

**02/05/15**  
**PRESENTATION:**  
**ECONOMIC**  
**IMPACT OF**  
**VITIAMIN D**  
**DEFICIENCY**

<TARGET><BILL></BILL><SUBJECT>02-05-15 PRESENTATION  
ECONOMIC IMPACT OF VITIAMIN D  
DEFICIENCY</SUBJECT><COMM>HHSS29</COMM></TARGET>

# Economic Impact of Vitamin D-Deficiency

L. Ray Matthews, M.D., FACS  
Associate Professor of Surgery  
Director of SICU

*Morehouse School of Medicine  
Department of Surgery*

*\* No Disclosure \**

## Disclaimer:

The following presentation includes images  
of a medical nature, including traumatic  
wounds

# Objectives

- Understand that vitamin D is a true hormone
- Recognize that vitamin D has a significant impact on the economic health of Alaska and every state
- Know that addressing the most common nutritional deficiency in the world yields big dividends-More Money!



**Chairman of the Joint Chief  
of Staff  
Raymond T. Odierno**

**Ft. McNair  
January 2014**

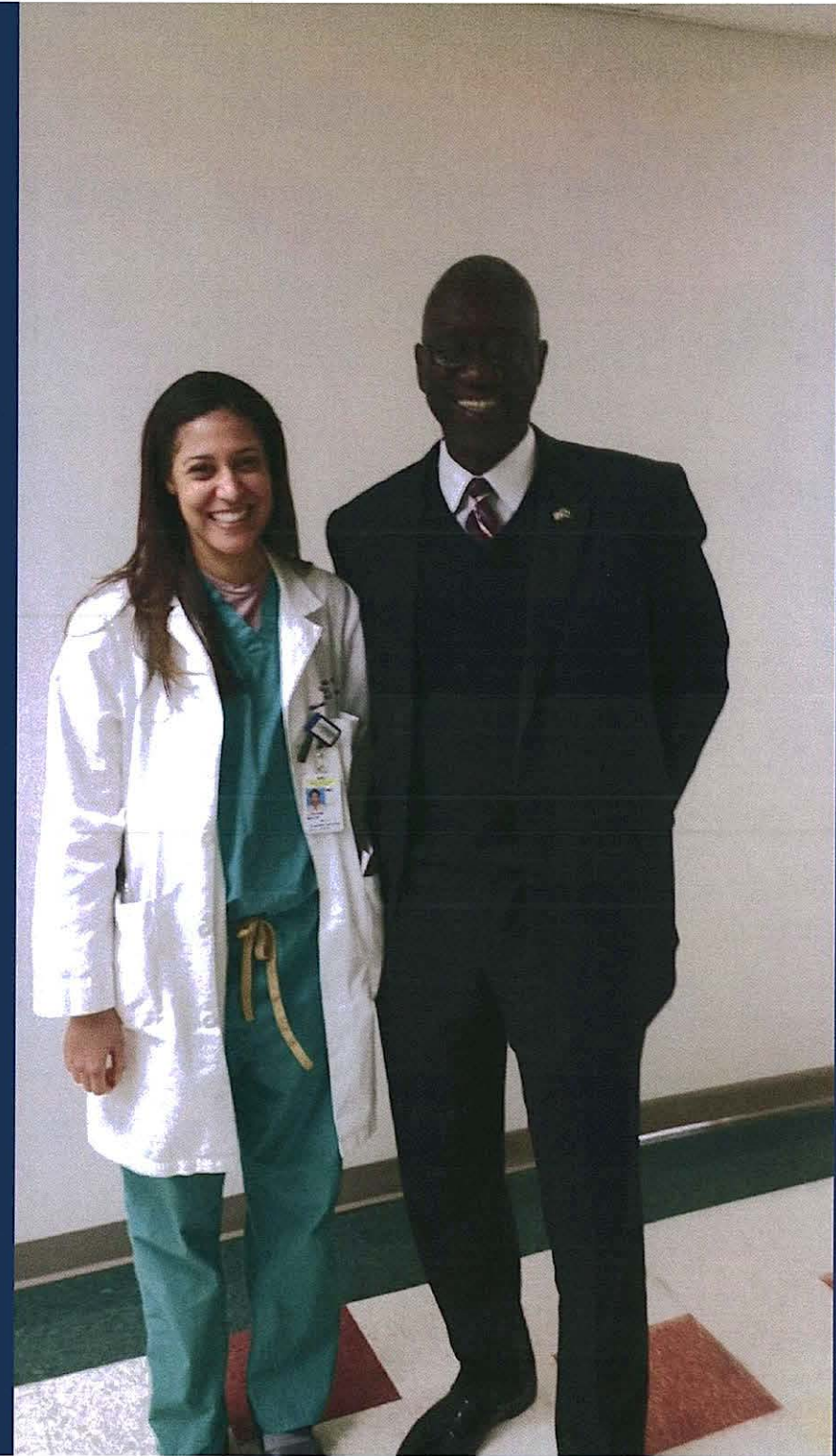


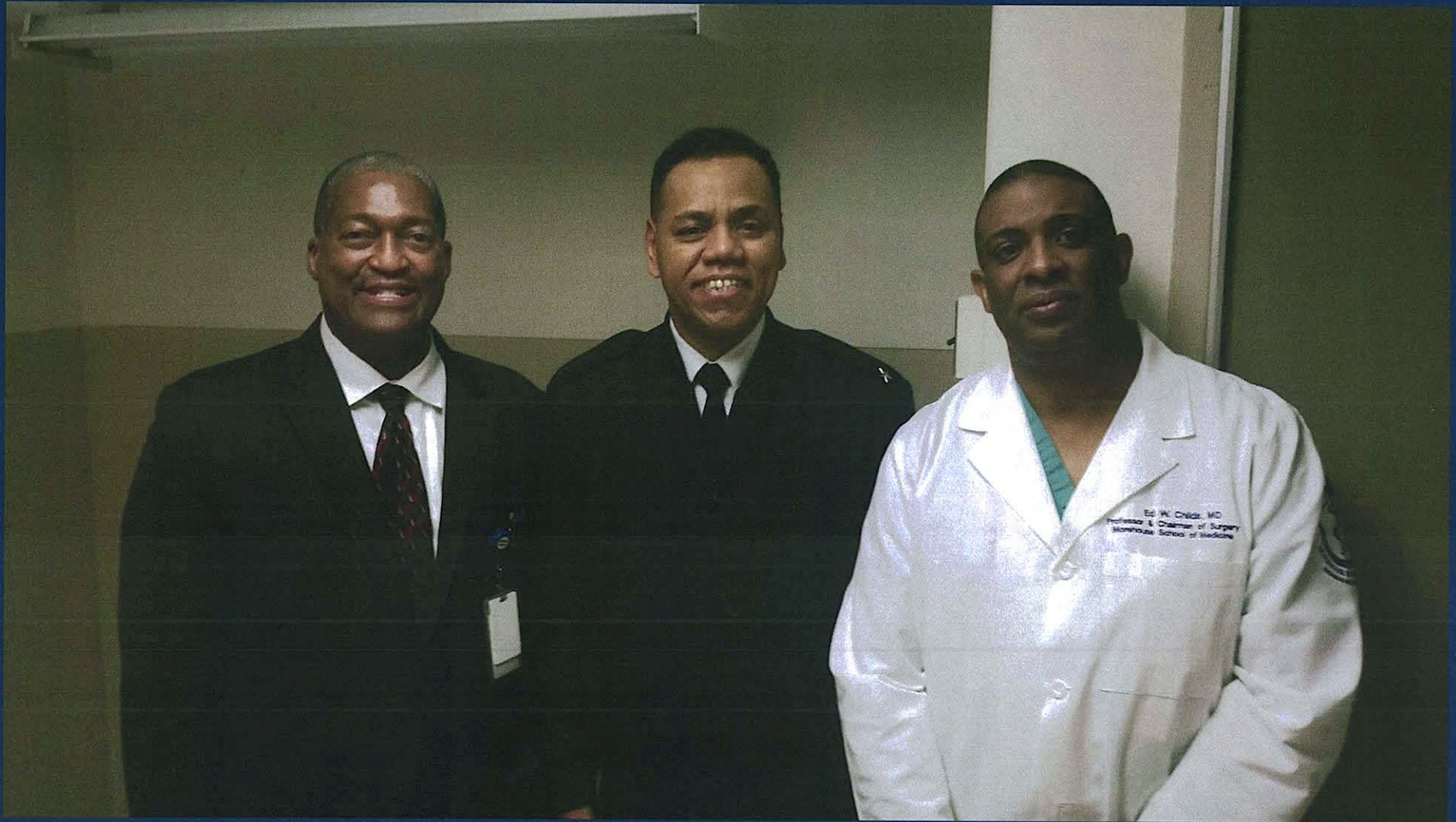
**Vice Chair Joins Chief of  
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**Ft. McNair  
January 2014**

**Major General (Retired)  
Abraham Turner**

**Grady Memorial Hospital  
January 2014**





**Brigadier General Smith  
Grady Memorial Hospital  
December 2013**

# Vitamin D Talk at FDA

## February 20, 2014



# Vitamin D Talk at FDA

## February 20, 2014



# Grady Memorial Hospital



# Vitamin D Deficiency in Animals



Photo courtesy of Irlbeck (CSU)

# Vitamin D Deficiency in Animals

Soft Egg Shells

Reduced Growth

Leg Weakness



Photo courtesy of Irlbeck (CSU)

# 32<sup>nd</sup> Degrees of Latitude

Background:



# Vitamin D Deficiency

## Background:

- Steroid hormone
- Receptors (VDR) on most cells/tissues in the body
- Controls the expression over 3,000 human genes  
*(only 30,000 human genes)*
- Plays role in immune modulation:
  - \*T-cells → Activation
  - \*Macrophages → antimicrobial proteins

# Risk Factors for Vitamin D-Deficiency

1. Dark skin/melanin/African Americans-  
Decreases vitamin D production 98%  
3x-10x longer in sun than Caucasians
2. Obesity-Vitamin D stored in fat cells
3. Age-70-year olds produce 25% vitamin D as a  
21 year old person  
skin/cutaneous production
4. Breast Feeding-Human milk provides only 25  
International units/Liter of Vitamin D

# Risk Factors for Vitamin D-Deficiency

5. Medications-Steroids, transplant meds, seizure meds, HIV meds
6. Nursing home patients/prisoners-Decreased sun exposure
7. Vegetarians-Vitamin D in fatty fish
8. Inflammatory bowel disease (IBD)
9. Malabsorption syndromes
10. Living above 32<sup>nd</sup> latitude (Atlanta-Scottsdale, Arizona)

# Risk Factors for Vitamin D-Deficiency

11. Pregnant women-Feeding two people
12. Athletes in indoor sports (Basketball, football)
13. Sunscreen-Blocks 98% vitamin D production
14. Season and time of day-Need sun at 90° angle to make vitamin D
15. Skin grafts for burns
16. Liver failure
17. Nephrotic syndrome

# Risk Factors for Vitamin D-Deficiency

18. Chronic kidney disease
19. Dietary- 70% Americans lactose intolerant
20. Indoor living/working/technology
21. Umbrellas/clothes that cover entire body
22. Acute illness/hospital patients-Vitamin D level drops 50% within 24 hours of acute illness/trauma
23. Primary hyperparathyroidism
24. Hyperthyroidism

## Vitamin D Deficiency

### Background:

- Innate Immunity ↑
- Adopted Immunity ↓
- Plays role Inflammation Biomarkers

\*IL-6  
\*TNF  
\*CRP } Down regulation

- Regulates calcium & phosphate absorption
- Sun & Wave length Specific: UVB(280-320nm)

# Vitamin D Deficiency

## Background:

## Diseases Associated with Vitamin D- Deficiency:

- 17 different cancers(breast, prostate, colon,lung,renal)
- Cardiac disease(CHF, arrhythmias, CAD), hypertension, strokes
- Osteoporosis, rickets, Chronic pain/fibromyalgia, osteoarthritis
- Muscle weakness/falls in elderly patients
- Parkinson's disease, dementia, Cognitive/mental functioning
- Multiple sclerosis
- Depression/schizophrenia
- Colds, flu
- Weight loss, hair loss, Skin damage, acne
- Tuberculosis

# Vitamin D Deficiency

## Background:

- US  $\longrightarrow$  80% deficient (264 million)
- 80% of hospitalized patients deficient
- 80% of nursing home patients deficient
- Levels Drop 20-30% in winter months (Winter blues)
- Zero production Nov-Mar (32<sup>nd</sup> latitude, Atlanta)

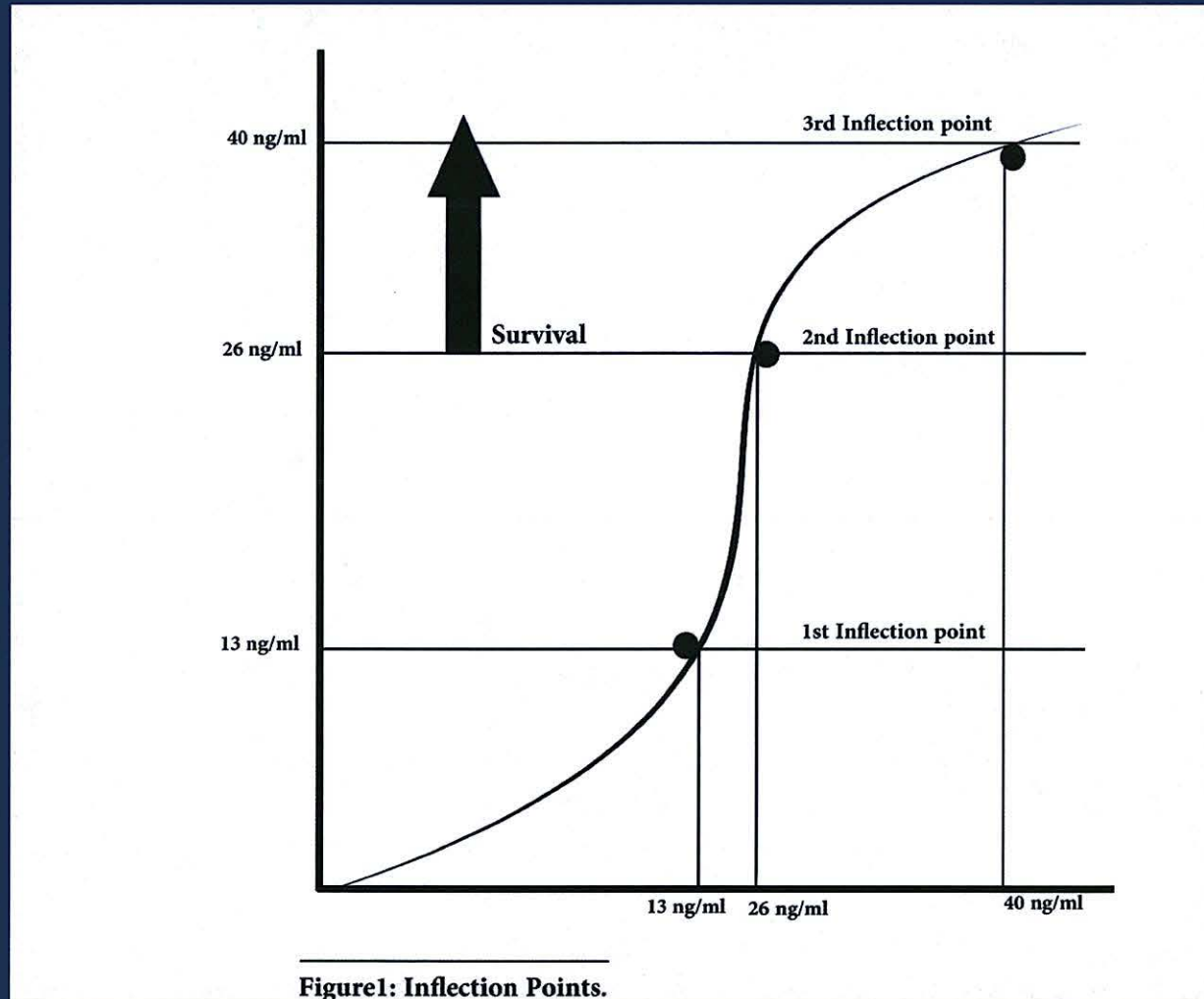
***GOD'S MIRACLE VITAMIN***

*Safe*

*Cheap*

*Effective*

# Matthews, Danner, and Ahmed Vitamin D Deficiency Scale



# All- Cause Mortality

## Meta- analysis:

18 independent randomized controlled trials with 57,311 participants with mean dose of 528 IU followed for average of 5.7 years.

