



Integrated Care redesign in patients with osteoporosis and low impact fractures

Ugis Gruntmanis, M.D.



Objectives



- To learn about prevalance of low trauma fractures and osteoporosis.
- To discuss how to better coordinate care and and improve system care of patients with fractures and osteoporosis.



Patient



- 62 yo women comes in for follow-up visit
- Her BMI is increased, has HTN, is on SSRIs and PPIs
- PSH includes, plate placement for R forearm fracture 3 years ago, when he fell on ice
- Has lost 2" of height
- BMD by DXA lowest in LS -2.0SD







- How many women and men fracture due to osteoporosis during life time?
- A. 50% and 20%
- B. 10% and 5%
- C. 30% and 15%
- D. 70% and 30%





Incidence of Chronic Disease: Women

- One of two women will have minimal trauma related fracture.
- One in three will have CAD.
- One in five will have stroke.
- One in eight will have breast cancer.

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





Fractures and morbidity.

(Fracture begets fracture)

Morbidity



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

Compression fracture in men.

		All Subjects (N=78; Vertebral Fx= 22/78=24.4%)		Non-African American (N=59; Vertebral Fx= 18/59=31%)		African American (N=19; Vertebral Fx=4/19=21%)		
		ROC AUC	95% CI	ROC AUC	95% CI	ROC AUC	95% CI	
FRAX (Hip) without BMD	before Xray	0.55	0.39 - 0.70	0.59	0.42 - 0.77	0.42	0.15 - 0.70	
	after Xray	0.66	0.53 - 0.78	0.63	0.47 - 0.78	0.72	0.42 - 1.00	
FRAX (Osteo) without BMD	before Xray	0.59	0.43 - 0.75	0.66	0.48 - 0.84	0.50	0.22 - 0.78	
	after Xray	0.74	0.62 - 0.85	0.73	0.59 - 0.87	0.94	0.82 - 1.00	
FRAX (Hip) with BMD	before Xray	0.53	0.37 - 0.69	0.60	0.42 - 0.79	0.64	0.18 - 1.00	
	after Xray	0.66	0.52 - 0.80	0.63	0.47 - 0.79	0.74	0.39 - 1.00	
FRAX (Osteo) with BMD	before Xray	0.54	0.38 - 0.69	0.62	0.43 - 0.82	0.69	0.30 - 1.00	
	after Xray	0.72	0.60 - 0.84	0.70	0.55 - 0.84	0.95	0.84 - 1.00	

How many patients with hip fractures have had previous fractures?



12. ASBMR 2006. 28th Annual Meeting in Philadelphia, Pennsylvania, USA. 2006. Abstract SA405. Lyles KW et al

13. Clin Orthop Rel Res 2007;461:226-230 Edwards BJ et al

Graph courtesy of Dr. JR Bayly

14. NHS Quality Improvement Scotland. Effectiveness of Strategies for the Secondary Prevention of Osteoporotic Fractures in Scotland. 2004. McLellan AR et al





Hip Fractures

High rate of morbidity

- 50% of patients do not regain their independence
- 50% of patients do not regain their previous mobility

High rate of mortality

- 17-22% in women and 31-35% within 1 year

Khosla S, Amin S, Orwoll E. Endocrine Rev.





Hip Fractures

- 90 percent of patients who did not need assistance climbing stairs before hip fracture, are not able to climb five steps in the year after the fracture.
- 66 percent can not get on or off a toilet without assistance.
- 50 percent are not able to raise themselves out of a chair.
- 31 percent are not able to get out of bed without help from a caregiver.
- 20 percent are not be able to put on a pair of pants without assistance.

FIGURE 3: INCIDENCE OF OSTEOPOROTIC FRACTURES AMONG MEDICARE FFS BENEFICIARIES BY FRACTURE TYPE IN 2016, NEW HAMPSHIRE

FRACTURE TYPE	OSTEOPOROTIC FRACTURE RATE PER 10,000 BENEFICIARIES	ESTIMATED OSTEOPOROTIC FRACTURES IN 2016*
Нір	64.2	1,500
Distal Femur/Femur	16.1	400
Pelvis/Sacrum	23.5	600
Tibia/Fibula	40.6	1,000
Humerus	38.3	900
Radius/Ulna	14.6	400
Distal Radius/Ulna	36.5	900
Clavicle	10.2	200
Spine	99.0	2,400
Rib	57.0	1,400
Total	399.9	9,700

FIGURE 5: PROPORTION OF MEDICARE FFS BENEFICIARIES WITH A NEW OSTEOPOROTIC FRACTURE IN 2016 WHO HAD KEY POST-FRACTURE EVENTS DURING THEIR OSTEOPOROTIC FRACTURE EPISODES, NEW HAMPSHIRE

Percent of Episodes...

