

# Comparative Effectiveness of a Bilayered Living Cellular Construct and a Dehydrated Human Amnion/Chorion Membrane for use in Pressure Injuries

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## INTRODUCTION

- Pressure injuries (PRIs) are at risk for infection, pain, disability and longer hospital stay, and amount to increased morbidity and mortality<sup>1,2</sup>
- PRIs are most prevalent in the ICU and the ICU is also where most PRIs are acquired (~27% and ~59%, respectively)<sup>3</sup>
- A single PRI carries a cost of patient care as high as \$151,700 and over 60,000 US individuals die due to PRIs annually<sup>4,5</sup>
- A bilayered living cellular construct (BLCC)<sup>(a)</sup>, bioengineered with living keratinocytes and fibroblasts, is FDA approved for the treatment of venous leg ulcers and diabetic foot ulcers<sup>6</sup>
- dHACM<sup>(b)</sup> is a dehydrated placental membrane marketed under Section 361 of the Public Health Service (PHS) Act as Human Cells, Tissues, and Cellular and Tissue-based Products (PHS 361; HCT/Ps).
- Electronic medical records for wound care management (WoundExpert<sup>®</sup>, NetHealth)<sup>(c)</sup> were used to evaluate the effectiveness of BLCC vs dHACM for the treatment of PRIs\*

<sup>(a)</sup>Apligraf<sup>®</sup>, Organogenesis Inc., Canton, MA  
<sup>(b)</sup>Epifix<sup>®</sup>, MiMedx; Marietta, GA  
<sup>(c)</sup>WoundExpert<sup>®</sup>, Net Health, PA

## OBJECTIVE

Real-world data (RWD) were used to conduct a comparative effectiveness analysis of BLCC versus dHACM for the treatment of PRIs.

## METHODS

### Study Population

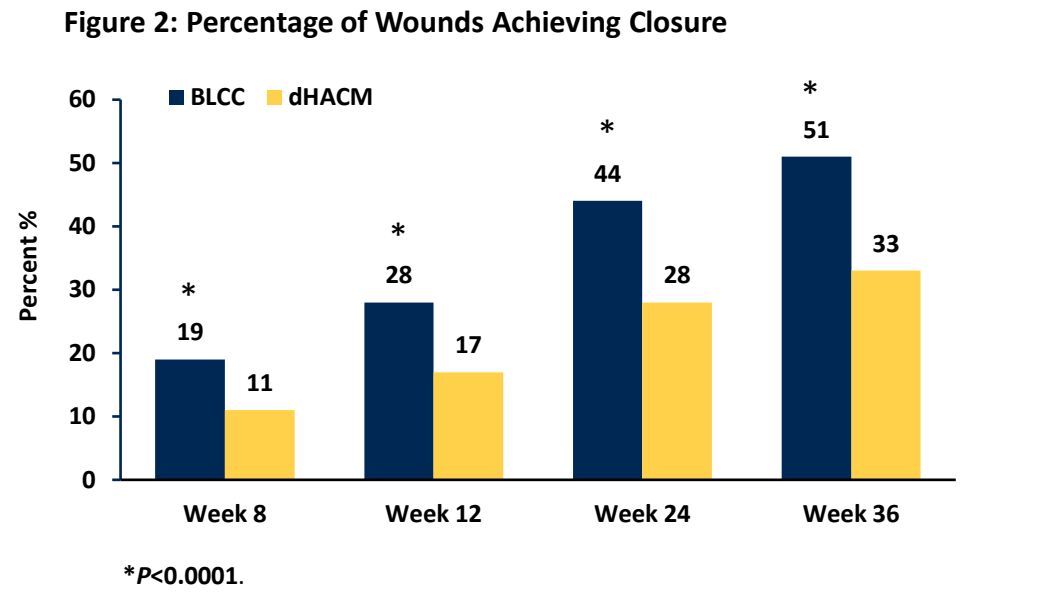
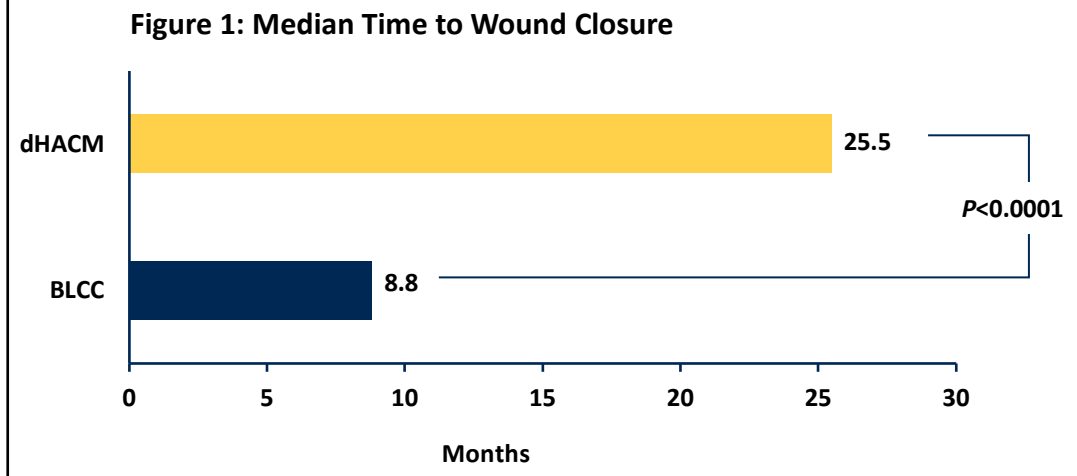
- An analysis was conducted on PRIs treated with BLCC or dHACM between 2020 and 2022 on 1,038 PRIs
- PRIs over anatomical locations (sacrum, coccyx, greater trochanter, ischial tuberosity, calcaneus, and lateral malleolus) and Stages II–IV with surface areas between 1-20 cm<sup>2</sup> were included
- Patients with no baseline wound measurements or follow-up visits were excluded

