

# Minimal Trauma Fractures, Deadly but Ignored (part II).

## HiROC and High Value Approach.



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Department Internal Medicine Grand Rounds  
The University of Texas  
Southwestern Medical Center  
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*This is to acknowledge that Ugis Gruntmanis, M.D. has disclosed that he does not have any financial interests or other relationships with commercial concerns related directly or indirectly to this program. Dr. Gruntmanis will not be discussing off-label uses in his presentation.*

Presenter: Ugis Gruntmanis, M.D.

Rank: Associate Professor

Division: Endocrinology

Purpose & Overview:

The purpose of this talk is to discuss quality and costs of healthcare globally. Particularly, the focus will be on quality of post-fracture care in the United States and presently at UT Southwestern. The Stepwise Approach will be discussed in improving post-fracture care, hopefully resulting in the High Value HiROC (High Risk Osteoporosis Care) model.

Objectives:

- Overview of quality for post-fracture care that patients currently receive
- Introduce HiROC to UT Southwestern
- Discuss High Value Care Model

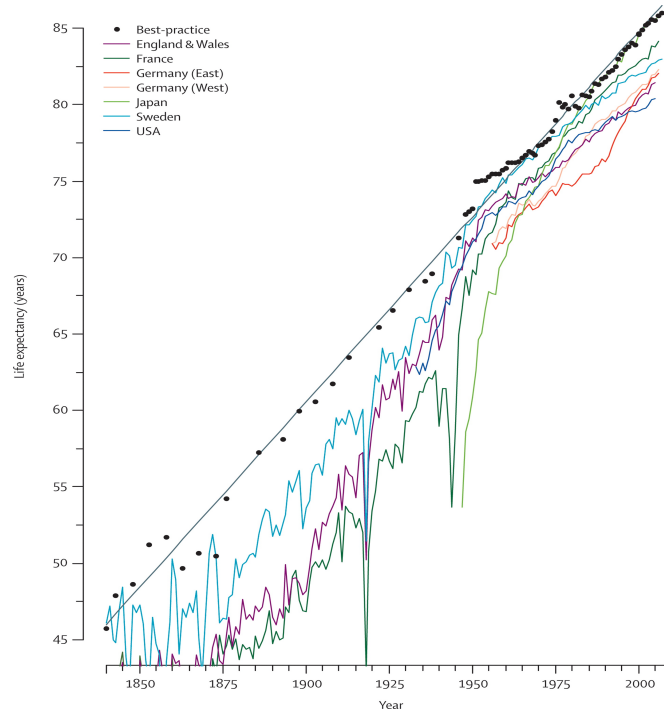
Biosketch:

Dr. Gruntmanis is an Associate Professor in the Division of Endocrinology as well as an Associate Director of the Department of Internal Medicine's Residency Program. Dr. Gruntmanis received his medical training from Stradins University in Riga, Latvia. He completed his Internal Medicine training at Yale and the University of Rochester along with his Endocrinology fellowship at Cedars Sinai/UCLA. Dr. Gruntmanis has been at UT Southwestern since 2001. His clinical and research interests include different aspects of male osteoporosis and hypogonadism. Dr. Gruntmanis' other passions include medical education, mechanisms of health care delivery and how to improve health care value to patients presently at UT Southwestern and in his native country Latvia. He has also served as an advisor to Secretaries of Health and Welfare of the Republic of Latvia.

## Cost & Quality of Health care in United States and Texas

The discussion about minimal trauma fractures and osteoporosis is possible due to significant advances in health care and increased longevity in the United States and around the world (Christensen K et al. Lancet. 2009; 374:1196-1208).

### Survival



Christensen K et al., Lancet. 2009; 374:1196-1208

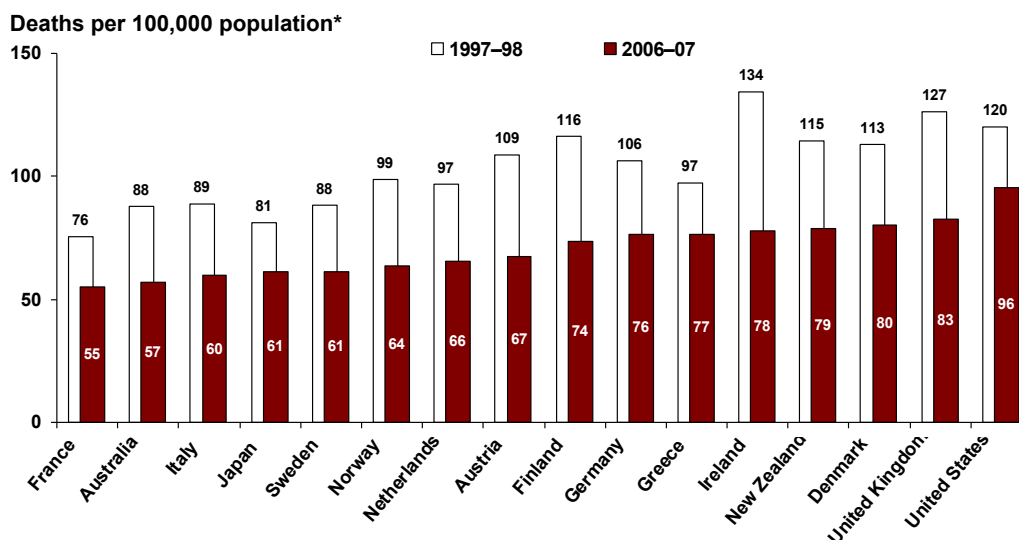
Even though health care is responsible for spending 18% of GDP (OECD Health Data 2009), it only accounts for 10% of reduction in premature mortality. Other factors are behavioral patterns 40%, genetic predisposition 30%, and social circumstances 15% (Schroeder et al. N Engl J of Med 2007; 357:1221-28).