The summary relative risk for mortality from any cause was 0.93.

(95% CI, 0.87-0.99)

# Vitamin D Deficiency and Health Care Reform

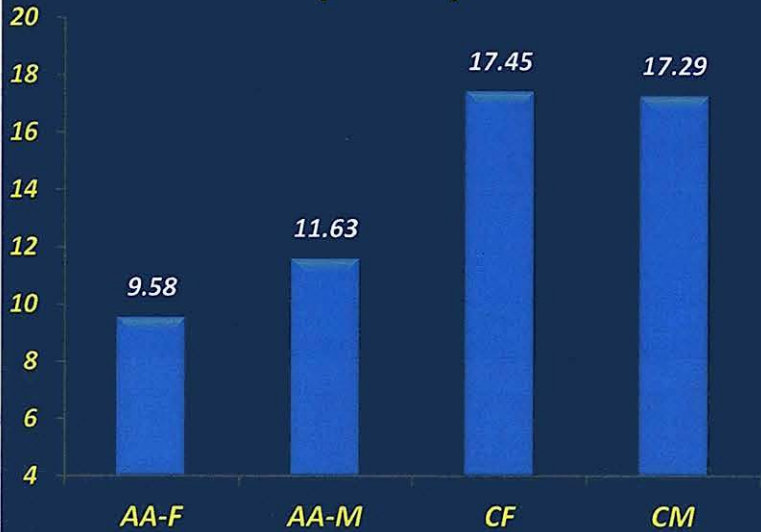
- You can't talk seriously about health care reform unless you address vitamin D deficiency in the U.S. population.
- Nutrition plays a very important role in human health.
- Vitamin D 2,000- 5,000 IU daily.

# Vitamin D Deficiency

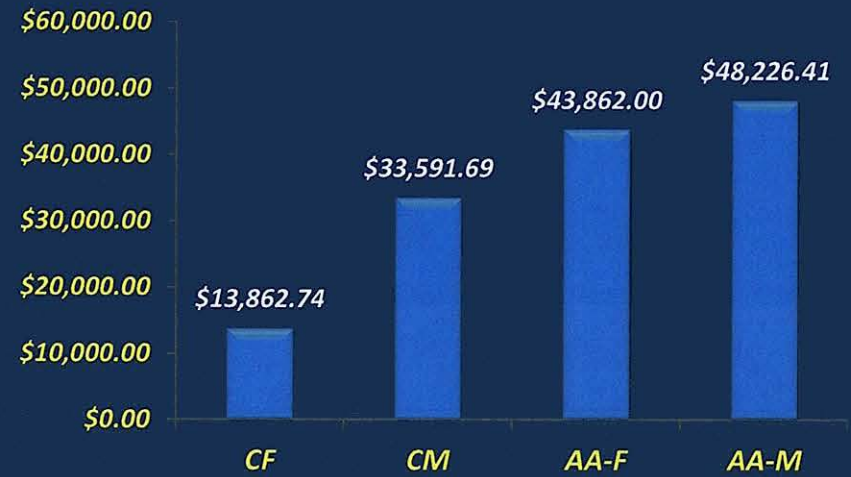
## Results:

Figure 6: Race & Gender Comparison

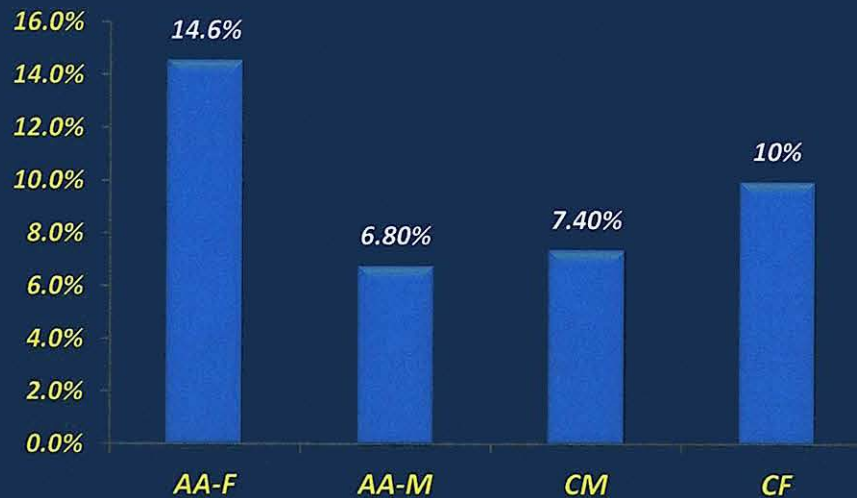
Vitamin D Level (N=195)



SICU Cost (N=195)



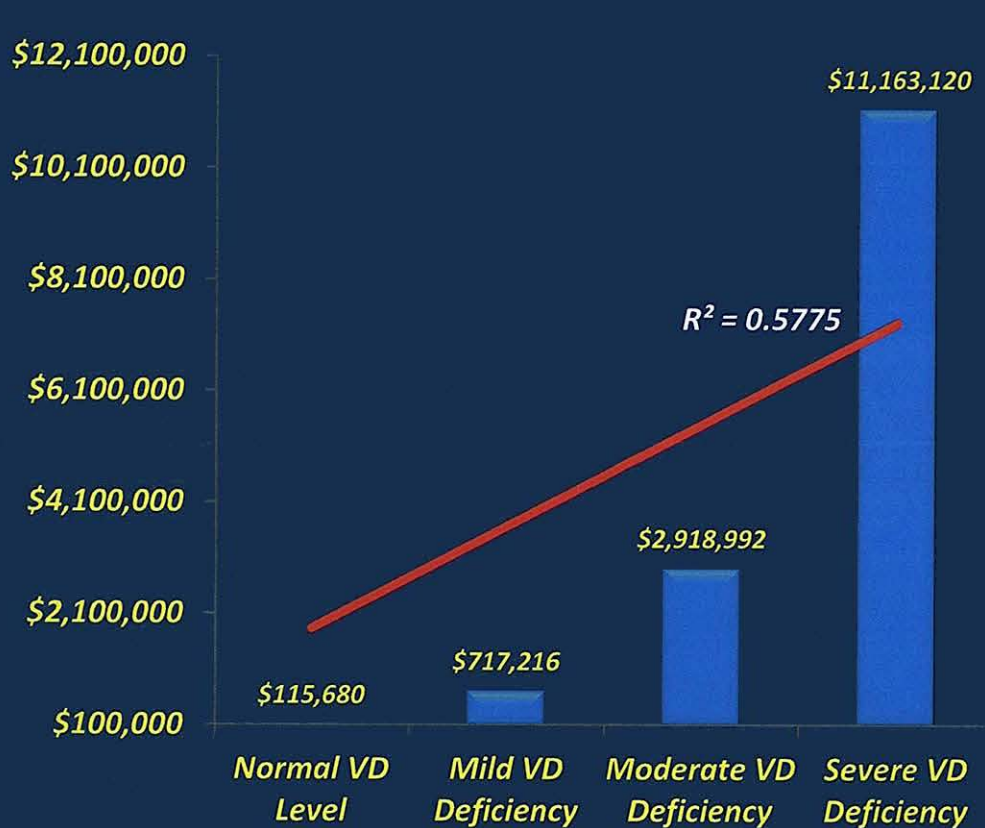
Mortality Rate (N=17)



# Vitamin D Deficiency

## Results:

**Figure 5: Overall Hosp Cost 08/2009-08/2010**

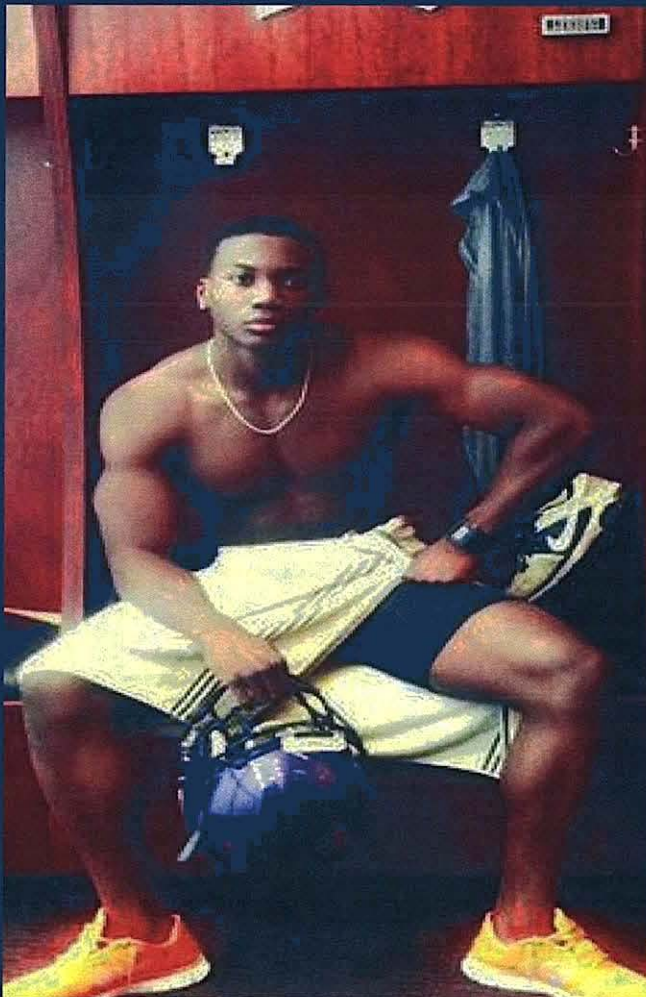


**Overall ICU Cost 08/2009 - 08/2010**



# Vitamin D Improves Athletic Performance

Jordan Moore Wins Georgia State High School , Boys 5-A,110-Meters High Hurdles Championship 2010, 2011, 2012  
Big 12 Conference Champ 60 & 110 Meters Hurdles  
Broke or Tied 4 TCU School Records



2% Body Fat

Height: 6'3"

Weight: 221 lbs

Runs 40 yard dash in 4.3 seconds

Bench press-440 lbs

Squat press-540 lbs

# Clinical Relevance of Optimizing Vitamin D Status in Soldiers to Enhance Physical and Cognitive Performance



*Laurel M. Wentz, PhD; Jerad D. Eldred, 18D; Michael D. Henry, MD;  
Cristóbal S. Berry-Cabán, PhD*

Journal of Special Operations Medicine Volume 14, Edition 1/Spring 2014

# Vitamin D Improves Athletic Performance



- MLK Girls 2011 Georgia 5A Track Champions
- 4 X 100 time of 45.42 fastest in U. S. in Spring 2012
- Receiving track scholarships at top SEC schools
- DJ Polite Bray 200 meters state champ 2012

# Errol Robinson

## Ole Miss Short Stop



- A rare prospect at this level, Errol is already a superb second baseman and shortstop—so good in the field that he'd be able to play solidly on professional dirt up the middle already.
- His fielding embodies the descriptor *acrobatic*.
- An everyday shortstop this season after manning second last year, he has shown freakish lateral range, covering large tracts to both his glove and arm side.
- Errol Robinson's Hometown is Boyds, Maryland

Errol Robinson was named to the initial Brooks Wallace Award Watch List.

# Josh Outlaw



Outlaw is 6'4", 290 pounds of lean, mean muscles.

- Josh Outlaw, MLK High School graduate and Texas Tech offensive lineman (right tackle) was a Semper Fidelis All-American.
- The talented, decorated, and athletic Outlaw can play guard and tackle positions on both sides of the ball.
- Big, bad, and very swift on his feet, Outlaw has a swagger to match his athletic skills. He is a fearless team leader.

# Academic Performance



Since 2007, Serve First has adopted a group of schoolchildren in rural Mississippi with the goal of helping to nourish students who

school <sup>physi</sup> they have on Friday will be the last full meal they'll have until the <sup>development.</sup> following Monday.  <sup>Oftentimes,</sup>

In two year's time, school officials have reported a drastic drop in student absences. While a total of 1,992 abs was recorded in 2005, that number dropped to just 92 in 2007.

# Academic Performance

## First Take

First Take is the name of my favorite album from one of my favorite singers. This is the online journal of Ben Guest.

Friday, July 19, 2004

## Level One to Level Four

Here's a 2004 article about another Delta school that jumped up a few levels (hat tip to Cathy Hayden).

### School rebounds 3 levels in 1 year

·Maintaining staff key to staying at Level 4, says Ruleville principal

By Cathy Hayden chayden@clarionledger.com

RULEVILLE - Test scores at Ruleville Central Elementary in Sunflower County made an impressive rebound in just one year, going from rock bottom to just one rating from the top.

But maintaining the high scores will depend on the school's ability to retain its staff, said eight-year veteran Principal Bessie Gardner.

In 2002-03, "we had three people quit in fourth grade," she said of the school that had respectable but not stellar test scores until spring 2003. "That's what caused us to go on probation. It wasn't that teachers weren't teaching, but it was instability in the grades where we really needed it.