(Estimated New Hampshire Medicare FFS beneficiaries with

Parts A and B or Part A alone coverage)

In which the beneficiary dies

With at least one subsequent fracture

With a BMD test within six months after the anchor event With at least one hospitalization within seven days after the anchor event



0% 10% 20% 30% 40% 50% 60% 70% 80% Percentage of Episodes (95% Cl)

What we do matters a lot!

d Sample 5-12.xls



SUMMARY: 54 million Americans age 50 and over either already have or are at risk of osteoporosis. Osteoporosis-related bone fractures are responsible for more hospitalizations than heart attacks, strokes and breast cancer combined. As the nation ages,





How good are we at D-H

Minimal trauna fractures from 10/1/2019 to 10/1/2020

	DXA	Treatment with drugs
Forearm fx 293	22%	19%
Humerus fx 283	15%	18%
Spine fx 727	17%	31%
Hip fx 270	15%	30%





Why it's not happening?



"It is Bermuda triangle, comprised of orthopedic surgeons, primary care physicians, hospitalists, radiologists, ER physicians, PM&R, geriatrics, urologists, oncologists and osteoporosis specialists, into which the fracture patient disappears"

As we look for and find solutions, it is clear, fracture risk can be reduced, readmissions can be reduced and most of all human suffering, morbidity and mortality can be reduced with systemic improvement of care models for these patients.

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











Low trauma fracture BPA

	Pt. Education	🔐 Vitals 🖌 Open Orders 📲 Reque	est Ouliside Records	Questionnaires	 Send Patient 	Message 🙀 Appts	
Theo Test-POC	No FYI Flags						
Male, 74 y.o., 1/25/1948	Review M	edication Review Tobacco use	Chief Complaint	Vital Signs	Pain/Physical/PHO	Allergies Le	arning Needs Assessment
MRN: 75002299-8	Marite De Dagasta	Ordelida Mada — Orantianaria		History	Detient Contents	Factoria Contacta	
Cur Location: CT Scan	Verity RX Benefits	Outside Meds Questionnaire	s Answer Qnrs	HISTORY	Patient Contacts	Encounter Contacts	
Code: History (no ACP docs)	Review						
Adv Dir: None							
	Allergi	ies a			🖌 Medicatio	ns 🗸	
My Pat List Reminders: None +	No Known A	Mergies			Outpatient Me	dications	
① Lung Cancer Screening	NO KIOWITZ	allergies			F19140 ASTX660	30 mg capsule	Take 1 capsule by mo
Fragility Fracture?						being capsure	Refrigerate Do not as
🛞 Research Participant	o≌ Prob		BestPract	tice Advisory	- Test-POC, Theo		
Eisenberg, Ellen H, MD PCP - General	Acute UTI	Fragility fracture is a strong pre from a standing height or less).	edictor of subsequent f , recommend initiating	fractures. If fraction of the fraction of the fraction of the formed of	cture occured spont osteoporosis and of	aneously or from min taining a baseline DE	or trauma (fall EXA.
Coverage: Medicare/Medicare P		Acknowledge Reason -					
Allergies: No Known Allergies		Will address osteoporosis	Not a fragility fracture	Patient declin	nes treatment No	time/not addressed	
ACTIVE TREATMENTS						✓ <u>A</u> ccept	<u>C</u> ancel
							DODIS AS DEPORTI OF F





Inpatient low trauma fracture order set

This patient likely has osteoporosis as a cause for their fracture. Consider using the Fragility Fracture or treat with IV zoledronic acid.

Important points to consider:

- Risk of recurrent fragility fracture is XX% in Y months and is markedly reduced by bisphospho therapy.
- Patients can receive treatment pre-op without impact to post op healing
- Osteonecrosis of the jaw is a very rare complication (1 in 10,000), prevention of recurrent trac much larger
- The protocol includes checking a Vit D level, which will be reviewed by pharmacy before ZA is







Reminders on time of treatment

# infusions	patient	patient	# of patients with CONSECUTIVE annual infusions MISSED since starting ZA	% of patients with CONSECUTIVE annual infusions MISSED since starting ZA	overall % with missed
4	3	1%	0	0%	
3	50	10%	0	0%	
2	133	28%	45	34%	9%
1	295	61%	202	68%	42%





Ortho discharge recomendatios

Misc:

1. If you are a smoker, quitting is very important to help your fracture heal. You should contact your PCP to assist you with setting up a cessation program.

2. Remember that ICE and elevation are very important to decrease swelling and control pain. You should use the ICE for 20-30 minutes at a time.

3. To help with bone healing and your overall bone health, your intake of calcium should be at least 1200mg a day and your vitamin D intake should be at least 800 IU per day.

***4. You should meet with your primary care provider in the next month to discuss the possibility that you may have osteoporosis. Contact your PCP for an appointment to discuss this as well as possible treatment for this condition.

***Orthopedic Recommendations for secondary prevention of fragility fractures based on the National Osteoporosis Foundation guidelines (to be discussed with your PCP)

1. Consider Bone mineral density testing (DEXA) to confirm diagnosis of osteoporosis and determine disease severity and monitor response to treatment in appropriate patients after discharge (patients over the age of 75 with multiple osteoporosis risk factors warrant treatment without BMD testing).