Despite high and unsustainable spending levels, it was found that quality of health care provided in the United States is at best average when compared with other developed economies and the need to improve. The seminal paper (McGlynn EA et al. N Engl J Med 2003; 348:2635-2645) found that patients in the US received the recommended care in slightly more than 50% of cases, then in some conditions, such as, “hip fracture” patients received only 23% of recommended care. Responding to this study and others, the Institute of Medicine (IOM) published a report termed Crossing the Quality Chasm.

(<http://www.iom.edu/Reports/2001/Crossing-the-Quality-Chasm-A-New-Health-System-for-the-21st-Century.aspx>). This publication by the IOM defined what would High Performance Health System (HPHS) look like, and called for improvements and to provide care which is safe, effective, patient centered, timely, efficient and equitable. In other words, it is what Michael Porter MD would call High Value Care. Therefore, what has happened since?

The Commonwealth Fund recently looked at 16 developed countries to find out if mortality had been amenable to health care and has it improved during the period from 1997-2007, and it has. Across the board by about 30%, yet the United States is lacking in this metric.

## Mortality Amenable to Health Care



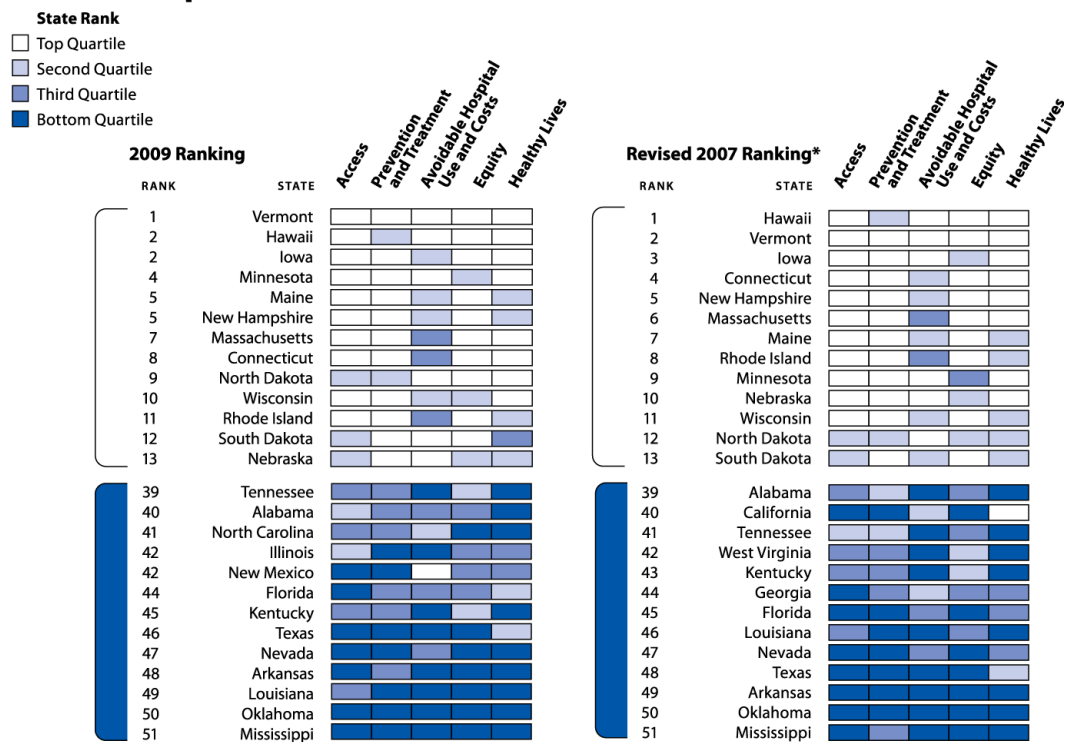
Countries' age-standardized death rates before age 75; including ischemic heart disease, diabetes, stroke, and bacterial infections.