"We corrected that. ? If we get stability, we'll be able to maintain" Level 4, she said.

Scores in reading, language and math at the 400-student school were so low in spring 2003 the state rated it among the 10 worst-performing schools in Mississippi.

After spring 2004 state tests, the school is now rated exemplary and is no longer pegged to get intensive state guidance and extra federal dollars.

Making such a change is a difficult task for many schools in the Mississippi Delta, where keeping teachers has been a chronic problem for many years.

# Vitamin D Improves Academic Performance



- 31 out of 36 on ACT
- 3.6 GPA
- Starting quarterback Morehouse College
- 98% High School 4 year graduation rate since 2011 (Georgia 68% graduation rate)
- 2011/2012-25 football scholarships
- 2012/2013-24 football scholarships
- 2013/2014- >20 football scholarships
- 3 Seasons-2 Concussions

# Jordan Moore, 3 weeks after right ACL reconstruction surgery (12/21/12)



- Off crutches 5 days
- Minimal post op swelling gone less than 2 weeks
- Able to flex to 90% at 3 weeks
- Light weight lifting at 3 weeks
- Out of knee brace 4 weeks

## Healthy Champs

# Parents encourage MLK athletes to boost performance with Vitamin D nutrition program

In DeKalb County, Martin Luther King Jr. High School has produced an impressive sports resume over the past 2 years. Consistently taking home titles as state champions and producing a number of stand-out athletes, the MLK Lions have dominated on the football field and the track field. What's their secret? Along with coaching and rigorous practice, the Lions attribute their achievements to nutrition and a daily regimen of Vitamin D.

Two years ago, the parents' Booster Club incorporated vitamin D as part of the nutrition program for MLK's sports teams on the advice of Dr. L. Ray Matthews, who is director of Morehouse surgical critical care at Grady Hospital in Atlanta and a vitamin D researcher. MLK Head Coach Michael Carson, MLK Booster Club President Tony Sylvester, and Rev. B.T. Moore all noted that many MLK athletes were malnourished.

"Most of these students were not receiving a meal from the time they left school until they returned to school the next day," says Coach Michael Carson.

With advice from Dr. Matthews, a "parent-led" nutrition program was started that included feeding the athletes balanced meals every Thursday and Friday afternoon. The Booster Club parents were responsible for overseeing every aspect of the nutrition program—from hiring the caterer to serving the meals themselves.

"As parents, we wanted to make sure the kids received a healthy meal, especially the day before and the day of the game. I personally made sure that my son ate a nutritious meal. He took his vitamin D everyday and so did I," said Corey Tibbs, whose son, Blake, was selected for the CSS High School All-Star Team because of his outstanding performance as a wide receiver.

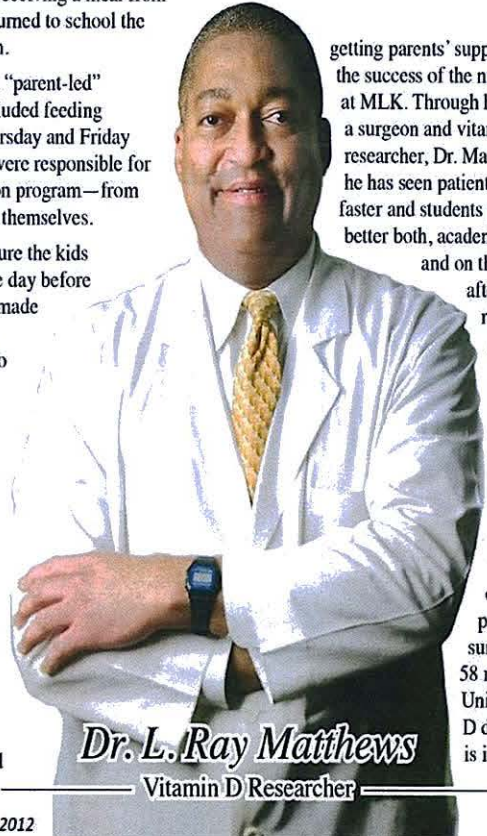
Tibbs said he read a lot of information on his own about vitamin D before the Booster Club started its nutrition program.

"When Dr. Matthews spoke with us, he validated much of what I had already read," Tibbs said.

Dr. Matthews, who as been researching vitamin D since 2007, said



MLK quarterback Jonquel Dawson (No. 5) with Coach Mike Carson and UGA-bound wide receiver Blake Tibbs.



**Dr. L. Ray Matthews**  
Vitamin D Researcher

getting parents' support was key to the success of the nutrition program at MLK. Through his work as a surgeon and vitamin D researcher, Dr. Matthews said he has seen patients heal faster and students perform better both, academically and on the field, after a daily regimen of vitamin D and good nutrition.

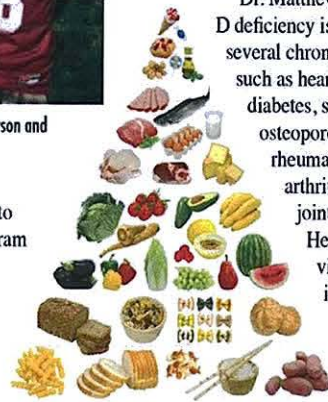
"Vitamin D deficiency is the most common nutritional deficiency in the world, affecting over 1 billion people worldwide," said Dr. Matthews, who is a Morehouse School of Medicine assistant professor of clinical surgery/trauma. "Over 58 million children in the United States are vitamin D deficient. Vitamin D is important for calcium

and phosphorus metabolism, strong bones, muscle strength, and immune modulation."

Vitamin D is a steroid hormone synthesized from cholesterol in exposed skin in response to sunlight (hence, its nickname "the sunshine vitamin"). Dr. Matthews said most Americans do not get enough sunshine. A healthy dose of sunshine, he said, amounts to about 15 minutes per day.

Dr. Matthews said vitamin D deficiency is linked to several chronic conditions such as heart disease, diabetes, stroke, asthma, osteoporosis, rheumatoid arthritis, joint pain, and 17 varieties of cancer. He said athletes who are deficient in vitamin D often times have more injuries.

In 2010, 81 percent of the New York Giants football team



was diagnosed as being vitamin D deficient, as reported during the American Orthopedic Society for Sports Medicine convention held in San Diego. Professional football players with vitamin D levels of less than 30 ng/ml had more injuries including broken bones, sprains, and muscle pain, the society noted.

Dr. Matthews credits high daily doses of vitamin D with helping to reduce the number of injuries among MLK's athletes. Track Coach Eric Merriweather, parents Anthony Sylvester, and the Rev. B.T. Moore say athletic injuries in the school's track and football programs decreased by more than 50 percent.

They said the students are living proof that vitamin D can make a difference in performance.

"The football team had only one fracture—a broken ankle—during the entire season," said Matthews. "That is very impressive considering the fact that they played 13 games and have 85 athletes on the team."

## MLK High School's Champion Highlights

- MLK won the 5-A Georgia State Girls Track Championship in May 2011.
- The football team finished the 2011 season with a 12-1 record and was ranked third in the state's 5-A Division.
- Eleven football players were named to the All-Region First Team.
- Six MLK seniors played in the Georgia State All-Star football game.
- Head Coach Michael Carson was named the "2011 2-5A Regional Coach of the Year" and the "2011 Atlanta Falcons' Georgia 5-A High School Coach of the Year."
- Senior football player and track star Jordan Moore earned recognition as the two-time Georgia 5-A boys 110 meters high hurdles champion in 2010 and 2011.
- Quarterback Jonquel Dawson ranked second as Georgia's all-time career touchdown leader with 93 touchdowns and over 8,700 career yards. He threw for 3,380 yards and 39 touchdowns, earning the Regional 2-5A Player of the Year Award.
- Defensive end Kenderius Whitehead shared 2-5A Regional Co-Defensive Player of the Year award and led the state with 19 sacks and 114 tackles.
- Blake Tibbs (66 rec., 1,084 yards, 15 TDs) and Joshua Stanford (55 rec., 1,014 yards, and 11 TDs) were both 1,000-yard receivers for MLK's high-powered offense.
- MLK was named 2-5A Regional Football Team of the Year.
- The school won the 2-5A Regional Football Championship.
- The school defeated defending Georgia State 5-A champions Brookwood High in the second round of the playoffs.

# Vitamin D Improves Academic and Athletic Performance and Decreases Injuries



# Avoidable Sports Injuries-Severe Vitamin D-Deficiency



# Vitamin D Increases Athletic Performance in Women



# Vitamin D in Concussion/Traumatic Brain Injury

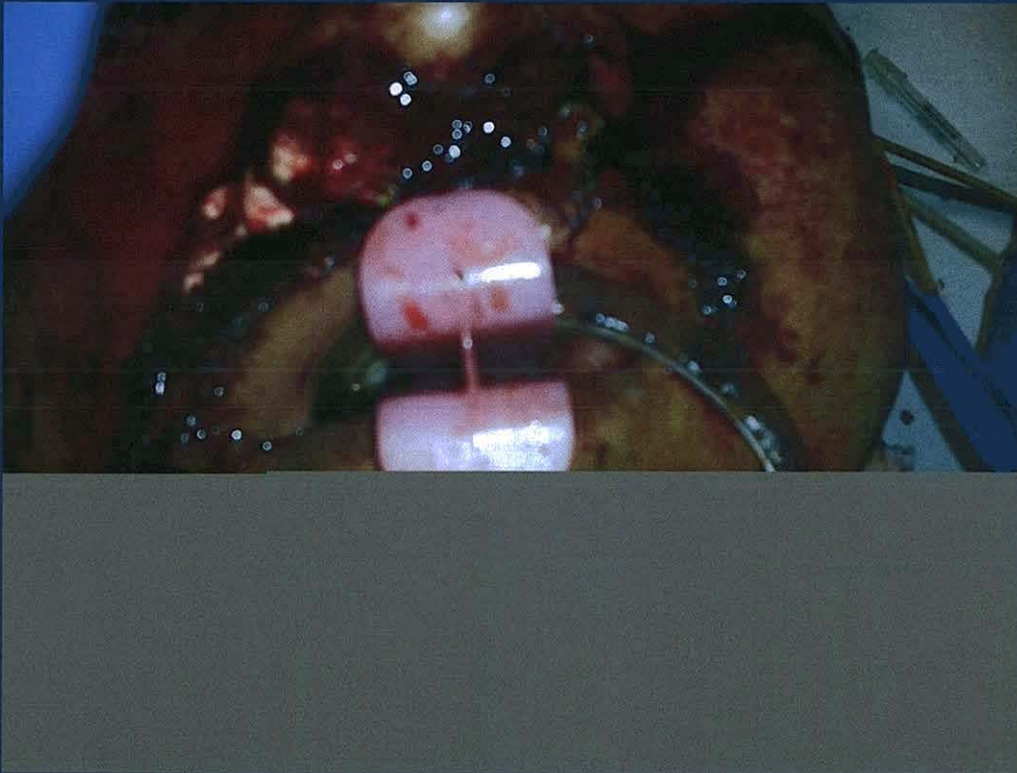
- Primary Injury
- Secondary Injury
  - Hypoxemia
  - Hypoglycemia
  - Hyperglycemia
  - Hypotension

# *Fatal Traumatic Brain Injury*



- 21-year old male
- S/P gun Shot Wound to head (left ear)
- Brain matter coming out of left ear
- Pronounced brain dead 18 hours later

# *Fatal Traumatic Brain Injury*



- 40-year old male
- Fell 40 feet and hit head on a rock
- Brain matter coming out of nostrils
- Proceeded to brain death

# *Fatal Traumatic Brain Injury*



- 35-year old male
- S/P 12 foot fall
- S/P Hemicraniectomy

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# Health & Wellness

## Grady/Morehouse surgeons discover breakthrough treatment for traumatic brain injuries

Lacy Adamson, 17, is a walking miracle, her mom, Lori Adamson says. One minute the Newton County teen was driving down a rural, two-lane road from varsity cheerleading practice. The next second, her truck was somersaulting into a cow pasture. A motorist who was traveling behind Lacy watched in horror as Lacy's truck flipped over and over after hitting a pothole in the road. Lacy was ejected from the vehicle and so badly injured that she had to be airlifted to Grady Memorial Hospital in Atlanta where the Morehouse trauma team led by Dr. L. Ray Matthews worked to save her life from a devastating head injury.

"She has regained her memory. She's walking and talking and cheering again just as if she never had the accident," said Lori Adamson. "We know personally that miracles do happen."

It's been six months since Lacy Adamson was critically injured from head to foot, suffering the most serious contusions to her chest, heart, lungs, spine and brain. After the accident in July, Lacy had to learn to walk again, talk again and even swallow, her mom said.

Lori Adamson, who is a registered nurse, says that a regimen that included vitamin D3, omega 3-fatty acids, glutamine, and progesterone which Matthews started Lacy on while she was in intensive care, saved her life and put her on the road to recovery.

"We could see her improvement every day that she was in the hospital," said Adamson, who, along with her husband, stuck by Lacy's side during her treatment at Grady and rehabilitation at Egleston Children's Hospital.

"Fifty percent of patients with the type of head injury that Lacy sustained do not survive. Those injuries are known as a Diffuse Axonal Injury (DAI)," Matthews said. "Another 47 percent are in permanent comas or severely impaired the rest of their



Photo by Glenn L. Morgan/OCG News

life. Less than 3 percent regain conscience and can interact with their environments."

Matthews said he knew from the outset that he had to treat Lacy's brain injuries with multiple drug therapy in order to give her a fighting chance for survival and recovery. As soon as she arrived at the hospital, the trauma team started her on a combination of vitamin D3, omega 3-fatty acids, glutamine, and progesterone, administered through a nasogastric tube. Together, the drugs regulate inflammation and make the injured brain cells more resistant to stress, trauma, lack of oxygen, high temperatures, low temperatures, high glucose, and low glucose.

"The brain is the most complicated organ in the human body," said Matthews. "We know that single drug therapy for brain injuries does not work because a recent military study on citicoline confirmed that. We've had very successful outcomes with combination/multiple drug therapy in patients like Lacy who have returned to near normal levels of functioning after treatment. This is a breakthrough."

Matthews said giving omega 3-fatty acids to brain trauma patients is essential because 30 percent of the brain is made of omega 3-fatty acids. He said 80% of Americans are omega 3-fatty acid deficient and vitamin D3 deficient.

"Being deficient in both, omega 3-fatty acids and vitamin D3, slows down the brain's ability to heal itself in patients with traumatic brain injuries," Matthews said. "Just as you would need bricks—and not straw—to repair a broken brick wall, you need omega 3-fatty acids to repair traumatic brain injuries."

Matthews said providing the body with vitamin D3 is also essential. Like omega 3-fatty acids, vitamin D3 regulates inflammation and helps the immune system fight off infection, bacteria, viruses, fungi, cancer cells, pneumonia, colds, and the flu.

