



# Changes in wound bacteria undergoing weekly sharp debridement among individuals with chronic venous leg ulcers

Junglyun Kim, PhD<sup>1,2</sup>, Joyce Stechmiller, PhD<sup>2</sup>, Michael T Weaver, PhD<sup>2</sup>, Magali Rezende de Carvalho<sup>2</sup>, & Debra E Lyon, PhD<sup>2</sup>

1. Chungnam National University College of Nursing; 2. Department of Biobehavioral Nursing Science, University of Florida College of Nursing; 3. University of Alabama Capstone College of Nursing

## Objective

- This study aims to describe changes in wound bacteria among individuals who received weekly sharp debridement for 8 weeks.

## Background

- Approximately 1% to 2% of the population in the United States suffers from venous leg ulcers, which cause \$1 billion in healthcare costs.
- Venous leg ulcers tend to be chronic and recur more often among wounds.
- Sharp debridement of the wound is recommended for the treatment of chronic wounds. However, a meta-analysis reveals that the evidence for the effectiveness of debridement in venous leg ulcers is limited.
- Nevertheless, no study has described changes in wound bacteria during sharp debridement over the course of the treatment period. It is necessary to understand how wound bacteria change over time under sharp debridement to provide concrete evidence to assist the practice.

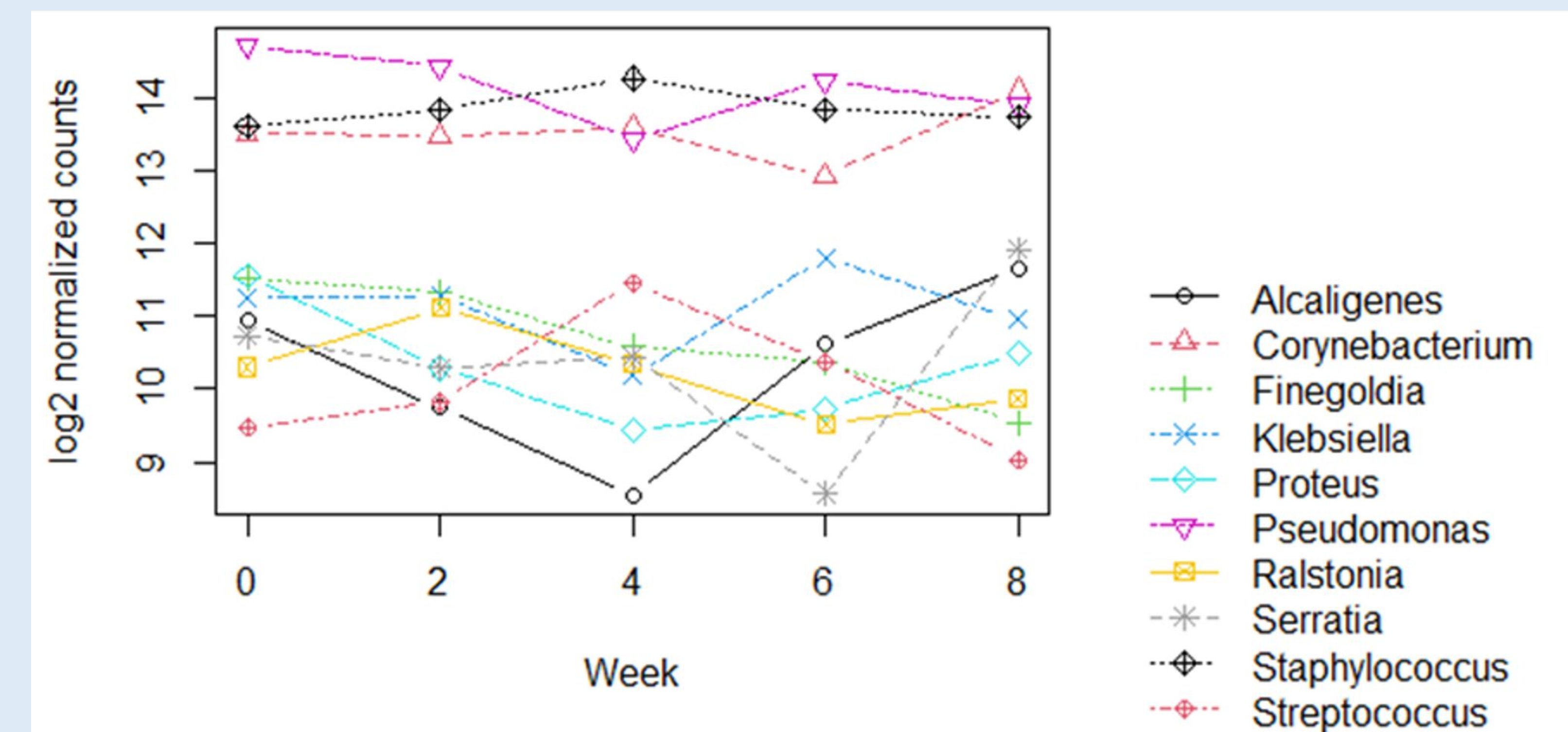
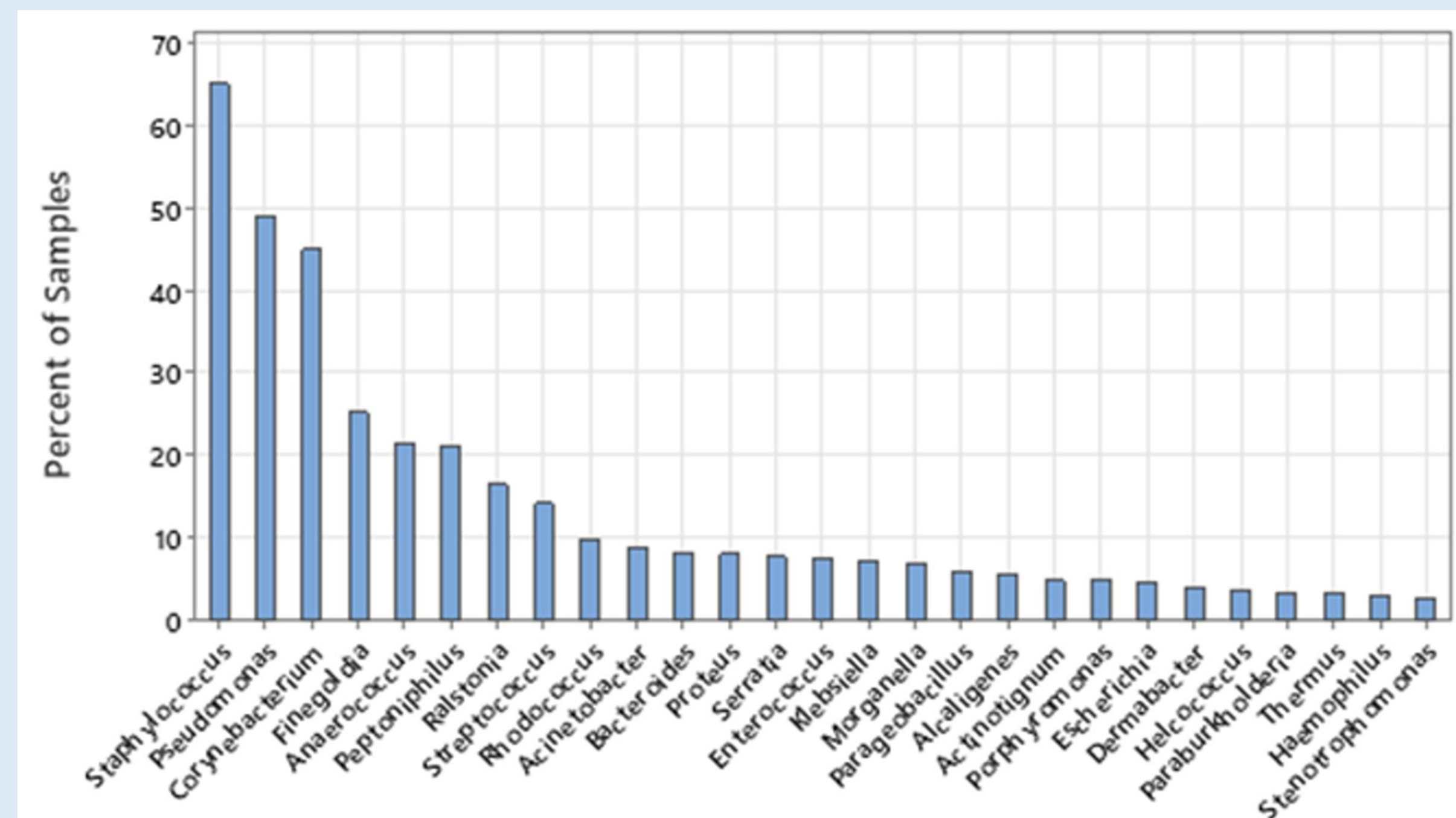
## Methods