Source: Commonwealth Fund National Scorecard on U.S. Health System Performance, 2011.

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They also found that transformation towards HPHS is slow. As an example, equity from 2006 to 2011 has not changed and stands at 69%. Quality has improved some and efficiency is again the same as it was in 2006, at 53%. During the years 2007 to 2009, Health System Performance in Texas improved slightly in the national ranking, moving from the 48 position to the 46 position, although we clearly rank in the bottom quartile in access, equity, prevention, treatment, along with avoidable hospital use and costs.

## States in Top and Bottom Quartiles, 2009 and 2007

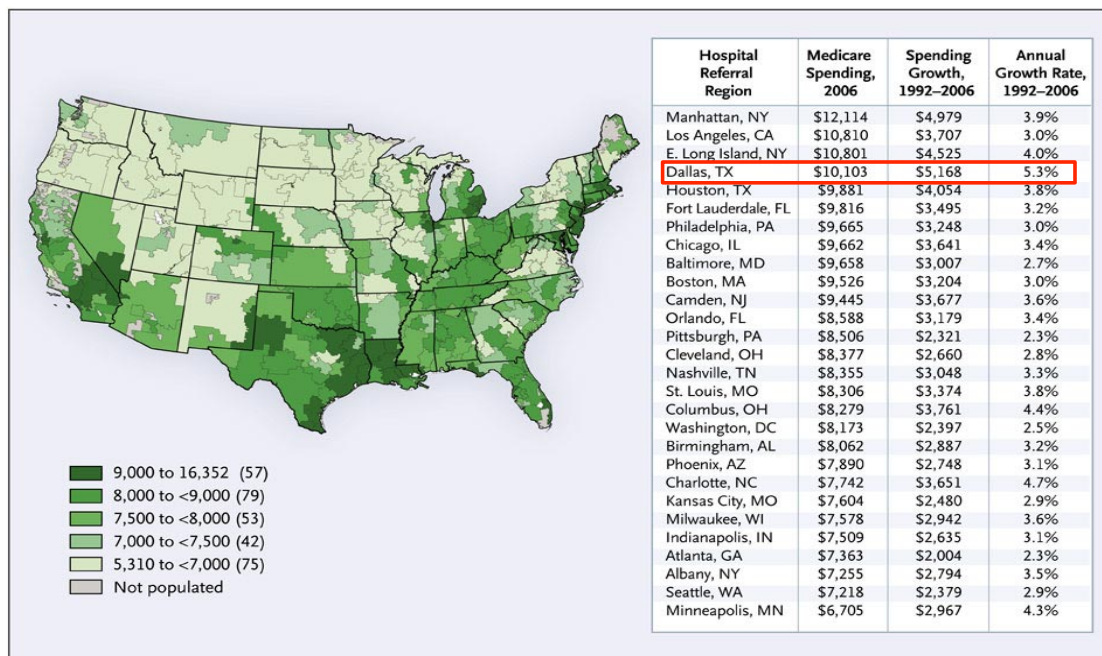


\* Some state rates from the 2007 edition have been revised to match methodology used in the 2009 edition.  
SOURCE: Commonwealth Fund State Scorecard on Health System Performance, 2009

Data from the Dartmouth atlas shows that in 2006, two Texas cities, Dallas and Houston are 4<sup>th</sup> and 5<sup>th</sup> receive highest noncapitated Medicare reimbursement rates, \$10,103 and \$9881, respectively (Fisher E et al. N Engl J Med 2009;360:849-852).

In 2010 the tables turned and Houston now spends \$11,567, Dallas \$11,484, San Antonio \$10,367, and McAllen, Texas “only” \$13,824 (down from ~\$18,000).

*Reimbursement Rates for Noncapitated Medicare per Enrollee, 2006, and Annual Growth in Medicare Reimbursements, 1992-2006, for the 25 Largest U.S. Hospital-Referral Regions*



Fisher E et al. N Engl J Med 2009;360:849-852

Despite generally bleak improvements in quality, there have been pockets of excellence, showing that better care can be achieved. In 2007, the National Committee for Quality Assurance (NCQA) dropped use of Beta-Blocker Treatment after Myocardial Infarction. It was no longer needed as most patients received Beta-Blockers after MI (Lee TH. N Engl J Med 2007; 357:1175-1177). Yet this story was hardly one of overnight success. The NCQA's action came 25 years after the publication of the Beta-Blocker Heart Attack Trial (BHAT). To improve quality of care, American Heart Association has instituted Get with Guidelines for care of stroke, atrial fibrillation and others, American Orthopedic Association used it as an example and started Own the Bone Program in 2009, so it is clear that some progress is made.