Matthews also said that vitamin D3 along with glutamine (an essential amino acid during stress) produces Heat Shock Protein (HSP), which help the injured brain cells ward off stress of any kind. Instead of dying, brain cells with more

### Trauma Surgeon Dr. L. Ray Matthews

Dr. L. Ray Matthews is an assistant professor of surgery at Morehouse School of Medicine and Director of Surgical Critical Care Unit at Grady Memorial Hospital in Atlanta. A graduate of the University of Mississippi School of Medicine, he completed his surgical residency at Morehouse School of Medicine/Grady Memorial Hospital. He did his surgical critical care fellowship at Mayo Clinic in Rochester, Minnesota and was also on staff as a Senior Associate Consultant prior to his arrival at Grady Memorial Hospital in 2007.

HSP can now be repaired.

Matthews and his research team, comprised of Dr. Ed Childs, Dr. Omar Danner, Dr. Ken Wilson, Dr. Frank Jones, Diane Dennis-Griggs, NP, and Lexi Frederick, NP, have been studying vitamin D for five years. Matthews said many Americans do not produce enough vitamin D hormones because they don't get enough sunshine. He has been giving high doses of vitamin D hormone to trauma patients, those who have deficiencies and suffer from various health problems and athletes to improve their performance.

"Ninety percent of our vitamin D production comes from the sun striking our skin and making vitamin D3," Matthews said. "I call vitamin D3 God's miracle vitamin. It is the backbone or workhorse drug supplement in treating traumatic brain injuries because it works at multiple levels. Vitamin D3 controls 3,000 out of 30,000 genes in the human body. Anything that controls 10 percent of all human genes is a very powerful substance and should be respected."



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The most vitamin D information on the web!

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## A Concussion-Free Football Season: How one High School beat the odds - July 2012

### High School in Atlanta added vitamin in 2011 to their sports teams

Martin Luther King Jr. High School in Lithonia, Georgia has reduced its concussions and sports injuries by almost 100%. What was their secret? In 2011, the school started a parent-led nutrition program that included a daily regimen of vitamin D. The program was instituted by Dr. L. Ray Matthews, one of the nation's leading researchers in vitamin D and assistant professor of surgery and director of surgical care at Grady Memorial Hospital in Atlanta,

"Vitamin D helps prevent sports related concussions by several different mechanisms," says Dr. Matthews. "First of all, vitamin D produce stronger bones (skull) which is more resilient to stress and shock from trauma to the head, vitamin-D also improves muscle strength and muscle coordination which results in less frequent falls. ...it also produces a special protein called "heat shock protein" which makes the brain more resilient to heat, cold, stress, and trauma," he said.

Vitamin D also controls 10% of the genes in the human body and is involved in tissue repair after repeated blows to the head and is a steroid hormone that controls 3,000 out of 30,000 genes in the human body.

While the NFL and rest of the world is trying to figure out what to do about concussions, at least one football team gets it right! MLK finished their 2011 football season with a 12-1 record in Georgia's very competitive 5-A class. Even more impressive is they played 13 games with 85 football players without a single concussion. There was only one fracture/broken bone the entire season.

Meanwhile, a 2010 study found 81% of the New York Giants football players are vitamin D deficient. In fact, Dr. Matthews says more NFL teams should reconsider their strategies in dealing with head injuries. They can start by adding Vitamin-D into their team daily regimen, as concussions have increased 60% over the past decade.

Reports over the past decade show, the number of concussion increased 60%. Dr. Matthews believes, taking one pill a day can decrease those numbers.

## Next Steps:

# Altered cerebral metabolism in TBI

1. Prevent cerebral edema and swelling
  - Brain cell death
  - Need powerful anti-inflammatory agents
  - Vitamin D3 CRP, IL-6, IL-8, TNF
  - Omega 3-fatty acids
  - Chronic inflammation
  - Free radical formation



Evil twins of  
TBI Patients

## Next Steps:

# Altered cerebral metabolism in TBI

## 2. Neuroprotection

### – Vitamin D3

- Increases heat shock protein (HSP)
- Chaperone proteins
- Stress response proteins
- Helps intracellular protein maintain 3-D confirmation shape in stress-Tau proteins

### – Progesterone

- Stimulate respiratory nerve center
- Helps wean difficult TBI patients off the ventilator

## Next Steps:

### Altered cerebral metabolism in TBI

#### 3. Nutrition/metabolism/repair damaged brain cells

- Omega 3-fatty acids
  - 30% brain composition
  - 80% U.S. Population omega 3-fatty acid deficiency
  - Need bricks to repair brick wall, not straw
  - Utilize 15% total body energy
  - Metabolism increases to 150% after TBI (37.5% total body energy)
  - Brain fatigue (Glutamine, branched chained amino acids)

# Combination Therapy with Vitamin D3, Progesterone, Omega 3-Fatty Acids, and Glutamine Reverses Coma and Lowers Mortality Rate Versus Vitamin D3 and Progesterone Alone



LR MATTHEWS; OK Danner; YA Ahmed; KL Wilson; DM Dennis-Griggs; AT Fredrick; EW Childs;  
Morehouse School of Medicine,



**Background** Management of patients with concussions/traumatic brain injuries (TBI) has changed very little over the past 20 years. The medical cost of treating TBI patient in the United States was \$76.5 billion in 2010 and rising annually. We hypothesize that 4 drug combination therapy(vitamin D3, progesterone, omega 3-fatty acids, and glutamine) improves recovery and lower mortality better than two drug therapy with vitamin D3 and progesterone alone (Bahram Aminmansour study).

## METHODS

This study with 183 TBI patients was a prospective comparison study done at Grady Memorial Hospital Memorial a Level I trauma center in Atlanta, Georgia from August 2009 through February 2012 versus Bahram study.

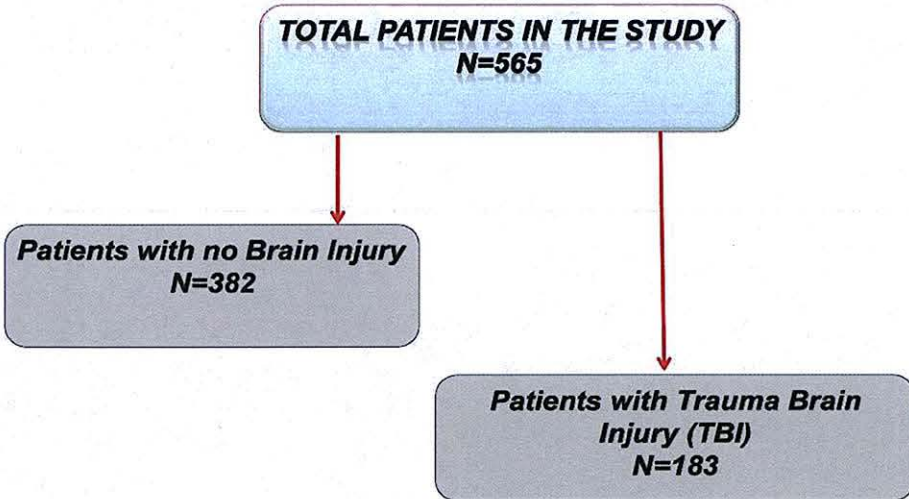


Figure 1. Patients with Trauma Brain Injury Included in the Study.

## RESULTS

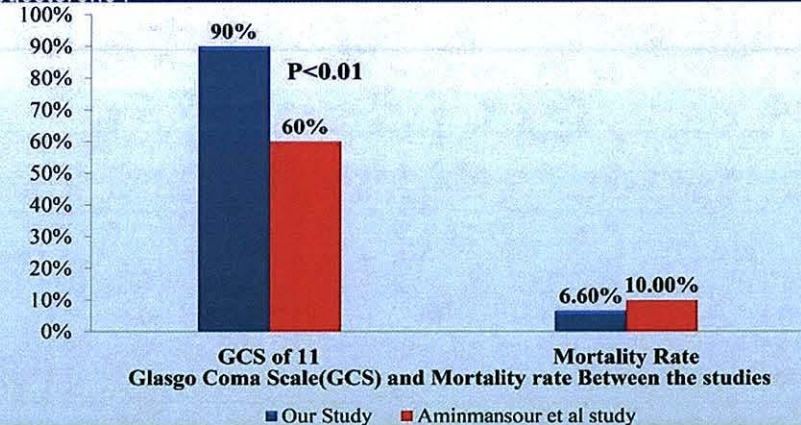
Male patients totaled 143 (78.1%) and female patients totaled 40 (22.0%). There were 110 African American patients (60.1%) and 73 Caucasian Americans (40.0%). Mean age was 46.54+ 18.2. Mean vitamin D3 level was 18.76+10.01. Mean ICU Length of Stay was 8.43+13.77 days . Table1.

Table1. Population Characteristics

Male	143(78.1%)
Female	40(22.0%)
African American	110(60.1%)
Caucasian	73(40.0%)
Age (± stdev) Yrs	46.54 ± 18.2
Vitamin D Level (ng/ml)	18.76 ± 10.1
LOS (Days)	8.43 ± 13.77
Mortality	12(6.65%)

There were 18 deaths (six were excluded due to withdrawal of care/support).

Mortality rate in our study after exclusion criteria was 6.6% (12 mortality cases in 183 patients), comparing to Aminmansour Bahhran et al, were the mortality rate was 10% (2 mortality cases in 20 patients) in the group treated with Vitamin D and Progesterone .



There were 18 deaths (six were excluded due to withdrawal of care/support). Our study showed an absolute mortality risk reduction of 3.4(AR=3.4), and relative risk mortality reduction of 34.4% (RRR=34.4). Our recovery to a GCS of 11 was 90% versus 60% in the Aminmansour Bahhran et al study (p<0.01)

## CONCLUSION

Our study shows that 4 drug combinations is more effective, offers better recovery, and offers more neuroprotection than 2 drug therapy.

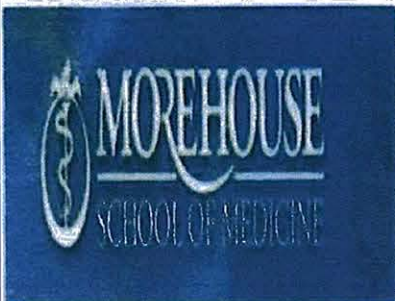
## 2000-2011 Morehouse Trauma Stats

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
Admission	431	439	445	406	444	522	598	734	599	543	558	539	6258
Age 15 to 55	392	405	406	347	388	466	515	635	497			374	4425
Age >55	38	29	35	56	52	55	77	88	97	0	0	165	692
Males	322	347	342	292	339	403	450	544	479	426	404	405	4753
Females	109	92	103	114	105	119	148	190	120	118	152	134	1504
Death	46	51	39	36	38	46	48	30	37	33	29	31	464
Blunt Trauma %	66.6	66.5	69.9	75.9	76.6	75.5	80.4	75.7	76	74	77.34	78.2	?
Penetrating Trauma %	33.4	33.5	30.1	24.1	23.4	24.5	19.4	24.3	24	26	22.66	21.8	?
Injury Sever Score % >15	24.1	25.7	30.1	35.2	34.9	36.2	36.6	30.5	24.7	24	26.6	29.1	?
% Alcohol Level >80	19	21.2	22.9	17.7	18.9	21.3	20.6	22.6	22.5				?
% Positive Drug Screens	15.8	14.4	22.2	32	36	33.3	37.1	40.1	26.4				?
Mortality Rate %	<b>USE MEDICINE</b> 10.7	11.6	8.8	8.9	8.6	8.8	8	4.1	6.2	6	5.2	6.2	?

# A 42% Reduction in Mortality Rate at a Level I Trauma Center Using Integrated Care

L. Ray Matthews, MD, Assistant Professor of Surgery, Director, Surgical Critical Care, Grady Health System Morehouse School of Medicine, Yusuf Ahmed, MD, MPH, Diane D. Griggs, NP Clinical Associate, Morehouse School of Medicine, Kenneth L. Wilson, MD, Assistant Professor of Surgery, Morehouse School of Medicine, Omar K. Danner, MD, Assistant Professor of Surgery, Morehouse School of Medicine

Grady Health System is the largest public hospital-based health system in the Southeast. Included are Grady Memorial Hospital; Children's Healthcare of Atlanta at Hughes Spalding; Crestview Health and Rehabilitation Center; and nine neighborhood health centers.



## ABSTRACT

### Background:

Despite changes in residents' work hours in 2003, no study to date has demonstrated a quantitative improvement in patient outcomes or safety. Resident fatigue from long duty hours is a contributing factor; however, it is not the most significant risk to patient safety.

### Methods:

We retrospectively examined records of 5,152 patients included in the Grady trauma registry from 2000 to 2009.

### Results:

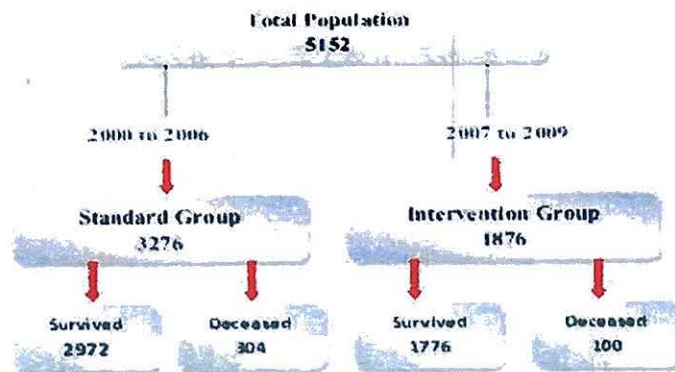
The overall mortality rate declined from 9.34 percent in the intervention-exposed group, with a relative mortality risk reduction of 41.86 percent, with P-value of <0.0001.

### Conclusion:

A patient-centered, physician-led model of care reduces mortality risk rate in a level I trauma center when compared to traditional medical practices.

### Methods

We retrospectively examined records of 5,152 patients (Figure 1) included in the Grady trauma registry from 2000 to 2009. From 2000 to 2006, traditional methods were used in patient care. Trauma patients from 2007-2009 were managed using Integrated Model of care.



### traditional methods:

- Decisions were made based on each physician's preference and best judgment rather than the latest evidence
- Attending physicians saw patients within 24 hours of admission
- Patients were heavily sedated on ventilators, often developing pneumonia that caused longer ICU stays

### Integrated Model of care:

- A multi-disciplinary, team approach
- Close resident supervision by attending physicians
  - Patients seen by the attending physician within six hours of admission
  - Standardization based upon best practices. Specific changes included:
    - Change from inverse-ratio ventilation to low TV/high PEEP strategy for patients with acute respiratory distress syndrome (ARDS)
    - Daily monitoring of PaO<sub>2</sub>/FIO<sub>2</sub> ratio for early detection and assessment of ARDS
    - Initiate nutritional therapy using TPN/enteral nutrition and glutamine supplement
    - Discontinue use of paralytics in intubated patients
  - Sedation "holiday" for ventilated patients

### primary outcome

mortality rate.

