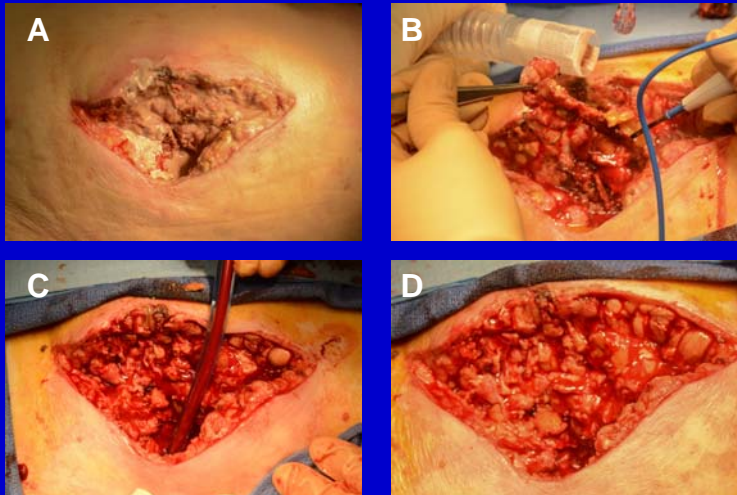


# Defining Outcomes for Clinical Wound Research in Older Adults

February 21, 2014

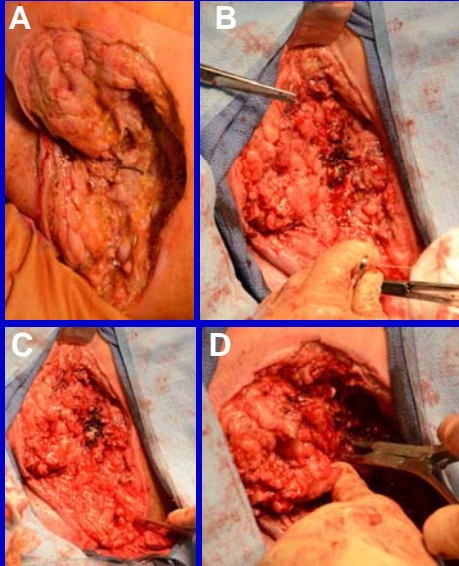
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## 2/4/14: What is a typical day in geriatric surgery for wound healing patients?



90 year female who presented to emergency room with " stage III pressure ulcer"  
Blood culture was positive for enterococcus. She had Systemic Inflammatory Response Syndrome. Wound culture: MRSA.

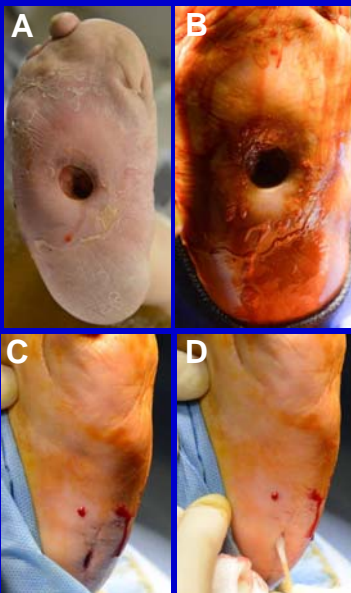
**2/4/14: What Are Clinical Signs of Delayed Healing?  
Are Pain, Drainage, and Cellulitis Potential Harbingers of SIRS ?**



**Sacral bone  
culture grew VRE,  
pseudomonas,  
and E. Coli.**

**Bone pathology:  
“viable bone with  
three lineage bone  
marrow  
hematopoiesis”**

**2/4/14: A typical day in geriatric surgery. From a research  
perspective can these wounds be standardized?**



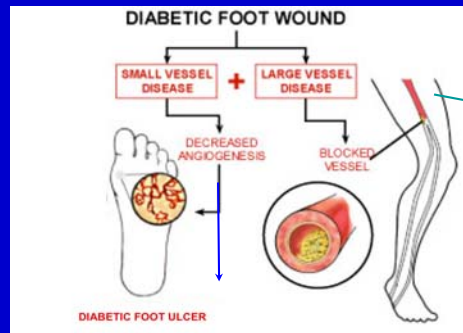
**68 year woman with  
“diabetic foot ulcer”  
Soft tissue culture,  
Bone and right lateral  
“surgical” wounds both  
grew  
pseudomonas  
and MRSA**

**2/04/14: How do we improve outcomes for venous insufficiency ulcers in older adults?**



**74 year female with left posterior leg venous reflux ulcer, infected tendon and radiation injury**

**Ischemic Ulcers in Older Patients Require Answers to Multiple Specific Research Questions Including: Is It Necessary to Vascularize Infrapopliteal Atherosclerotic Disease? Use of Stem Cells?**