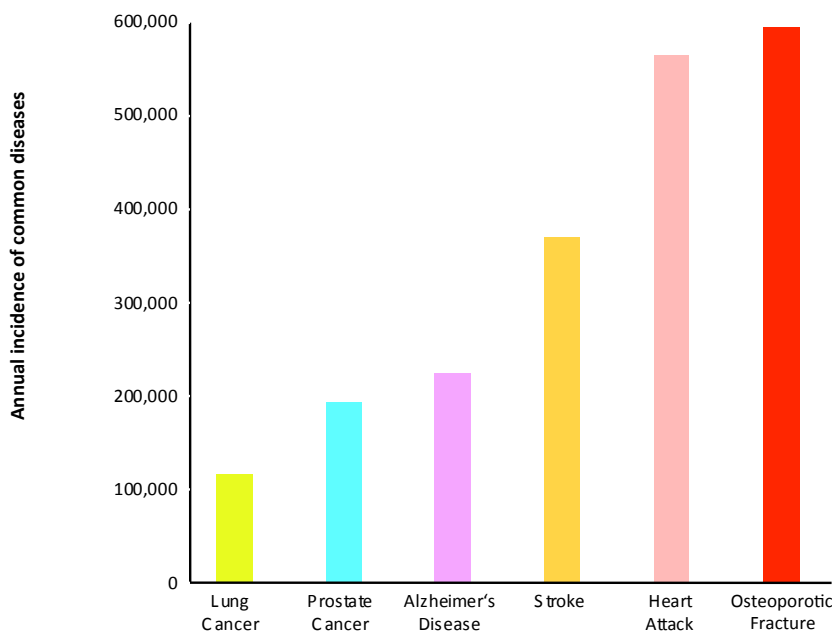
## Epidemiology & Costs of Hip and Other Fractures

Minimal trauma fractures are common and are utterly unrecognized problems. Annually there are more than 2 million fractures (600,000 in men), as compared with 800,000 strokes and about the same number of myocardial infarctions (Anon, National Osteoporosis Foundation/Fast facts on osteoporosis, 2008 Anon, Heart disease and stroke statistics - 2009 update. Circulation, 2009; 119:e21-181 American Cancer Society, statistics for 2009:

[www.cancer.org/docroot/STT/STT\\_O.asp](http://www.cancer.org/docroot/STT/STT_O.asp)).

Fifty-two million people have low bone mineral density (BMD) as measured by dual-energy X-ray absorptiometry (DXA). Thirty-nine percent of fractures take place in men and 61% are women. A total of all fractures include 14% hip, 20% forearm, 41% vertebral and 25% humerus fractures. Annually 300,000 hip fractures take place, with one-year mortality reaching 17-22% in women and 31-35% in men (Khosla S et al. Endocrine Rev. 2008; 29:441-64).

## Incidence of Chronic Disease: Men



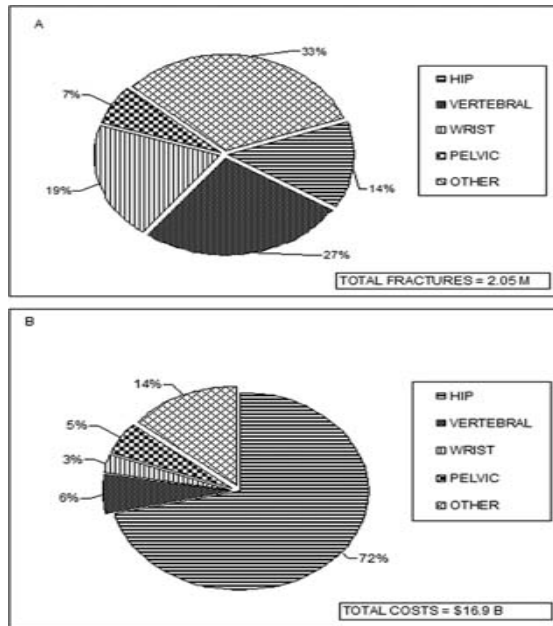
Anon, National Osteoporosis Foundation/Fast facts on osteoporosis, 2008

Anon, Heart disease and stroke statistics - 2009 update. Circulation, 2009; 119:e21-181

American Cancer Society, statistics for 2009: [www.cancer.org/docroot/STT/STT\\_O.asp](http://www.cancer.org/docroot/STT/STT_O.asp)

From those who survive, 50% do not regain their independence and/or previous mobility. What it does actually mean is that 90% of patients who did not need assistance climbing stairs before fracturing a hip will not be able to climb five steps in the year after experiencing the fracture. Sixty-six percent will not be able to get on or off a toilet without assistance. Fifty percent won't be able to raise themselves out of a chair, 31% will be unable to get out of bed without help from a caregiver and 20% will not be able to put on a pair of pants without assistance. Costs associated with fractures are also significant. In 2006, seventeen billion dollars was spent on care of fractures, 70% of which were for care after hip fractures (Burge R et al. Journal of Bone and Mineral Research. 2006 22 (3) 465-475).