### Background

Despite changes in residents' work hours in 2003, no study to date has demonstrated a quantitative improvement in patient outcomes or safety. Resident fatigue from long duty hours is a contributing factor; however, it is not the most significant risk to patient safety. Close staff supervision have a more appreciable effect on patients' outcomes. medicine, failure mode effect analysis (an approach commonly used by the military, aerospace, and automotive industries to predict bad outcomes) and close staff supervision have a more appreciable effect on patients' outcomes.

### Hypothesis

We hypothesize that a patient-centered, integrated model of care would reduce mortality risk rate at the level I trauma center.

### Results:

The overall mortality rate declined from 9.34 percent to 5.43 percent in the intervention-exposed group, with a relative mortality risk reduction of 41.86 percent, with P-value of <0.0001. (Figure2)

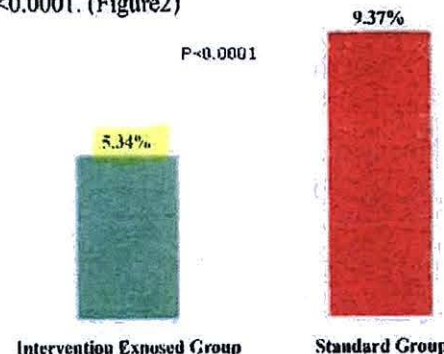
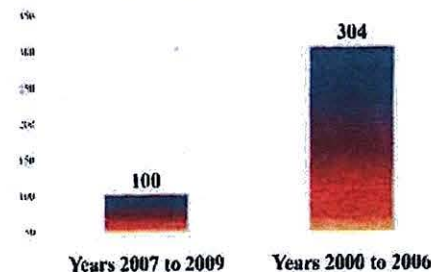


Figure 2: Percent of mortality Relative Risk between Intervention group and standard Group

Mortality events dropped significantly (N=100), in 2007, 2008 and 2009 when a model of coordinated, integrated, evidence-based care was applied to care practices in the ICU, compared to 2000 to 2006(N=304).



### Conclusion:

A patient-centered, physician-led model of care reduces mortality risk rate in a level I trauma center when compared to traditional medical practices.

# Mortality Risk Rate Reduced by 42%

Grady Health System

## Inside Grady

JUNE 16  
2008

www.gradyhealthsystem.org

### Soldier airlifted to Grady after falling 500 feet



Photo by Faith J. Jones

Above, Mark Mettler in a photo taken shortly before his skydiving accident. To the right, his mother Sallyann Mettler, Mark (center), and Dr. Leslie Matthews, assistant professor of surgery for Morehouse School of Medicine. Matthews treated Mettler when he was airlifted to Grady from a Rockmart skydiving facility.

By Faith J. Jones

Mark Mettler is no stranger to the sky. He was trained, after all, by the U.S. Army to jump from airplanes – 82nd Airborne Division – and he became a “sport” skydiver after leaving the military. On March 1, while getting recertified as a sport skydiver, Mettler’s parachute spiraled and he fell 500 feet to the ground at 70 miles per hour.

“He had to make seven jumps to be recertified,” his mother Sallyann Mettler said. “He was on his fifth jump, just doing simple maneuvers, when something happened.” That’s what was told to her when she arrived in Atlanta from her home in St. Joseph, Mich. She was terrified by what she saw when she arrived.

Mettler sustained 18 life-threatening injuries, and doctors say he had a 300 percent chance of dying from all 18 injuries.

“I was in shock,” Mrs. Mettler said. The 65-year-old recently placed her 90 and 93 year old parents in an assisted-living home, and her husband has kidney cancer. “I thought he was dying, and my first thought was I could lose my son, parents and husband in one year.”

Mrs. Mettler said she’d prepared herself for the worst and left everything in God’s hands.

“Everyday I thought I would never see him again,” she said. “I didn’t feel better until April 16 when he opened his eyes for the first time.”

Mrs. Mettler said she first credits Blaine Kunz, a paramedic for Puckett EMS, who administered care at the scene before her son was airlifted to Grady from Rockmart.

Kunz said he left his job as a financial analyst to become a paramedic, and he feels humbled that Mrs. Mettler credits him with helping to save her son. She then credits Grady’s trauma team – doctors, nurses, respiratory therapists, pharmacists – and everyone else who served her son. “Grady really made all the difference. Mark couldn’t have made it without them,” she said.

Mrs. Mettler especially credits Dr. Leslie Matthews, assistant professor of surgery for Morehouse School of Medicine.

“I always asked Dr. Matthews to tell me the truth about Mark, no matter how bad it was,” Mrs. Mettler said. “And he was truthful. Sometimes he told me ‘we don’t know but, we’re doing our best.’”

Matthews said it is rare for a patient to survive when they have suffered as many injuries as Mettler.

“He is truly a Grady miracle,” Matthews said. “Some of his injuries included collapsed lungs, cardiopulmonary arrest at the scene, a left ruptured diaphragmatic hernia (stomach and small bowel went into his chest and required surgical repair), acute respiratory distress syndrome, pelvic fracture and multi-system organ failure.”

(continued on page 3)

—500 ft fall

—Over 18 injuries including traumatic brain injury

—Mortality rate over 300%

—Full Recovery

***Paratrooper Survives 500 ft. Fall  
and GETS MARRIED!!!***



# Teenager survives being shot FIFTEEN TIMES by fellow gang members after telling them he wanted out



© Police Handout



© Police photo

# Penetrating Traumatic Brain Injury 7 Months Pregnant

Police: Second victim in Decatur  
kidnapping dies



She was kept on life support for almost a week, while doctors delivered her second child. Brooks was seven months pregnant at the time she was kidnapped. She was two weeks away from her 22nd birthday.

# Gunshot Wound to the Head



# Lady Impaled (Side View)



# Impaled Patient (post-op)



## Trauma Patient Returns to Say Thanks

Valerie Loring dreams of being a fashion designer and moved to Atlanta to attend classes at the Savannah College of Art and Design. While in school she was working on freelance designs, but also held a job as a waitress to help pay for day-to-day expenses.

On Dec. 13, 2009, Loring was driving home to Smyrna after finishing a double shift as a waitress at a Sandy Springs restaurant. It was around 6 a.m. in a heavy rain storm, when Loring collided with the back of another vehicle on I-285.



Former Grady patient, Valerie Loring (right) returned for a visit with her mother, Pamela Loring (left). The pair were towed around the hospital by Dr. Omar Danner (center), so they could visit with the countless staff members who assisted Valerie during her stay.

Loring remembers nothing of the accident. When she arrived in the Grady ED she was showing minimal response. She suffered a serious head injury, but no broken bones.

According to Dr. Omar Danner, assistant professor, Clinical Surgery, Morehouse School of Medicine, Loring's left pupil was at 6 millimeters and unreactive; she had blood around the left side of her brain and was bleeding inside her brain.

A drain was inserted to remove the blood and relieve pressure on the brain, in addition to a pressure monitor.

Loring was intubated and admitted to 7-L SICU where her case was followed by the neurosurgery and trauma surgery teams.

A week and a half after her admission, Loring had a tracheostomy tube inserted, but nevertheless she still developed ventilator associated pneumonia. According to Dr. Danner, it was truly touch-and-go for the first two to three weeks she was here.

Loring was in a coma for four weeks and spent a total of 41 days at Grady. She had some initial speech and physical therapy before being transferred to the Shepherd Center where she remained for another two months. Today she still continues her outpatient care.

Ten months after Loring's accident, she and her mother, Pamela Loring, returned

## healthcare delivery and policy program

### high value care delivery — what works, what doesn't

April 22-23, 2010 — Mission Palms Hotel — Tempe, Arizona



#### Case Studies

Participants discussed examples of projects underway at their organizations that were designed to generate higher-value health care by improving quality and reducing costs. Attached are draft summaries of several projects, which are in various stages of development and analysis.

Antonio Castaneda, M.D.  
North Texas Specialty Physicians  
[Improving Care via an Interoperable Health Information Exchange](#)  
[http://healthcare.asu.edu/healthcare/healthcare03\\_21.pdf](http://healthcare.asu.edu/healthcare/healthcare03_21.pdf)

Jacqueline Chadwick, M.D.  
University of Arizona College of Medicine

Farid Choudhry  
North Texas Specialty Physicians  
[Improving Care via an Interoperable Health Information Exchange](#)  
[http://healthcare.asu.edu/healthcare/healthcare03\\_21.pdf](http://healthcare.asu.edu/healthcare/healthcare03_21.pdf)

Steve Coati  
Selon Family of Hospitals  
[Asthma Disease Management Program at Selon Asthma Center](#)  
[http://healthcare.asu.edu/healthcare/healthcare03\\_21.pdf](http://healthcare.asu.edu/healthcare/healthcare03_21.pdf)

Denis A. Cortese, M.D.  
ASU Healthcare Delivery and Policy Program

William DePaso, M.D.  
Virginia Mason Medical Center  
[The Multisite Collaborative Model Applied to a Breast Clinic](#)  
[http://healthcare.asu.edu/healthcare/healthcare03\\_21.pdf](http://healthcare.asu.edu/healthcare/healthcare03_21.pdf)

Stuart Flynn  
University of Arizona College of Medicine

Bill Hemmerly, M.D.  
Catholic Health Initiatives  
[Reducing Outcomes with Fever Resolutions](#)  
[http://healthcare.asu.edu/healthcare/healthcare03\\_21.pdf](http://healthcare.asu.edu/healthcare/healthcare03_21.pdf)

Larry Harrison  
Scripps Clinic

Jeff Kosmo  
Mayo Clinic

Denise Link, R.N.  
ASU College of Nursing and Health Innovation  
[Nurse Practitioner Managed Health Clinics](#)  
[http://healthcare.asu.edu/healthcare/healthcare03\\_21.pdf](http://healthcare.asu.edu/healthcare/healthcare03_21.pdf)

Leah Matthews, M.D.  
Grady Health System  
[Decreased Mortality in Level 1 Trauma Centers](#)  
[http://healthcare.asu.edu/healthcare/healthcare03\\_21.pdf](http://healthcare.asu.edu/healthcare/healthcare03_21.pdf)

Brad Narr  
Mayo Clinic  
[Use of Information Technology in Intensive Care Units \(ICU\)](#)  
[http://healthcare.asu.edu/healthcare/healthcare03\\_21.pdf](http://healthcare.asu.edu/healthcare/healthcare03_21.pdf)

Robert Pryor  
Scott and White Healthcare System  
[Methicillin-Resistant Staphylococcus Aureus \(MRSA\) Surveillance in a Teaching Hospital: Quality and Cost Implications](#)  
[http://healthcare.asu.edu/healthcare/healthcare03\\_21.pdf](http://healthcare.asu.edu/healthcare/healthcare03_21.pdf)

Robert K. Smeidt  
ASU Healthcare Delivery and Policy Program

Marc S. Williams, M.D.  
Intermountain Healthcare Clinical Genetics  
[Unnecessary Duplication of Genetic Tests within an Integrated Medical Center](#)  
[http://healthcare.asu.edu/healthcare/healthcare03\\_21.pdf](http://healthcare.asu.edu/healthcare/healthcare03_21.pdf)

# Mortality Risk Rate Reduced by 42%

 Grady Health System

## Inside Grady

FEBRUARY 9, 2009

www.gradyhealthsystem.org

### Patient pronounced dead gets a second chance

By Faith J. Jones

It was about 50 degrees on Nov. 20 when Edward Anderson began slicing an oak tree with a chain saw for his girlfriend's family to burn in their heater.

It wasn't the first time the 29-year-old had used a chain saw, but this time the saw stuck in the wood and when Anderson pulled it, the saw jerked, cutting through the muscles and veins on the right side of his neck.

His girlfriend tried to help him until the paramedics arrived, and Anderson managed to tell her "I love you" before going into cardiac arrest. He was revived by the paramedics and airlifted to Grady from the Forsyth County home. While in the helicopter, Anderson again went into cardiac arrest and was intubated.

"When he arrived at Grady, he'd lost his entire blood volume – five liters. And, no blood was coming from the neck wound or the exposed blood vessels," said Dr. Leslie Matthews, assistant professor of surgery for Morehouse School of Medicine. "When he arrived in the operating room, his pupils were fixed and dilated and there was no palpable pulse or any pulse by the Doppler ultrasound."

Matthews said the "brain death" exam and apnea



Barbara Anderson is grateful to Grady for saving her son Edward after a chain saw accident. Edward was pronounced dead, but eight minutes later he started moving and doctors worked to save his life.

test were positive, and no narcotics or paralytics were administered.

"He was pronounced dead, removed from the ventilator and covered," Matthews said.

Eight minutes later, a nurse noticed movement in Anderson's left arm and notified doctors who again worked to save him.

"It's the strangest thing I've seen in my 20-year career," Matthews said.

Anderson, whose speech is a little muddled because of the accident, said he doesn't remember much about the accident or his surgery, but he remembers the excellent treatment he received when he became conscious.

His mother, Brenda Anderson, said she is still shaken by the accident and is glad her son survived.

(continued on page 4)

### Greater Grady Campaign has raised \$230 million



Tom Bell, chairman of the Greater Grady Capital Campaign, speaks to Atlanta CEOs during a breakfast at Grady. The committee has raised \$230 million for Grady.

(continued on page 4)

- Pronounced dead for 10 minutes
- Hypoxic traumatic brain injury
- Removed from ventilator
- Made full recovery
- Lost total blood volume exsanguinated
- Full Recovery

# Mortality Risk Rate Reduced by 42%

Grady Health System®

## Inside Grady

JANUARY 26  
2009

www.gradyhealthsystem.org

### NICU volunteers thanked for caring for Grady babies

By Faith J. Jones

Dollie Walker could be traveling the country or simply taking it easy at home – enjoying her retirement. Instead, she comes to Grady each week to help staff care for babies in the Neonatal Intensive Care Unit.

"I get such a joy out of it," Walker said of caring for the babies. She helps feed them, rock them and change their diapers. "Volunteering also helps keep my mind going, instead of just staying at home."

Walker was one of 48 volunteers who received a certificate of appreciation from Grady for being a special care nursery volunteer. More than 40 in-kind donors – businesses, churches and individuals who donate items to the nurseries – were also recognized.

Dr. William Sexson, associate dean of Clinical Affairs for Emory University School of Medicine and former director of the NICU, told the volunteers how



Dr. William Sexson, associate dean of Clinical Affairs for Emory School of Medicine and former director of Grady's Neonatal Intensive Care Unit, thanked volunteers for their services.