**Ischemic Ulcer: Secondary To Peripheral Arterial Disease**

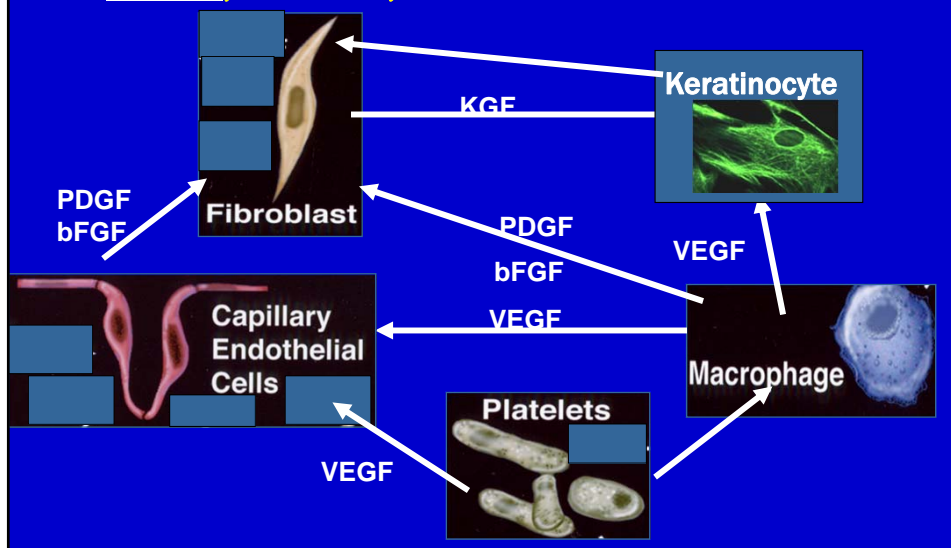


## Outcomes: What Data is Collected?

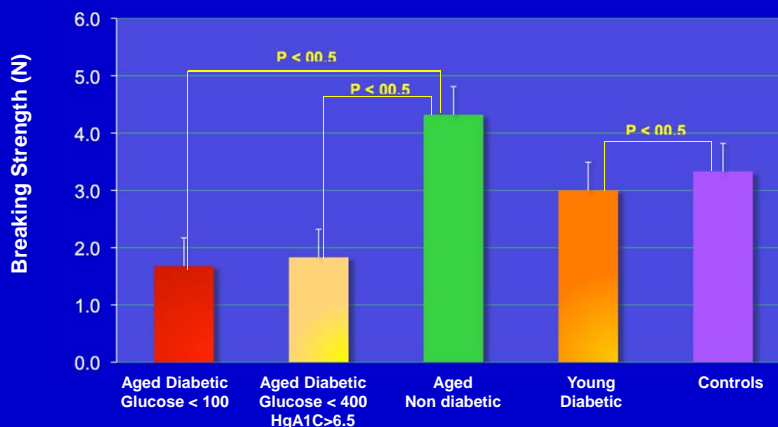
- 1) Incidence and healing rate of decubiti
- 2) Time to healing
- 3) Admission and readmission rate
- 4) Morbidity
- 5) Unplanned Mortality
- 6) Unplanned minor & major amputations

Visit Date	Number of Wounds	PU total	PU I	PU II	PU III	PU IV	DF	VSU	Art	Surg	Other	Non-Healing Wound	Percentage of HEALING
July 1	155	31	1	10	7	13	21	74	25	2	2	6	96.10%
July 8	139	24	1	3	1	19	7	83	18	3	4	8	94.20%
July 15	134	23	1	4	1	17	12	69	16	3	11	10	92.50%
July 22	128	12	0	1	2	9	5	80	20	4	7	11	91.40%
July 29	147	28	0	4	3	21	12	76	21	4	6	8	94.60%
JULY TOTALS	703	118	3	22	14	79	57	382	100	16	30	43	93.90%

## What is the Physiological Basis for Cell and Growth Factor Therapy? What is the Current Clinical Efficacy of Commercially Available Growth Factors such as bFGF, GMCSF, PDGF-BB, for Older Patients With Wounds?



## Does Diabetes and Ageing Result in a Synergistic Impairment in Healing?



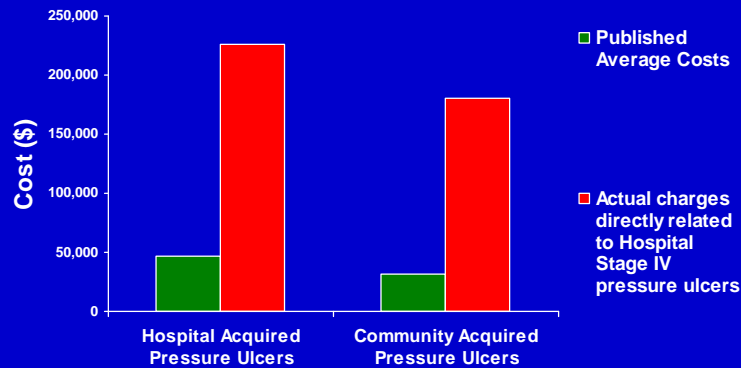
*Brem H et al, The synergism of age and db/db genotype impairs wound healing, Exp. Gerontol. 2007; 42:523-31.*

## Is it the Bacteria that Progress so Rapidly in Elderly Adults or Lack of Recognition Early on of the Infection ?

**Necrotizing  
Infection at  
Fascia and  
Muscle  
Layers**



## How Much Do Non-Healing Wounds in the Elderly Cost the Hospital? Costs Come From Morbidity of Ulcers



Brem et al., High cost of stage IV pressure ulcers. *Amer J Surg* 2010; 200:476-477.