## Incidence and Economic Burden of Osteoporosis-Related Fractures in the United States,



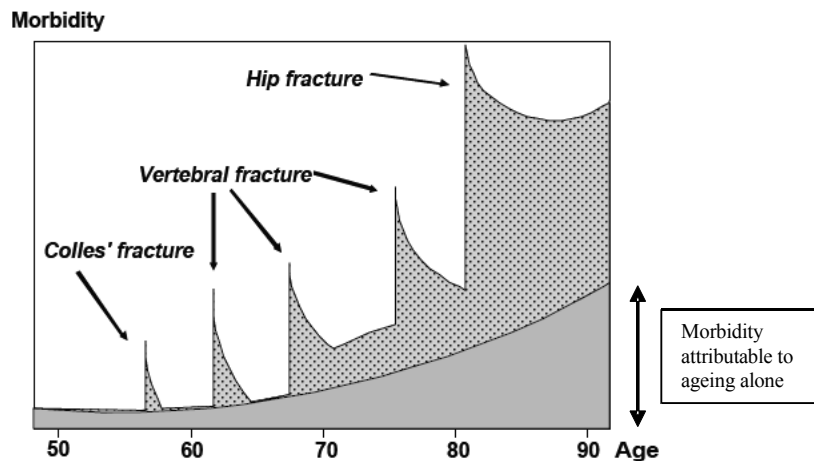
Breast cancer 4 billion,  
Prostate cancer 10 billion

Journal of Bone and Mineral Research  
Volume 22, Issue 3, pages 465-475, 4 DEC 2006

Each fracture begets a fracture and increases morbidity significantly. A hip fracture being the most severe form of bone fragility is again only 23% after receiving the recommended care.



# Fractures and morbidity.



Kanis JA & Johnell O. *Osteoporosis Review*. 2009;17(1):14-16

In 2000, a study from the University of Texas in Houston looked at three hundred and sixty-three consecutive hip fracture patients and found that after discharge from the hospital only 4.5% of men and 27% of women received therapy for osteoporosis (those who did 67% received only Calcium and vitamin D supplements). At 5 years, only 11% of men and 27% of women have had BMD done by DXA (Kiebzak GM et al. *Arch Int Med*. 2002; 162:2217-22). A study done eight years later by the Office of Inspector General in the Veterans Affairs system (95% of patients were men), showed that from 804 hip fracture patients, therapy was initiated in 4.7% and BMD by DXA done in 3% (<http://www.va.gov/oig/54/reports/VAOIG-09-03138-191.pdf>).

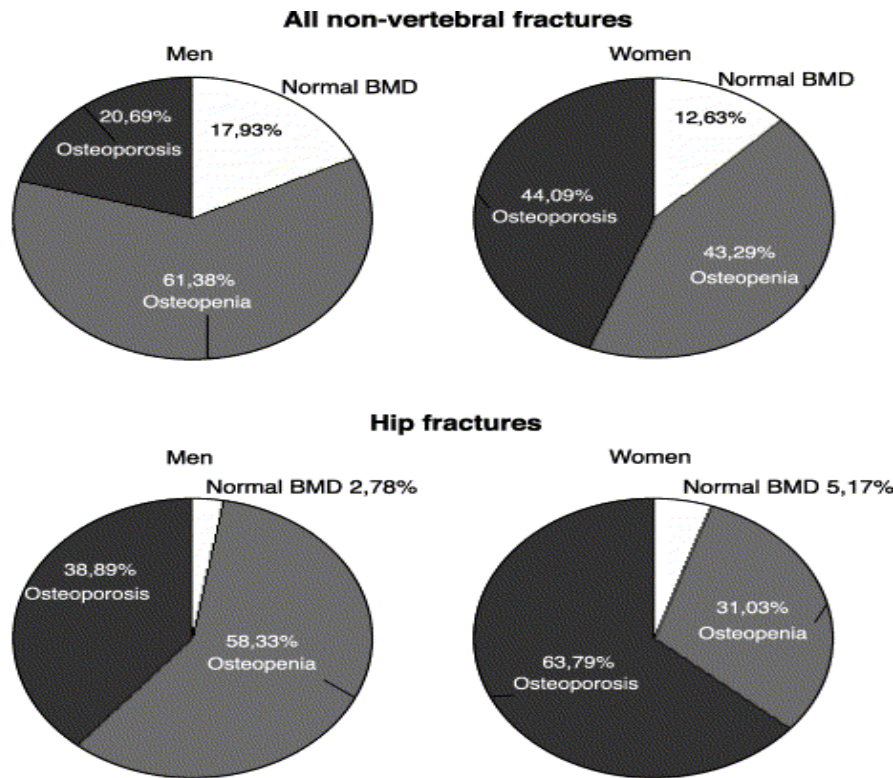
Dr. Slatnick who is resident in Physical Medicine and Rehabilitation here at UT Southwestern, together with Drs. Nguyen and Maalouf, are still collecting data on 75 patients who sustained hip fractures and were treated at UTSW in 2012 (data currently available only on 49 patients). At hospital discharge 18 of them (37%) received calcium supplements, 14 (29%) received vitamin D and none received bisphosphonates, medications studied, approved by FDA and clearly recommended in these patients.