### Patient thanks Grady for saving his life

By Faith J. Jones

Keith Weston was trying to do a good deed Oct. 3 when he tried to break up a fight at his friend's house in the West End.

"There were kids around, and I wanted to make sure they were safe," he said.

The next thing he knew, he'd been stabbed.

"I was shocked," he said. "When I saw

the hole in my chest, I knew it was bad."

Weston was brought to Grady and went into cardiac arrest for five minutes, requiring CPR and an ER thoracotomy (which partly consists of opening the chest to help doctors determine if the injury can be repaired). An echocardiogram showed doctors his heart was not beating because it was surrounded by blood in the pericardial sac.

Dr. Leslie Matthews, assistant professor of surgery for Morehouse School of Medicine, said Weston's heartbeat returned after the blood was removed from his chest and he was then taken to the operating room, but once again went into cardiac arrest.

"After blood clots were removed from his chest, the hole in his heart was repaired," Matthews said.

Weston was at Grady for two weeks after the stabbing.

"I feel really blessed to be here," he said. "And I just want to thank the doctors and nurses at Grady who took good care of me."

Weston, 47, said Grady is one of the best things Atlanta has to offer.

"If I been further away, I probably would have died," he said. "I'm glad I was so close."

Weston said he was treated at Grady a few times before "in his younger days" when he was "running the streets."

"I haven't been in trouble in 12 years, so when I was stabbed, I just didn't expect for anything like that to happen," he said. "I am very grateful to be here."

Weston said he doesn't remember what happened after being stabbed, but said when he woke up, "a pretty nurse" fed him Jello.

"Everyone at Grady was very nice," he said. "They saved my life."



Keith Weston thanks Grady for saving him after stabbing.

–Hypoxic Traumatic Arrest

–Stab wound-right ventricle heart

–Cardiac arrest twice

–ER Thoracotomy

–Full Recovery

# Vitamin D in Traumatic Brain Injuries



17-year-old female  
Status: Motor vehicle crash/ejected  
Diffuse Axonal Injury (DAI)

50% Mortality Rate  
47% Permanent Neurological damage  
3% Return of partial normal function

–Full Recovery

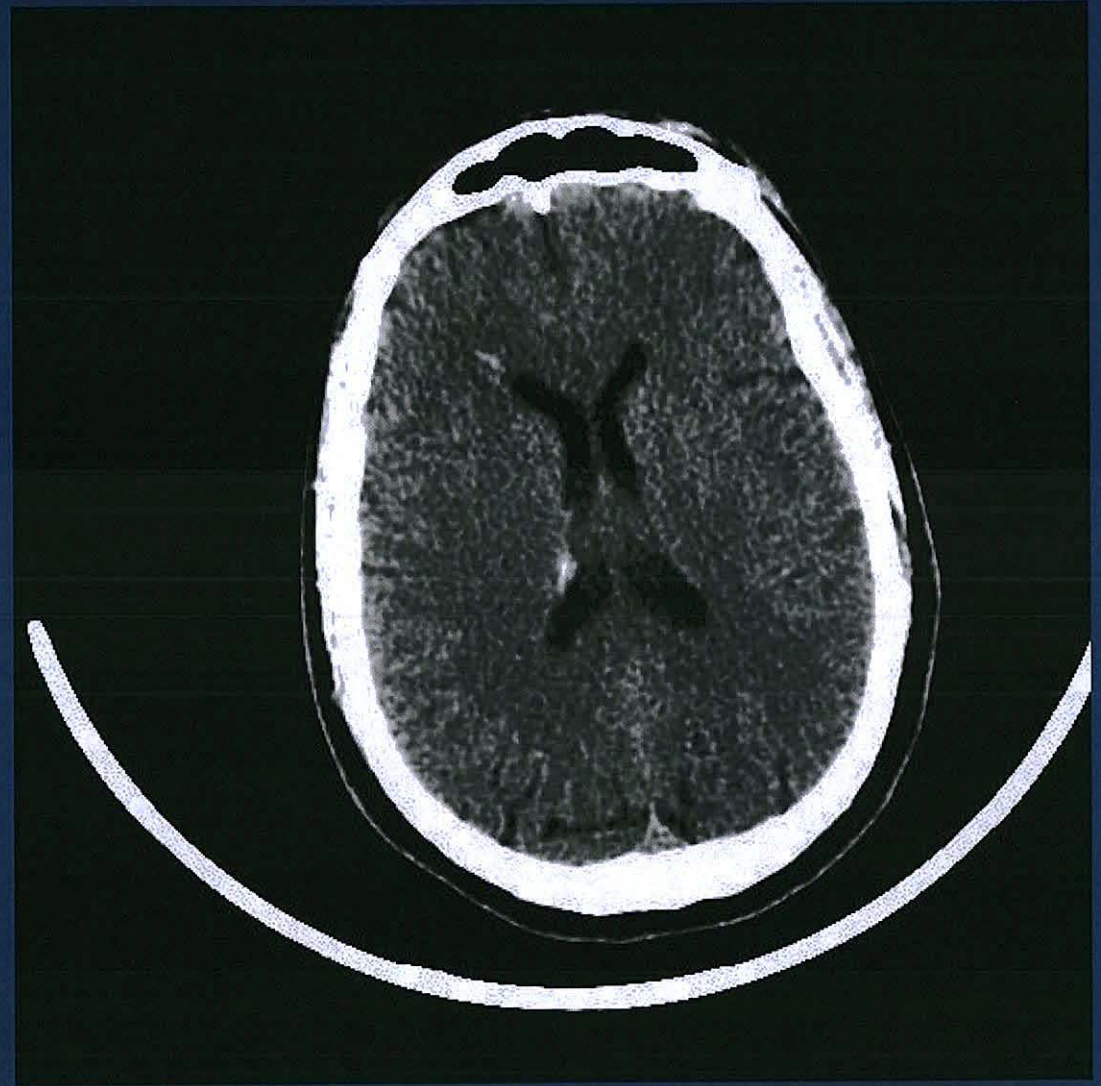
–Returned to school full time in 3 months after accident

# Post Traumatic Brain Injury Patient/College Student

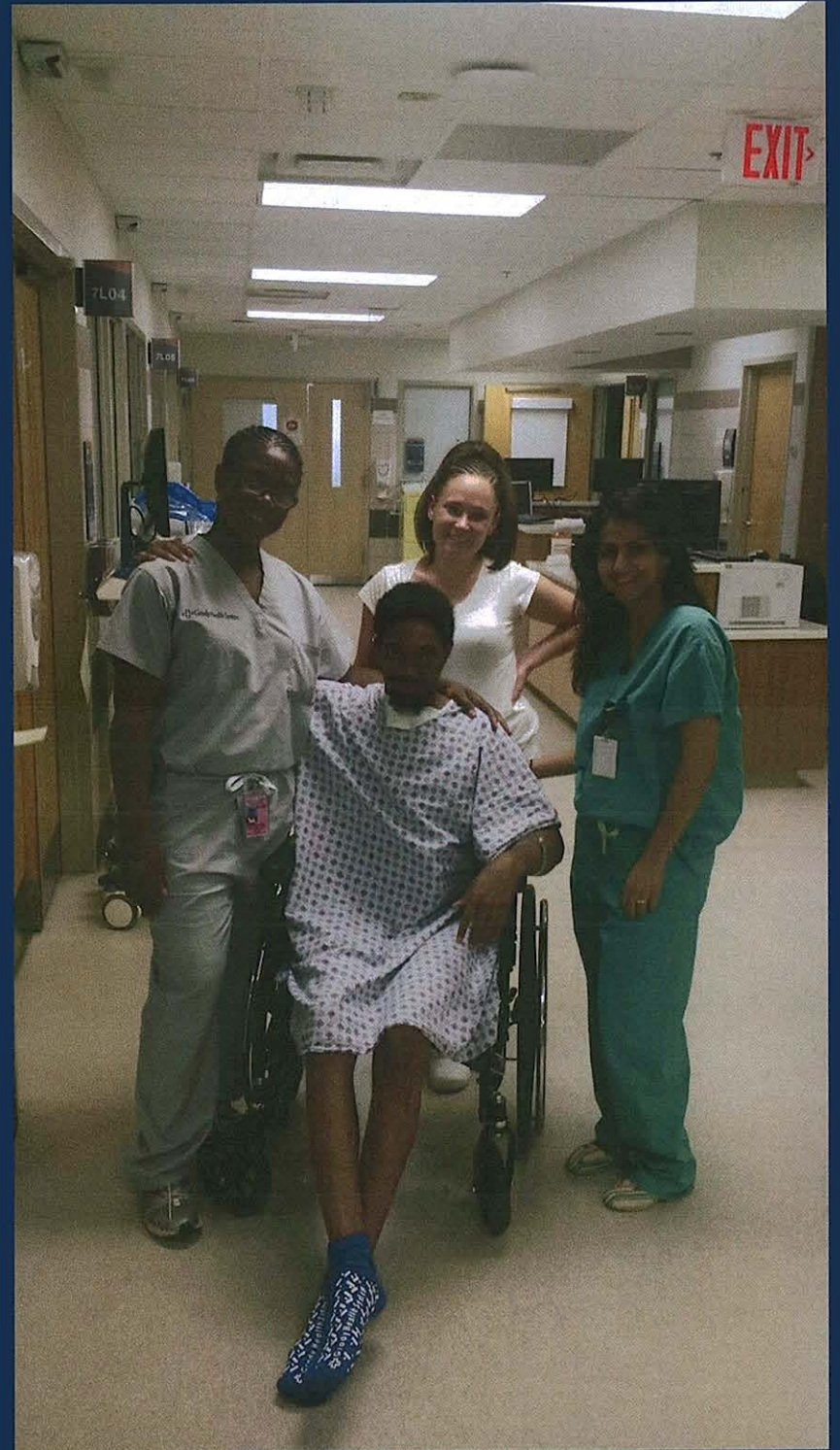


# Vitamin D in Traumatic Brain Injuries

- 28 year old male
- S/P rollover MVC
- Diffuse Axonal Injury
- IHP/IVH
- Splenic laceration, Grade 2
- Left rib fractures 8<sup>th</sup>-11<sup>th</sup>
- Left hemopneumothorax
- Left pulmonary contusion
- Ventilated Associated pneumonia
- Acute Respiratory Distress Syndrome



# Vitamin D in Traumatic Brain Injuries



# Vitamin D in Traumatic Brain Injuries



31-year-old male

Status: Post Assault/Blunt Trauma

- HIV positive
- Very poor prognosis, SDH, SAH
- Hepatitis A
- Syphilis
- Shingles
- Alcohol abuse
- CD4 count 46 (normal > 500)
- ARDS
- VAP
- Full Recovery

# Penetrating Traumatic Brain Injury

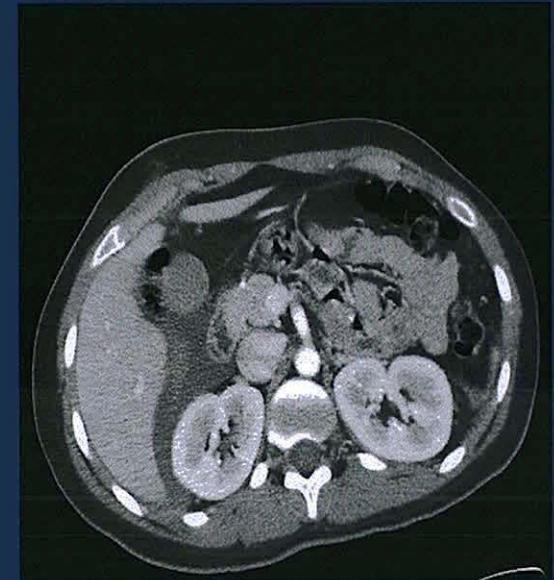
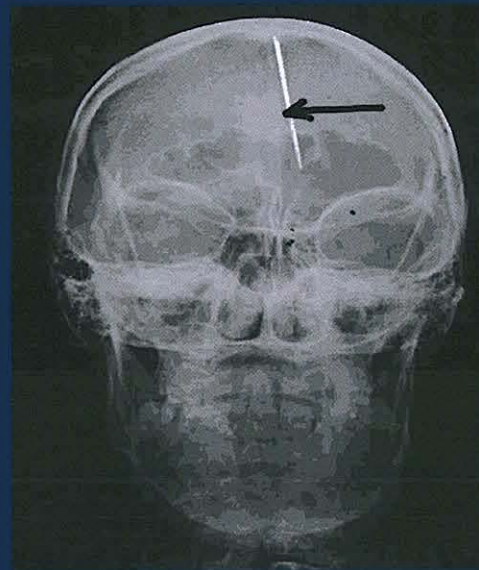
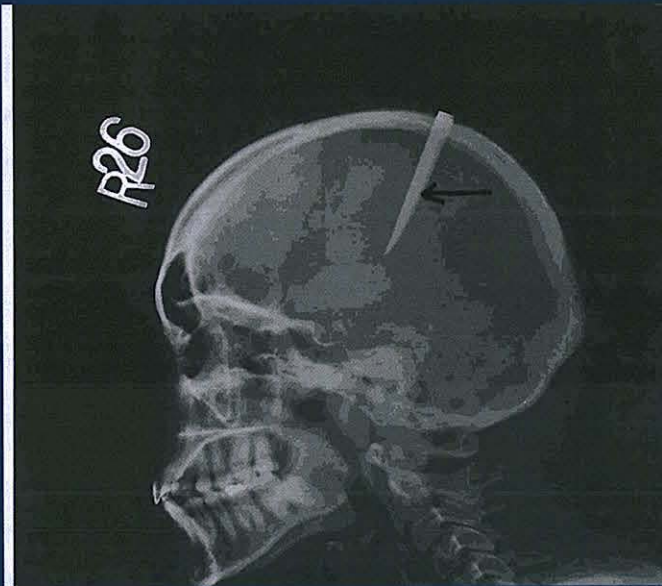