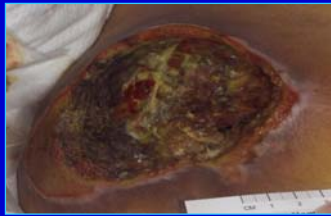
## Can we Establish Goal of Healing for All Older Adults Upon Presentation?



Brem H, Tomic-Canic M, Tarnovskaya A, Gill K, Ehrlich HP, Carasa M, Weinberger S, Baskin-Bey E, Entero and Vladeck B.

Healing of Elderly Patients with Diabetic Foot Ulcers, Venous Stasis Ulcers, and Pressure Ulcers. *Surg Technol Int* 2003;XI:161-167.

## Can Stage IV Pressure Ulcers Heal? Can Patients Heal in Presence of Multiple Comorbidities? Hospice or Healing Should be Initial Conversation in the Older Adult

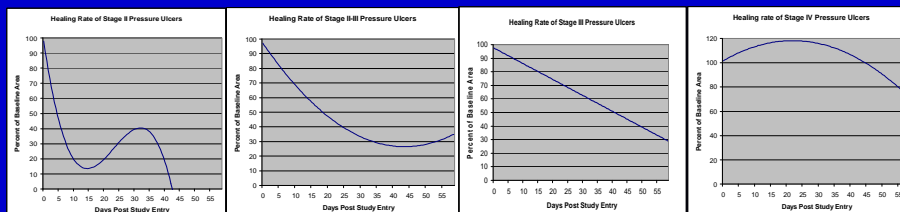


Schiffman et al, Operative debridement of pressure ulcers using the Wound Electronic Medical Record. World J Surg 2009; 33:1396-1402.

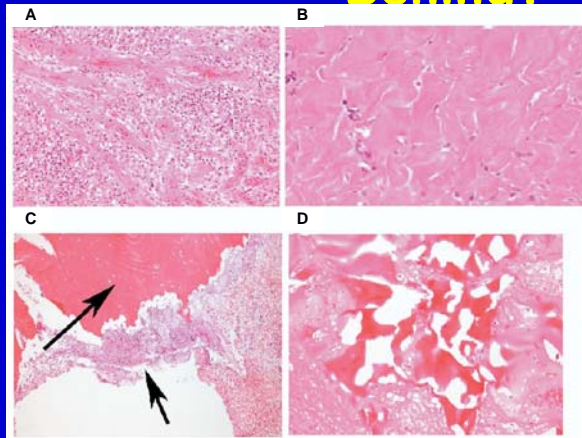
## Can Early Treatment and Following Protocol Halt Progression of Pressure Ulcers (N=150), using an Electronic Medical Record in Hospitalized Patients?

MH50 = the time interval over which wound area decreases by 50%

Stage III- MH50 = 41 days  
Stage IV- MH50 = 66 days



# What Is the Importance of Pathology of the Tissue Left Behind?



- A. Granulation tissue
- B. Fibrosis
- C. Osteomyelitis
- D. Reactive bone

Golinko et al. Operative Debridement of Diabetic Foot Ulcers. *J Am Coll Surg* 2008; 207:e1-e6.

# How Can Clinical Decision Support Improve Healing Rates for Pressure Ulcers?

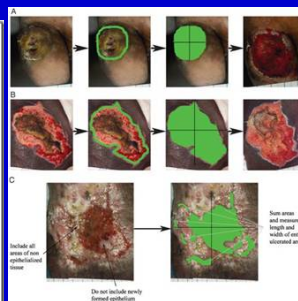


Figure 2. Uses standardized methods for wound photography and measurement

Figure 1. Provides patients and clinicians with a printed data summary to track healing progress

Rennert et al. 2009. Standardization of wound photography using the Wound Electronic Medical Record. *Advances in skin & wound care* 22: 32-38.



## **Deep Gratitude to a Group of Brilliant and Tireless Collaborators Here Today**

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- Theresa Jones. MD
- Robert Kirsner MD, PhD
- David Margolis MD, PhD
- Irena Pastar. PhD
- Olivera Stojadinovic, MD
- Marjana Tomic-Canic, PhD

## **Future: Goals of Outcomes Based Research for Older Adults With Wounds**

- Defining Hospital Based Wound Healing in the Elderly: Centers of excellence: Outcomes: Pain, Quality of Life, Readmission, Mortality, Prevention of Other Co- morbidities such as Renal and Heart failure
- Treatment of Sepsis in Older Patients who Have Wounds
- Prevent Amputation and Mortality
- Minimally Invasive Revascularization
- Hospice versus Healing
- Treatment of Osteomyelitis and Ischemia in Older Adults
- Use of Clinical Decision Support for **Patients** and Clinicians
- Regenerative Medicine (Cells, Growth Factors, Hyperbaric Oxygen, in Combination to Decrease Amputations and Heal Ulcers)
- Multi Center Clinical Trials in Real Time