In the largest study to date, and published this month, investigators looked at fate

of 96,887 patients who have sustained hip fracture. In 12 month follow-up period, 24% received medical treatment for osteoporosis; only 3.8% got DXA, yet 88.5% of patients have been seen by physicians in this 12 month period. (Solomon HD et al. Journal of Bone and Mineral Research. 2014. doi: [10.1002/jbmr.2202). From those who were not on osteoporosis medication before fracture, only 16.5% received them after hip fracture. Patients who were older then 80 had decreased likelihood of receiving osteoporosis medications, as did those with multiple comorbidities. Men on average were 55% less likely to receive osteoporosis medication in this study. Conclusion, patients at highest risk tend to receive medications less frequently.

### **Why Patients Do Not Receive Appropriate Care.**

Why is that, that patients at highest risk are least likely to receive treatment? Causes are complicated. First, there seems to be a clear knowledge gap between what is known about the benefits and the perceived risks of treatment for osteoporosis among patients and practitioners a like. Therefore targeted educational efforts such as these Grand Rounds should facilitate our understanding that any patients who have sustained minimal trauma fracture are at highest possible risk for subsequent fractures, increased morbidity/death and therefore, must be treated. Second, specialists who take care of patients with osteoporosis, over the years, have focused too much on BMD, interpreting it and assigning correct medication for it.



Schuit et al. *Bone*. 2004

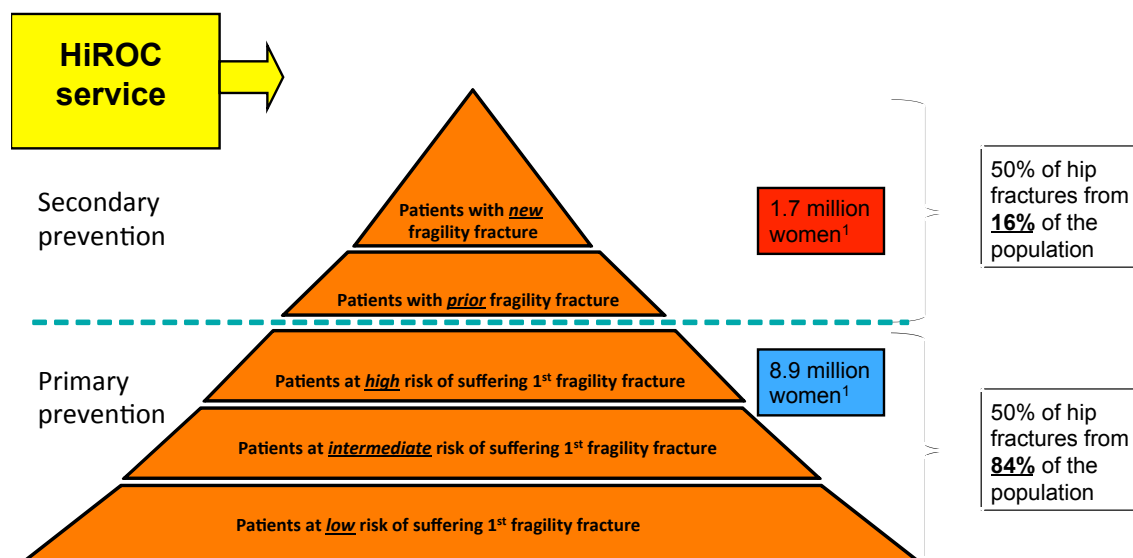
As mentioned before, our focus first should be on patients who have already sustained fracture, as their fracture risk is 3-20 times higher than in patients with “osteopenia” and “osteoporosis”. Yet the likely most important reason stems from the fragmented nature of the U.S. health care system itself. As fracture patients are seen by emergency room physicians and orthopedic surgeons, who try their best to take care of the fracture by themselves. A problem may arise upon discharge from orthopedic care when difficulties in communicating the long term needs of patients who clearly have osteoporosis come forth. This “gap” is beyond one physician’s ability to fix it. Studies have shown that the letter from the orthopedic team to the primary care physician had no significant impact on the rates of osteoporosis treatment. It is clear, that there should be system improvements along with changes in how hospitals are paid for care of hip fractures. Either fee for service or even bundle payment (if bundle is assembled incorrectly) will not stimulate physicians work across the services and departments.

From this year, care of patients after hip fracture will be a Medicare Clinical Quality Measure and likely will help us to focus on this problem, think systemically, on how can we improve.