–8-Year-old male

–Stab wound to the  
head

–Full Recover

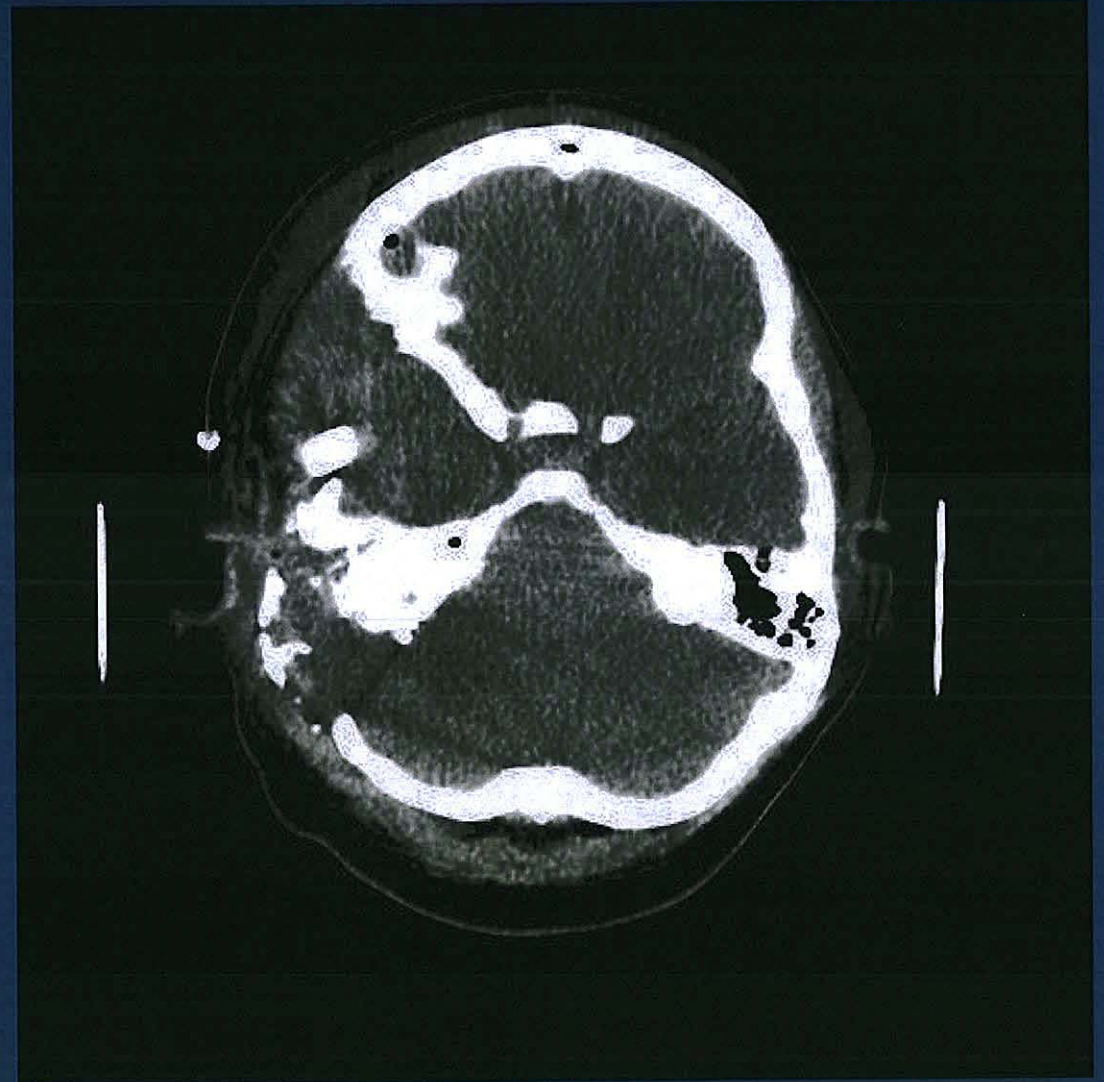
# Penetrating Traumatic Brain Injury with abdominal simultaneously



- 29-year-old female with stab wound to head and abdomen
- Right hemiparesis (resolved in 6 weeks)
- S/P craniectomy -en block removal of knife
- Exploratory lap/packing and over sewing grade III live laceration
- Full Recovery

# Penetrating Traumatic Brain Injury

- 31-year-old female
- S/P gunshot wound head, neck, abdomen



# Penetrating Traumatic Brain Injury

- Basal skull fracture
- SDH/IPH



# Penetrating Traumatic Brain Injury

- **S/P Chest tube placement for hemopneumothorax**
- **S/P Tongue laceration repair**



# Vitamin D for Critically Ill ICU Patients



- 57-year-old male
- Self-inflicted gun shot wound to the chest x2
- CVA/Stroke
- MI/Heart Attack
- EF 25% (75% normal)
- Congestive Heart Failure (CHF)
- Pneumonia
- Depression
- ETOH abuse
- Brother died
- Divorced

# Bio



**St. John's Gospel Singers**

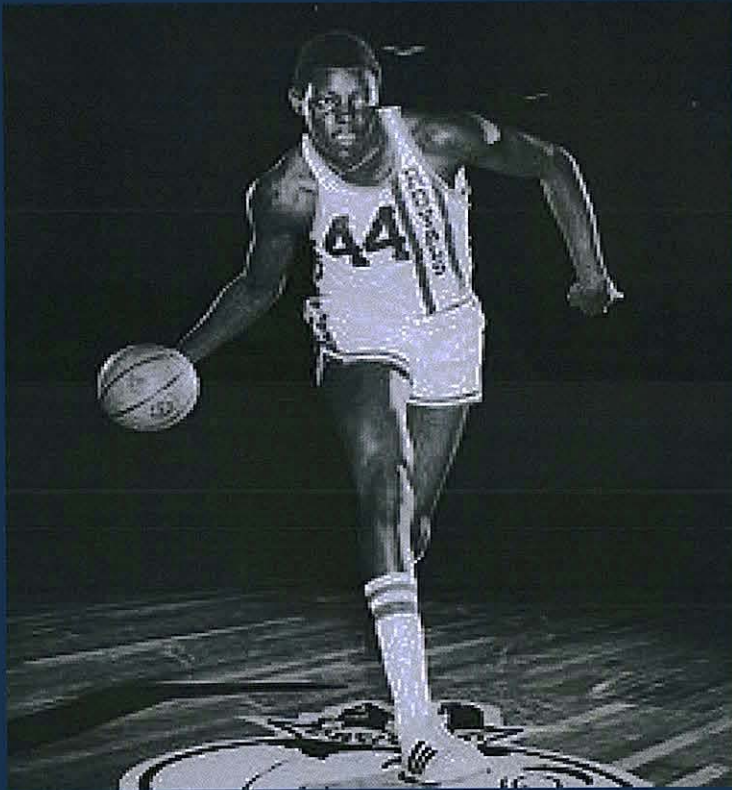


**Reverend John Matthews &  
B.B. King**

# B.B. King Takes Vitamin D



# Sam Lacey (NBA Basketball Player)



- Played at Gentry High School (Indianola, MS)
- Played at New Mexico State University (74-14 record)
- Played 13 seasons in NBA Kansas City Kings
- Died March 17, 2014

## Career NBA statistics

Points 10,303 (10.3 ppg)

Rebounds 9,687 (9.7 rpg)

Blocks 1,160 (1.5 bpg)

# BIO

Volume 145  
Number 5

SURGERY IN "SIAMESE" TWINS

723



FIG. 4. Linda and Lillian M. Xiphopagus twins prior to surgical separation.

4). Their development prior to operation followed the normal pattern for twins of their size. X-rays taken after one twin had been given barium by mouth showed that the intestine of the one herniated across the bridge into the abdominal cavity of the other, but no communication between the twins' intestinal tracts could be demonstrated (Fig. 5). Also when charcoal was administered by mouth to one, it was recovered in the diaper of the one, but not in the other. Intravenous indigo carmine to one was almost all excreted in the urine of the one with only a faint tinging of the diaper of the other, indicating only a minimal vascular communication. Surgical separation was performed by one of us (H. W.) when the twins were 5½ weeks old, using procaine locally supplemented by ether inhalations. The connecting bridge consisted of skin and fascia, cartilage joining the sterna, and a small bridge of liver which was divided between clamps. Centrally, a common peritoneal septum was present so that in separation Linda received the peritoneal covering which resulted in widely opening the peritoneal cavity of Lillian. Closure of the facial defects in both was accomplished under some tension. The resulting ventral herniae were



FIG. 5. Linda and Lillian M. Gastro-intestinal series in one twin, showing herniation of viscera into the abdominal cavity of the other, but no communication between the twins' intestinal tracts.



FIG. 6. Linda and Lillian M., age 14 mos., with mother.

## Matthews Siamese twin sisters

## Separated in 1955

## Made medical history

# BIO

## Indianola native treats Fordice

■ Dr. Ray Matthews was valedictorian of his 1981 Gentry High School class.

By ROBERT H. SMITH

Dr. Ray Matthews, 33, of Atlanta, who is originally from Indianola, ended up treating Gov. Kirk Fordice on Tuesday evening at the Grenada Lake Medical Center following the governor's fiery wreck.

Dr. Matthews, who is a final-year resident in general surgery at Grady Memorial Hospital in Atlanta, was working during his vacation when he suddenly found himself caring for the injured gov-

ernor of Mississippi.

Gov. Fordice suffered broken ribs, an injured ear and a collapsed lung as a result of a single-vehicle crash Tuesday on I-55 near Grenada.

"I was arriving at the ER just moments after they brought him in," said Dr. Matthews. "I had driven from Indianola where I was staying with my mother."

Matthews told The E-T he had a 24-hour shift at the emergency room in Grenada. He said he tried

not to let Fordice's status affect him when he was informed of the identity of his patient.

"I try to stay calm and treat all patients the same and do what you can," he said.

Matthews recalled that he treated all kinds of patients when he worked at D.C. General Hospital in Washington, D.C.

Matthews was the valedictorian of the 1981 graduating class at Gentry High School.

He attended the University of Mississippi from 1981 to 1985 and attended medical school at the University of Mississippi Medical

See DOCTOR, Page 12.

## DOCTOR

CONTINUED FROM PAGE 1

Center in Jackson from 1985 to 1989.

Dr. Matthews gave a press conference yesterday afternoon in Grenada, telling reporters that Fordice had been prepared at the Grenada Lake Medical Center for transfer by vehicle to Jackson.

It is not unusual for persons who have suffered the kind of trauma that Gov. Fordice suffered to be transferred either to Memphis or Jackson, Dr. Matthews said during his press conference.

The governor was conscious while being treated in Grenada and was never near death, Dr. Matthews said during his press conference.

Dr. Matthews' mother is Mrs. Missouri Matthews of 904 Battle Street in Indianola.

## Injured Miss. governor in serious condition

By Gina Holland  
The Associated Press

**JACKSON, Miss. — Gov. Kirk Fordice was in intensive care Wednesday, recovering from serious injuries after his Jeep ran off a highway as he drove alone several miles behind his official escort.**

The state troopers assigned to accompany him were unaware of the wreck until they were notified by radio, officials acknowledged.

Fordice, 62, was in serious condition

— upgraded from critical — at the University of Mississippi Medical Center with bruises to his heart, lung and liver. He also had fractured ribs, a broken shoulder, a collapsed left lung, a severely lacerated ear.

The governor's 1996 Jeep Grand Cherokee ran off Interstate 55 some 15 miles north of



Fordice: Official escort wasn't there

Grenada, rolled several times and caught fire about dusk Tuesday. Grenada is 105 miles north of Jackson.

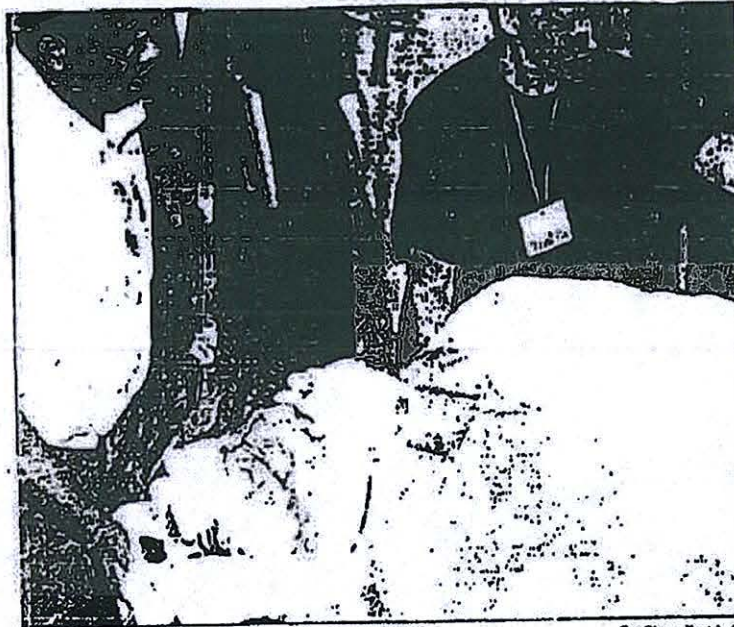
Fordice, a conservative Republican in the first year of his second term, remained on a ventilator to assist his breathing. His attending physician, Keith Thomae, estimated he would be hospitalized for at least two weeks "if everything went perfect."

"He's conscious enough to know that family members are at the bedside," Thomae said.

Lt. Gov. Ronnie Musgrove became acting governor.

The cause of the wreck remained under investigation. The weather was clear and the hospital said there was no evidence of alcohol use.

Travelers who stopped to help had to tear a door off, clear away Fordice's deployed



At hospital: Gov. Kirk Fordice arrives at the University of Mississippi Medical Center after his car ran off a highway Tuesday evening.

air bag and cut through a seat belt. "The fire was right there around him," said truck driver William Lowe, one of those who helped free Fordice.

Fordice was en route to

Jackson for a GOP election night gathering.

The governor "typically takes the afternoon off Election Day," spokesman Heath Hall said. "He generally likes

to get out and drive sometimes and clear his thoughts and this was one of those occasions."

State Public Safety Commissioner Jim Ingram initially insisted that state troopers who guard Fordice were "near the governor at all times."

Lowe, however, said he saw no troopers at the scene. Anc Vicky Reyna, a Grenada County Sheriff's Department dispatcher, said a motorist, not a trooper, initially reported the wreck by cellular phone.

Ingram later recanted, saying troopers were three miles in front of Fordice.

Doctors said the outlook is good for Fordice.

"It looks like he's holding his own," said plastic surgeon Michael Angel, one of about 15 physicians treating Fordice.

Angel said a third of Fordice's ear "was just hanging by a thread." It took about 4 stitches to repair the wound.

"He's nearly out of the woods," Angel said. "I have good feeling that he's going to have a good recovery."

# BIO

## Dr. Matthews was on scene in New York City

■ Local surgeon and Gentry graduate was at medical conference when attack occurred; others in county had relatives near World Trade Center Tuesday.

Other Sunflower Countians also had a personal connection with the tragedy at the World Trade Center Tuesday.

One of those was Ray Matthews, a Gentry High School graduate who now works as a surgeon in the emergency room at King's Daughters Hospital in Greenville.

Matthews, 38, told The E-T Tuesday that he was in New Jersey for an Educational Medical Seminar when the incident occurred.

After the attacks, Matthews said, the doctors at the conference were brought across the harbor to Liberty Island Park on Ellis Island, where an outdoor triage area was set up.

Matthews said that about 120 doctors and 100 paramedics were in his group that was called on to help out.

Talking to The E-T from a cell-phone at the triage area, Matthews said that he could see fighter planes flying overhead, and that armed guards with M16s were posted at the gates of Ellis Island.