### Statistical Analyses

- Analyses were performed on 1,038 PRIs: 732 BLCC-treated and 306 dHACM-treated
- Treatment period started with the first use of BLCC or dHACM
- Cox Proportional Hazards Regression (Cox) analysis that adjusted for multiple covariates including ulcer area and duration was used to compute the percentage of PRIs with wound closure at all timepoints by or on week 36
- Kaplan-Meier analysis was used to determine the median time to closure
- Cox Hazard ratio (HR) with 95% confidence interval (CI), and P-value were determined with terms for treatment, baseline wound area, baseline wound duration, baseline wound depth and patient age at first treatment

## RESULTS

- Patient baseline demographics, wound, and treatment characteristics were comparable between groups
- BLCC treatment significantly reduced the median time to wound closure by 65.5%; P<0.0001 (Figure 1)
- Frequency of wound closure for BLCC (732 wounds) was significantly greater than dHACM (306 wounds) at week 8 (19 vs. 11%), 12 (28 vs. 17%), 24 (44 vs. 28%), and 36 (51 vs. 33%); (P<0.0001) (Figure 2)
- Cox Hazard Ratio was computed as 1.82; HR = 1.82 [95% CI (1.40, 2.37)]; P<0.0001



## CONCLUSIONS

- BLCC significantly improved the probability, frequency, and incidence of healing when compared to dHACM
- Cox adjusted survival data for wound closure showed that BLCC was superior to dHACM at 8 weeks (19 vs 11%), 12 weeks (28 vs 17%), 24 weeks (44 vs 28%), and 36 weeks (51 vs 33%)
- Treatment with BLCC increased probability of healing by 82% compared to dHACM throughout the period of observation; HR = 1.82 [95% CI (1.40, 2.37)]; P<0.0001
- This difference between groups in median time to wound closure demonstrated 65.5% reduction with the use of BLCC; P<0.0001
- These data may help guide PRI treatment practices. BLCC RWD in PRIs showed consistent results when compared to data from pivotal RCTs that supported FDA approvals in VLU and DFUs<sup>7,8</sup>

## REFERENCES

- Li Z, Lin F, Thalib L, Chaboyer W. Global prevalence and incidence of pressure injuries in hospitalised adult patients: A systematic review and meta-analysis. *Int J Nurs Studies* 2020;105:103546.
- Chung M-L, Widdel M, Kirchoff J, et al. Risk factors for pressure injuries in adult patients: a narrative synthesis. *Int J Environ Res Public Health*. 2022;19(2):761.
- DecubICUs Study Team, European Society of Intensive Care Medicine, and Trials Group Collaborators. "Prevalence, associated factors and outcomes of pressure injuries in adult intensive care unit patients: the DecubICUs study." *Intensive Care Medicine* 47.2 (2021): 160-169.
- Internet Citation: 1. Are we ready for this change?. Content last reviewed October 2014. Agency for Healthcare Research and Quality, Rockville, MD. <https://www.ahrq.gov/patient-safety/settings/hospital/resource/pressureulcer/tool/pu1.html>
- Mervis JS, Phillips TJ. Pressure ulcers: Pathophysiology, epidemiology, risk factors, and presentation. *Journal of the American Academy of Dermatology*. 2019;81(4):881-890.
- Apligraf [package insert]. Canton, MA: Organogenesis Inc.; 2017.
- Falanga V, Sabolinski M. A bilayered living skin construct (APLIGRAF) accelerates complete closure of hard-to-heal venous ulcers. *Wound Repair Regen*. 1999;7(4):201-207.
- Falanga V, Margolis D, Alvarez O, et al. Rapid healing of venous ulcers and lack of clinical rejection with an allogeneic cultured human skin equivalent. *Human Skin Equivalent Investigators Group. Arch Dermatol*. 1998;34(3):293-300.

## Disclosures

Oscar Alvarez, PhD and Michael Sabolinski, MD are paid consultants for Organogenesis Inc.

\*De-identified patient data released to Organogenesis, Inc. was consistent with the terms and conditions of Net Health's participating client contracts and the requirements of the Health Insurance Portability and Accountability Act of 1996 (HIPAA). Net Health was not involved in any way in the analysis, interpretation, or reporting of the data.