## What is HiROC?

In UT Southwestern we have very good orthopedic, physical medicine and rehabilitation care. Physical medicine inpatient team already sees all the patients who come in with hip fracture. Some of them are later admitted to our outpatient rehabilitation care unit at Zale. After discussion with all the stakeholders, we are planning to start inpatient and outpatient HiROC (High Risk Osteoporosis Consult) service. The hope is, that HiROC will be notified (we are currently working on making this process as easy as possible) to see all the hip fracture patients while they are still inpatient as those are the patients with highest mortality and morbidity. 50% of future fractures come from 16% of population who have already had fractures and 50% come from 84% of patients with high and intermediate risk for osteoporosis.

## Risk of future fractures and allocation of resources.



7. BOA-BGS 2007 Blue Book. <http://www.nhfd.co.uk/>

15. (Adapted from) *Curr Med Res Opin* 2005;21:4:475-482 Brankin E et al

Patients' osteoporosis/fracture related medical history will be then assessed, laboratory tests, such as, 25 vitamin D (turnaround time max 4-6 hours), PTH, calcium, thyroid tests ordered, if vitamin D level will be at normal level and patient will not have contraindications, treatment with zoledronic acid will be initiated. Zoledronic acid is generic now and cost \$220 for 4mg once a year infusion. Study

by Lyles et al., showed that patients who are admitted with hip fracture and treated with zoledronic acid versus placebo, have all clinical fractures reduced by 35%, clinical vertebral fractures by 46%, clinical non-vertebral fractures by 27%, hip fractures by 30% (p value 0.18) and death by 28% (Lyles KW et al. N Engl J Med 2007;357:1799-1809). Information related to osteoporosis, role of calcium, vitamin D in bone health will be provided to all patients while in hospital. After discharge from hospital or rehabilitation service, patient will be scheduled for HiROC outpatient clinic to assess functional status, and compliance with calcium and vitamin D and other which may contribute to bone loss and falls. We will submit IRB protocol to prospectively follow these patients, and compare outcomes with historical data.

If the HiROC system works well, we will expand service to all patients who are admitted with minimal trauma fractures, then to those who have had minimal trauma fractures in the past but have not been treated for it. Finally, we would expand service to those patients who have osteoporosis by T score and/or high FRAX score.

Couple words about compression fractures. We must remember that most vertebral fractures are non-clinical but morphometric fractures and 80% of the cases go unrecognized due to a lack of complaints (Center JR et al. Lancet 1999; 353(9156):878-882). With that in mind we have to be more aggressive in identifying patients with already existing fractures. One very simple and practical approach is to measure patients' height. My experience is that very few physicians and nurses measure height even in older patients. When we do measure height and find height loss some patients are very surprised, yet others have assumed that losing two inches and more is part of the normal aging process. In a study by Siminoski et al. 4cm loss in height was associated with relative risk of vertebral compression fracture of 20.6 (Siminoski K et al. *Osteoporosis International*. 16(4):403-10, 2005 Apr). In study by us, in men with prostate cancer using GnRH agonists who have lost more than 1.5" of height, we found that 24.4% (22 out of 78), of men had compression fractures and only 5 knew that they had it (Neubecker K et al. J Osteoporos. 2011). It is clear that all patients older than 65 need their height measured once a year and height loss is found, spine films should be done to rule out compression fractures, as presence of fracture regardless of BMD should call for aggressive treatment. The second important predictor of fracture is age. This was first proven by Hui et al., who compared risk of radius fractures between women of different age groups, but similar BMD (Hui SL et al. J Clin Invest 1988; 81(6):1804-1809). This study showed that age is a powerful predictor of future risk of fracture.

Question may be if such proactive osteoporosis programs have been implemented elsewhere and what are the results?

Study recently published by Dell et al., from Kaiser Permanente, looked at 625,000 individuals over age 50, after they implemented fracture liaison service (Dell R et al. J Bone Joint Surg Am. 2009;91). They found that with this program, they prevented 1069 fractures (41% reduction from before), saved 257 lives and 39 million USD.

HiROC service has also been implemented in Geisinger and as per its founder has reduced fractures and reduced spending substantially.

### **High Value Post-fracture Care**

Questions remain if this is the best we can do and if this approach will create Value for patients. Value for this purpose will be defined as Outcomes/Costs (both for total treatment cycle and up to some period after that). To illustrate Value Care point, I will describe experience from Seattle. Virginia Mason Medical Center (VMMC) approached Starbucks and Aetna, to create High Value back pain pathway. They ultimately created system in which patients with back pain are triaged immediately to physical therapists, one approach, which has been shown to actually help patients. As the result they reduced need for MRIs and visits with specialists. The patients got better faster, with much less waiting and at lower costs. Yet no everybody felt like a winner, MRIs were very profitable for VMMC and PT was not, as a result they negotiated new contract with Aetna, to pay more for PT. So we need to rethink our processes and try to continuously improve it. Choosing Wisely initiative by ABIM started in 2009 and has targeted other low value services for improvement. Yet when one sees list made up by professional organizations, most frequently they are ready to cut services provided by specialists in other fields (Morden NE, N Engl J Med 2014; 370:589-592). Most organizations do not track and/or reward if Choosing Wisely is actually implemented. That has to improve if we genuinely want to improve value for patients and decrease escalation of health care costs.