"The Air Force is policing the area," he said. "It's pretty intense."

Matthews, who said that he had arrived in New York on Saturday, said that he had never been to the World Trade Center, but had planned to tour it after his workshop.

"But unfortunately, that's changed," he said.

This is not Matthews' first brush with history as a surgeon.

In November 1996, while working in the emergency room at Grenada Lake Medical Center,

with a famous patient — then-Gov. Kirk Fordice.

Fordice had been brought to the emergency room there following his wreck on I-55 on his way back from Memphis, having suffered broken ribs, an injured ear and a collapsed lung as a result of the crash. Fordice received treatment in Grenada before being transferred to Jackson.

Marsha and Jack Bishop's daughter, Martha Barron Bertram, was at work not far from the World Trade Center when the attacks occurred.

Marsha Bishop was at a doctor's office when the crashes occurred, she said, and did not learn about it until she got out and saw the news on television in the lobby.

Her first concern, she said, was for her daughter's safety.

Bishop said that when she returned to her car, she saw on her cell phone that her daughter had called, and was able to talk to her not too long afterwards.

"I would say within 10 minutes I knew she was OK," Bishop said. "But it seemed like a long time."

She said that her daughter, who is 28, witnessed part of the tragedy from where she worked.

"She could look out her window and see the second one collapse," she said. "She was real upset, naturally."

"She was crying, she was so devastated," she said.

Bishop said that her daughter had been able to determine pretty quickly that her husband was safe.

"They couldn't use their cell phones — they couldn't talk," she

said, explaining that it was hard to get a cell phone connection after the disaster. "But they could send e-mail through their cell phones."

She said that she appreciated the support and concern from all those who called to check on her and her daughter.

"When I came home, there were so many messages," she said.

Bishop said that she was upset about the attack.

"I'm angered about it," she said.

**Marsha Bishop's daughter was at work nearby. Within 10 minutes I knew she was OK. But it seemed like a long time.**

# Dr. Willem Kolff



## Dr. Willem Kolff

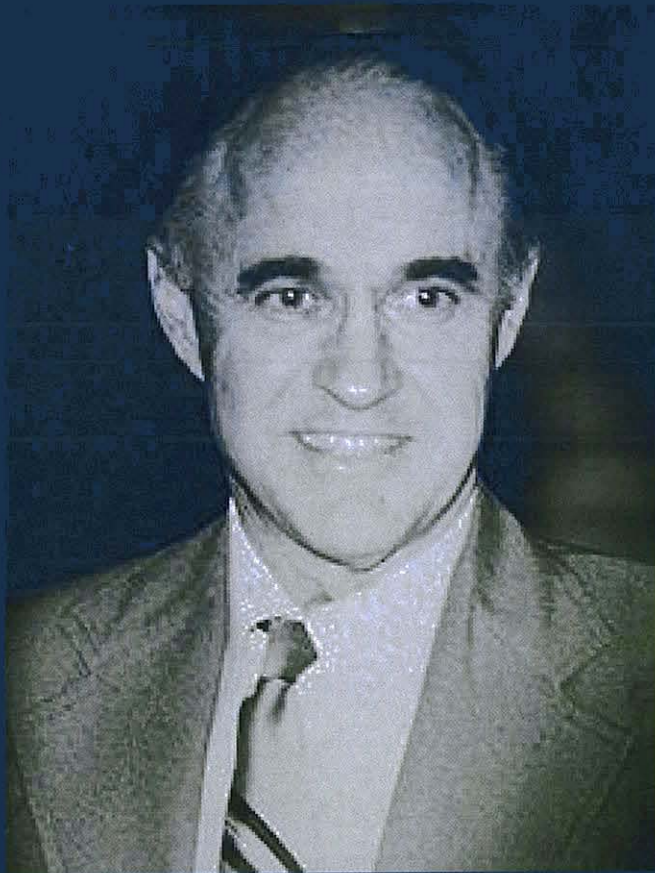
- Father of Hemodialysis
- Invented Artificial Heart
- Invented intraaortic ballon pump (IAAP)

## Dr. Jacob Kolff

- Son of Dr. Willem Kolff
- Prominent heart transplant surgeon
- Improved artificial heart

Retired in Pennsylvania

# Dr. Arthur Guyton-University of Mississippi Medical Center



- Published 9 editions of Guyton's textbook of medical physiology
- Built first motorized wheelchair
- 10 children/10 doctors
- BP meds based on his research

# Dr. James D. Hardy

## University of Mississippi Medical Center



- World's first heart transplant
- First lung transplant → Medgar Evers
- First double lung transplant
- Hardy's textbook of surgery

## Clay Simpson Jr., PhD



Public Health Deputy  
Assistant Secretary for  
Minority Health in the Department of  
Health and Human Services

# Dr. Clay Simpson

- Charter member of Federal Government's Senior Executive Service (SES)
- Received Distinguished Executive Presidential Rank Award in 1991 (highest award in SES)
- Received the SES Meritorious Executive Presidential Rank Award
- More than 31 years of federal service

# President George H. W. Bush & Dr. Clay Simpson



*To Clay Simpson  
Congratulations and best wishes*

*Gez Bush*

## ER DRAMA: COUPLE WEDS AT KDH

# Heart condition changes plans for families

**MOLLY MORGAN**  
DELTA DEMOCRAT TIMES

For Brian McGaugh 25, and Marcie Winborne, 27, the most joyous day of their lives almost didn't happen.

The young Greenville couple was supposed to exchange wedding vows at St. Joseph Catholic Church on April 6.

Instead, they found themselves saying their "I dos" in the emergency room of The King's Daughters Hospital.

Marcie, who has been diagnosed with supraventricular tachycardia, a disorder that raises the heart rate, had felt her heart begin to race earlier that morning.

So, she went to lie down, hoping it would slow down.

"It wasn't that abnormal because it has happened before, but I have been able to make it stop," Marcie said in a recent interview. "This will just happen out of nowhere, and it doesn't happen when I get nervous."

"A lot of people asked me if it happened because I was nervous about the wedding," she said, "but it can happen even when I am stress free."

Marcie's heart rate accelerated to 230 beats per minute, more than two times faster than the highest rate considered normal, so her father called her fiancé Brian.

"I just got out of bed and took a shower because I had seen this happen to her before, and she has always been able to control it," Brian said.

"I went over to her house and told her we could drive around to calm her down, but she fell to her knees before she could reach the car," he said.

Marcie, a registered nurse at The King's Daughters Hospital, was rushed there when her heart would not slow down.

After taking her pulse, the doctor on call, Ray Matthews, gave the families the bad news: Marcie would have to stay in the hospital for observations, which could have forced the wedding to be postponed.

Undaunted, the young couple was determined not to put their special day off any longer. So, as guests began filing into the church, Brian and Marcie were still trying to find a way to get



FOR THE DELTA DEMOCRAT TIMES

Newlyweds Brian McGaugh (left), 25, and Marcie Winborne, 27, of Greenville pose on Winborne's hospital bed on their April 6 wedding day. The couple got married at The King's Daughters Hospital after Winborne's heartbeat accelerated, leading to her hospitalization.

married. Dr. Matthews

"Nobody really knows who brought up the initial idea to get married at the emergency room, but we were soon making the plans to call Father (Richard) Somers and do the wedding anyway," Brian said.

Somers, the pastor of St. Joseph Catholic Church who performed the ceremony, called the Diocese of Jackson to get permission to do the ceremony outside of the church. As soon as the request was approved by church officials, Somers arrived at the emergency room.

"This was a first for me because I had never

See **VOWS** on A7

## Worsening severity of vitamin D deficiency is associated with increased length of stay, surgical intensive care unit cost, and mortality rate in surgical intensive care unit patients

L. Rav Matthews, M D , Yusuf Ahmed, M D, M P H, Kenneth L. Wilson, M D, Diane D. Groggs, N.P., Omar K. Danner, M D

Received 8 March 2011; received in revised form 6 July 2011 published online 13 February 2012

[Abstract](#) [Full Text](#) [PDF](#) [Images](#) [References](#)

### Abstract

#### Background

>Vitamin D deficiency is the most common nutritional deficiency in the United States. It is seldom measured or recognized, and rarely is treated, particularly in critically ill patients. The purpose of this study was to investigate the prevalence and impact of vitamin D deficiency in surgical intensive care unit patients. We hypothesized that severe vitamin D deficiency increases the length of stay, mortality rate, and cost in critically ill patients admitted to surgical intensive care units.

#### Methods

We performed a prospective observational study of vitamin D status on 258 consecutive patients admitted to the Surgical Intensive Care Unit at Grady Memorial Hospital between August 2008 and January 2010. Vitamin D levels (25 [OH]2 vitamin-D3) were measured by high-pressure liquid chromatography and tandem mass spectrometry. Vitamin D deficiency was defined as follows: severe deficiency was categorized as less than 13 ng/mL; moderate deficiency was categorized as 14 to 28 ng/mL; mild deficiency was categorized as 27 to 39 ng/mL; and normal levels were categorized as greater than 40 ng/mL.

#### Results

Of the 258 patients evaluated, 70.2% (181) were men, and 29.8% (77) were women; 57.6% (148) were African American and 32.4% (109) were Caucasian. A total of 138 (53.5%) patients had severe vitamin D deficiency, 96 (37.2%) had moderate deficiency, 18 (7.0%) had mild deficiency, and 3 (1.2%) of the patients had normal vitamin D levels. The mean length of stay in the Surgical Intensive Care Unit for the severe vitamin D-deficient group was  $13.33 \pm 19.5$  days versus  $7.29 \pm 15.3$  days and  $5.17 \pm 6.5$  days for the moderate and mild vitamin D-deficient groups, respectively, which was clinically significant ( $P = .002$ ). The mean treatment cost during the patient stay in the surgical intensive care unit was  $\$51,413.33 \pm \$75,123.00$  for the severe vitamin D-deficient group,  $\$28,123.65 \pm \$59,752.00$  for the moderate group, and  $\$20,414.11 \pm \$25,714.30$  for the mild vitamin D-deficient group, which also was clinically significant ( $P = .027$ ). More importantly, the mortality rate for the severe vitamin D-deficient group was 17 (12.3%) versus 11 (11.5%) in the moderate group ( $P = .125$ ). Because no deaths occurred in the mildly or normal vitamin D-deficient groups, we compared the mortality rate between severe/moderate and mild/normal vitamin D groups ( $P = .047$ ).

#### Conclusions

In univariate analysis, severe and moderate vitamin D deficiency was related inversely to the length of stay in the surgical intensive care unit ( $r = .194$ ;  $P = .001$ ), related inversely to surgical intensive care unit treatment cost ( $r = .194$ ;  $P = .001$ ) and mortality ( $r = .125$ ;  $P = .023$ ), compared with the mild vitamin D-deficient group, after adjusting for age, sex, race, and comorbidities (myocardial infarctions, acute renal failure, and pneumonia); the length of stay, surgical intensive care unit cost, and mortality remained significantly associated with vitamin D deficiency.

**Keywords:** [Vitamin D](#), [Deficiency](#), [Surgical intensive care unit](#), [Severe](#)

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# Severe vitamin D deficiency is associated with worsened outcomes in surgical patients with ventilated-associated pneumonia

[Leslie Ray Matthews](#), MD, FACS, [Kenneth Wilson](#), MD, FACS, [Yusuf Ahmed](#), MD, MPH, [Diane Griggs](#), NP, Ed Childs, MD, FACS, [Omar Danner](#), MD, FACS

Morehouse School of Medicine, Atlanta, GA

[Full Text](#) [PDF](#)

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- II. [Methods](#)
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## Introduction

Vitamin-D deficiency adversely affects immune function in critically-ill patients. This study investigates the impact of vitamin - D deficiency in surgical intensive care unit (SICU) patients with ventilated-associated pneumonia (VAP). We hypothesize that severe vitamin-D deficiency increases the incidence, length of stay (LOS), hospital costs, and mortality rate in critically-ill patients with VAP.

## Methods

We performed a prospective assessment of the vitamin-D status of 565 patients admitted to our SICU between August 2009 and February 2012. We assess the surgical outcomes in this patient population that developed VAP. Vitamin D deficiency was defined as follows: severe, less than 13; moderate 14-26; mild 27-39; and normal 40 ng/mL.

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## Results

Of the 565 patients, 403 (71.3%) were male, and 162 (28.7%) were female, 388 (68.7%) were African-Americans and 177 (31.3%) were Caucasian. 46.8% were severe vitamin D deficient, 42.3% had moderate deficiency, and 8.8% mildly deficiency to normal. The incidence of VAP was 20.7% overall. The severe group comprised 61.3% versus 38.7% in the non-severe (moderately & mildly deficiency) VAP population (p value, 0.020). Mean SICU LOS for severely deficient group was 11.90 days versus 7.16 days (<0.001). Average ICU cost was \$45,689.67 for severe group with VAP versus \$27,627.45 (p< 0.001). Mortality rate for severe vitamin D deficient group with VAP was 12.7% versus 8.6%, (p= 0.090), trending towards higher mortality.

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## Conclusions

Severe vitamin-D deficiency increases VAP-associated incidence, LOS, and total hospital costs in SICU patients. Therefore, vitamin D deficiency should be assessed and corrected in critically-ill SICU patients expeditiously.

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# BIO

e~NEWS WEEKLY

## MSM IN THE NEWS

### NATIONAL NEWS



L. Ray Matthews, M.D.

### Dr. L. Ray Matthews Published in *The New England Journal of Medicine*

A paper on trauma surgery by Morehouse School of Medicine (MSM) Assistant Professor of General Surgery, Trauma and Surgical Critical Care L. Ray Matthews, M.D., has been published in the Jan. 29, 2009 issue of *The New England Journal of Medicine*. The article recounts the case of a 24-year-old car accident victim who was stabilized at a local hospital before being transferred to a regional trauma center.

“The title of the article, Traumatic Diaphragmatic Rupture with Intrathoracic Liver Herniation means that a patient’s liver was in his chest instead of his abdomen,” Matthews says. “The diaphragm is a muscle that separates the chest from the abdomen. Trauma patients can rupture this muscle, which results in abdominal organs being in the chest.”

This is Matthews first-ever published article in the prestigious NEJM. He began work at MSM two years ago following his fellowship at the Mayo Clinic in Rochester, Minn., where he also served as a senior associate consultant for the clinic. In addition to his daily surgical routine, Matthews also teaches MSM surgical residents and medical students.

An abstract of the article appears below:

## Former Grady/Morehouse Trauma Patient



- Prominent Stockbroker
- 40 something male S/P Bicycle versus Car Accident
- Traumatic brain injury
- 46 other serious injuries
- Told he would never walk again
- TV commercials, billboards, radio interviews

# Applications of Vitamin D in Sports Medicine

Thank You

Any Questions??