- Subjects who received weekly sharp debridement at a wound clinic were enrolled between 2018 and 2022.
- Debrided wound tissue was collected every two weeks during the 8-week study period.
- Bacterial identification from wound tissue was performed using 16S rRNA sequencing.
- The DESeq2 package in R version 4.2.0 was employed to analyze differential expression in the sequence data across the study weeks.

Table 1. Participant characteristics (N=117)

Age	71.7 (9.6)	55 - 92
Wound Duration (days)	321 (499)	20 - 2944
BMI	34.1 (11.9)	15.4 - 84.1
Antibiotic Use		
No	46 (39%)	
Yes	71 (61%)	
Sex		
Male	64 (55%)	
Female	53 (45%)	
Race		
White	94 (80%)	
African-American	23 (20%)	
Week Healed <sup>1</sup>		
2	7 (6%)	
4	9 (8%)	
6	15 (13%)	
8	16 (14%)	
Not Healed	70 (60%)	

Note: <sup>1</sup> Does not sum to 100% due to rounding.



## Results

- A total of 585 wound tissue samples were collected from 117 subjects at five time points over eight weeks (baseline, 2, 4, 6, and 8 weeks).
- The final analysis included 345 wound tissue samples from 107 subjects.
- The genera Staphylococcus, Pseudomonas, and Corynebacterium exhibited the highest expression levels throughout the eight-week study period, including at baseline.
- Alcaligenes demonstrated a statistically significant 93% increase in expression compared to baseline.
- Finnegoldia and Pseudomonas showed the largest decreases in expression, with reductions of 9.8% and 11.1% per week, respectively, resulting in overall decreases of 56% and 61% over eight weeks (adjusted  $p < .05$ ).

## Discussion/Conclusion

- Weekly sharp debridement effectively reduced Finnegoldia and Pseudomonas, but did not reduce Staphylococcus. In contrast, Alcaligenes had a 93% increase in expression.
- The results indicate that weekly sharp debridement effectively eliminates anaerobic bacteria while not affecting facultative anaerobes, such as Staphylococcus, or aerobic bacteria, such as Alcaligenes.
- To reduce pathogenic bacteria in chronic wounds, additional treatments (e.g., bacteriostatic or antibiotic dressings) should be combined in the treatment strategy.

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