivery for breast cancer.

## Methodology

- A retrospective study using the Optum® de-identified Market Clarity Dataset (linked claims and EHR) was conducted among incident female adult patients diagnosed with breast cancer using ICD-10 diagnosis codes (C50x) between 1st October 2020 to 31st August 2022.
- The index event was defined as the first documented Paclitaxel claim within 30 days of diagnosis, and patients were categorized as receiving traditional or nano-drug delivery. Patients with 12-month pre- and post-index medical and pharmacy eligibility were included. Exclusions included patients with multiple drug delivery methods for Paclitaxel.
- Propensity score matching (PSM) (1:1 on age groups, Charlson Comorbidity Index (CCI), race/ethnicity, and line of business) was performed to remove confounders.
- Statistical significance was assessed using two sample T-test for continuous variables and Pearson chi-square test for binary variables.
- Healthcare resource utilization (HCRU), emergency room (ER) and Inpatient cost were analyzed in both the matched groups during the 12-month follow-up period.

## Results

Traditional drug delivery  Nano drug delivery

Fig 1: Patient Distribution by CCI Score

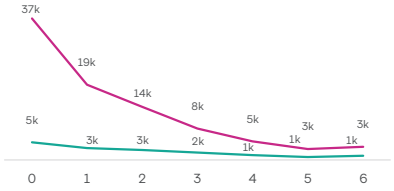



Fig 2: Top 5 Comorbidities

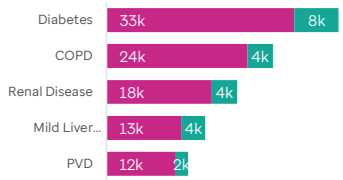



Fig 3: ER Patient Visits and Inpatient Visits

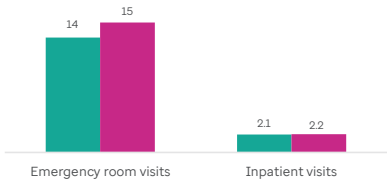



Fig 4: Inpatient Cost and ER Cost

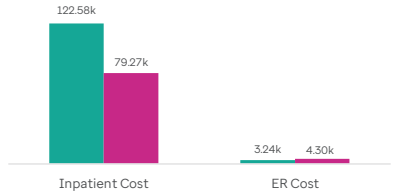



Fig 5: Inpatient cost and Inpatient Days (LOS)

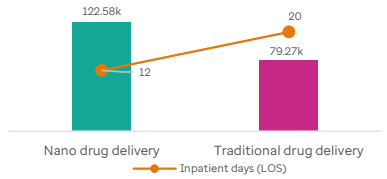
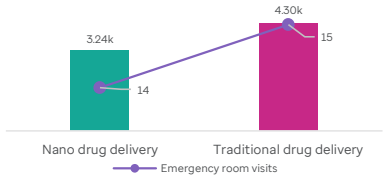



Fig 6: ER cost and ER Visits




- The study cohort comprised a total of 30,096 patients, of whom 15,048 received nanotherapy and 15,048 received traditional drug delivery for paclitaxel administration.
- The top 5 comorbidities for both traditional and nano drug delivery were diabetes, COPD, renal disease, mild liver disease and PVD. (Fig. 2)
- Patients on traditional drug delivery had higher HCRU compared to those receiving nanotherapy:
- Mean ER visits were higher for traditional (15.49, SD = 26.54 compared to nano drug delivery patients (13.71, SD = 19.08), (p<0.001). (Fig. 3)
- Mean inpatient length of stay was longer for traditional drug delivery patients (19.92 days, SD=39.25) compared to nano drug delivery patients (12.19 days, SD = 12.72, p<0.001). (Fig. 5)
- Mean ER cost was higher for traditional drug delivery patients ($4,301.63, SD = 7,710.18) compared to nano drug delivery patients ($3,237.06, SD = 7,429.06), (p<0.001). (Fig. 6)
- However, patients receiving nano drug delivery had higher inpatient costs: Mean inpatient cost was higher for nano ($122,581.28, SD = 136,419.19) as compared to traditional drug therapy patients ($79,270.92, SD = 90,083.72), (p<0.001). (Fig. 4)

## Conclusion and Limitation

- Nano-drug delivery for Paclitaxel in breast cancer patients can reduce healthcare resource utilization, including emergency room visits and hospital stays, compared to traditional formulations.
- This study highlights the adoption of nano-drug delivery systems for paclitaxel in breast cancer treatment, offering potential improvements in clinical outcomes despite an increase in inpatient cost as compared to traditional delivery.
- While our analysis did not account for disease advancement, presence of metastatic disease or the administration of other chemotherapeutic drugs in the breast cancer patients, these limitations provide opportunities for further analysis.

Optum