HiROC in a way is entirely opposite from Choosing Wisely as this is one of services where we do not do too much, we actually do way too little. To advance HiROC to High Value care (Porter ME, N Engl J Med 2010; 363:2477-2481) for patients after fracture we will need to think about four issues:

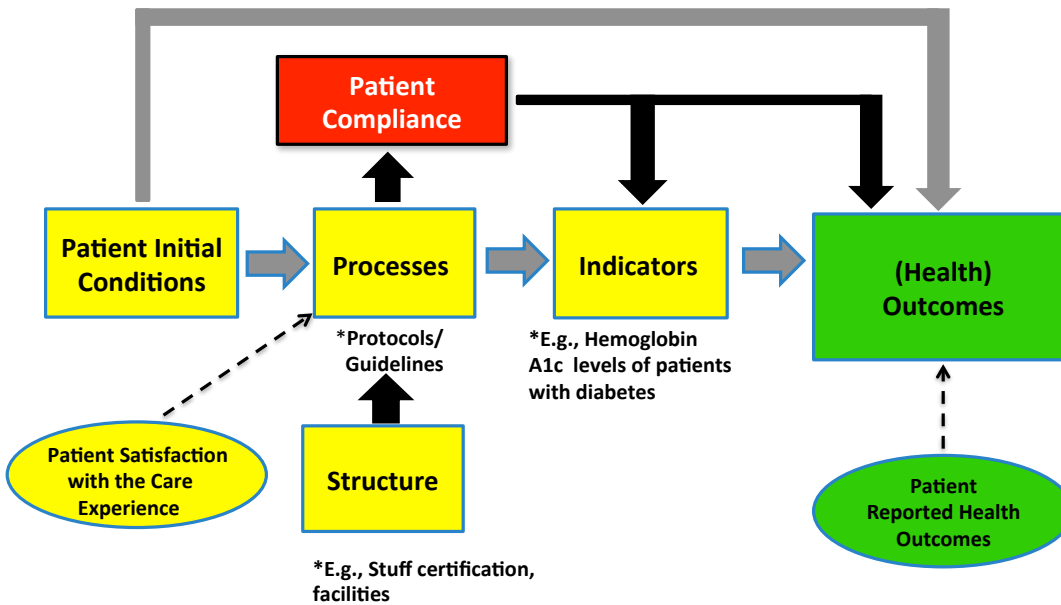
1. What do patients cherish the most and what they think would be true Value for them.
2. We should not measure Value (costs/outcome) by inputs, but outputs and outcomes to patient, such as return to work, ability to walk again to bathroom and total costs of treatment cycle (surgery, imaging, PT, drugs, consults, laboratory tests, outpatient follow-ups) till complete or partial recovery is accomplished.
3. Have to remember that Value is not the same as cutting costs across the board, but that it actually will allow flexibility to pay for services which are expensive and yet very effective, yet cut services which bring pseudo value.
4. Value Care is reducing TOTAL costs of care and not reducing costs of individual services.

I guess it all sounds good but which services will be cut? If that service was profitable for particular division, department and yet now benefits are moved to other department, how can we cope with that? Best option to address that as per Porter, is moving away from divisional/departmental accounting and towards Service lines and Integrated Practice Units (IPU) based on services involved in care of particular condition, such as fracture/osteoporosis service line. Service line patient outcomes (ones important to patient) and costs of total care cycle are carefully measured and reported. IPU is paid by bundle payments adjusted for complexity of patients and outcomes reached.

So if we could dream a bit, what would High Value fracture/post fracture service look like at UTSW?

1. IPU gets automatically notified with each minimal trauma fracture, or if patient is discovered to have untreated previous fracture from before.
2. Meet with patient/family and ask what they value the most and measure those outcomes as treatment progresses.
3. Orthopedic surgery, Physical and Rehabilitation Medicine, PT, Occupational Medicine, Nutrition, HiROC are all responsible for Totality of fracture and post-fracture care, and are paid by bundle payment which will encourage us to think and work like a team.
4. Outpatient follow-ups are seen in co-location post fracture clinic.
5. Involve patients, patient organizations more to tell us how to make system continuously better.

## Measuring Value in Health Care



Porter ME. N Engl J Med 2010;363:2477-2481.

If you have a chance, please read Thomas Lee MD and James Mongan's MD book *Chaos and Organization in Health Care* and series *Leading Health Care Innovation*, co-sponsored by New England Journal of Medicine and Harvard Business Review.

A phenomenal read.

Thank you!