2. You may have a discussion with your primary care provider or endocrinologist regarding initiation of a Bisphosphonate medication, a therapy used to treat osteoporosis.

FOLLOWUP APPOINTMENTS:

1. You will have followup appointments at DHMC as indicated in "Future Appointment and Orders". You will have an xray prior to those appointments so please come to Radiology, desk 3T, 1 hour BEFORE your appointment for those x-rays on ***.

2. If you are being discharged over the weekend or at night and do not have a scheduled appointment with Orthopaedics, you should be notified about your appointment within the next 1-2 days. Please call (603) 650-5133 if you do not hear about an appointment within that timeframe, as your follow-up is important to us.





BPA for urology clinicans

BestP	BestPractice Advisory - Zzztest,Amber							
/1	GnRH agonist therapy by clicking 'Accept', or (No related orders for	- please consider placing HiROC (High Risk Osteoporosis Consult) with Dr.Gruntmanis (Endocrinology) acknowledge reason for declining Ind in patient record)	1					
	Acknowledge reason:	P 🗋						
		Medically Not Indicate Defer COMPLETED EL PATIENT/GUAR						
	Add to unsigned 🗹 🖒 Add to Problem	l orders: HIROC(High Risk Osteoporosis) - CONSULT/REQUEST FOR ADVICE List: At risk for osteoporosis (Share with patient)						
			-					
		<u>A</u> ccept <u>C</u> ancel						





How good are we at DH primary care

- 41182 women 65 and older in DH primary care
- 27808 or 67% have had DXA ordered.
- 25099 or 61% have had DXA done.
- 6289 have had two DXA tests done.





Does fracture prevention strategies work?

- 625, 000 individuals over age 50 included in study.
- Prevented 1,069 hip fractures or 41.2% reduction.
- Each hip fracture about \$37,000.
- Saved 39.5 million USD.
- Saved 257 lives.

Dell R et al. J Bone Joint Surg Am. Nov 2009;91





Post-fracture/osteoporosis dashboard

OPERATIONS DASHBOARD				Section and the		Den A	A Lins Man	Gainer .				4
Risk Groups	May 11	Jun 11	Jul 11	Aug 11	Sep 11	Oct 11	Nov 11	Dec 11	Jan 12	Feb 12	Mar 12	Apr 12
Hip Fx Pts Need Rx	2807	2607	2630	2641	2597	2495	2505	2511	2532	2570	2543	2037
Osteo Pt needs RX	20052	18601	18834	18901	19076	17955	17956	17879	17958	18214	18106	18180
FX Pt Needs DXA and/or RX	12054	11830	11713	11508	11311	10864	10556	10445	10543	10624	10441	10389
Total At Risk	34913	33038	33177	33050	32984	31314	31017	30835	31033	31408	31090	31112
State State State						and the second						10
Need DXA Screening	May 11	Jun 11	Jul 11	Aug 11	Sep 11	Oct 11	Nov 11	Dec 11	Jan 12	Feb 12	Mar 12	Apr 12
Females 65+	18286	17818	17752	17537	17263	16517	16305	16481	16699	18809	18537	18129
Male 70+	16307	15452	15453	15125	14785	14012	13703	13666	13768	14894	14783	14441
Total	34593	33270	33205	32662	32048	30529	30008	30147	30467	33703	33320	32570
And the second se	100 A 100				The second second	and the state	100000		and the second	The Part of the		
RX Compliance	May 11	Jun 11	Jul 11	Aug 11	Sep 11	Oct 11	Nov 11	Dec 11	Jan 12	Feb 12	Mar 12	Apr 12
# Non-compliant	54495	55384	58161	59651	60910	61386	62177	63053	64206	64695	65019	65359
				4900	The Party of the	and the second		100			10- 7	
DXA Operations	Apr 11	May 11	Jun 11	Jul 11	Aug 11	Sep 11	Oct 11	Nov 11	Dec 11	Jan 12	Feb 12	Mar 12
DXAs per day	9.2	11.7	11.6	11.6	11.5	11	12.3	10.9	10.4	15.3	16.3	15.8
DXA Target per day	30	30	30	30	30	30	30	30	30	30	30	30
DXA Backlog (In order queue)	4207	5188	5996	5687	6210	5892	5267	6900	7346	9493	8526	7844
PERFORMANCE DASHBOARD		E and a second	1 minutes				and discouth	all and the	123	-		- Carlo and
MOC Performance	Jan-Jun 07	Jul-Dec 07	Jan-Jun 08	Jul-Dec 08	Jan-Jun 09	Jul-Dec 09	Jan-Jun 10	Jul-Dec 10	Jan-Jun 11	Jul-Dec 11	Jan-Jun 12	Jul-Dec 12
% 60+ FXs w/Osteo TX (DXA or RX) [In			the second second	the stand of the	Transfer & Constant	and the second second	Margare 1994	Files man	and the second			-
past metric was 50+1	66.7	67.0	68.0	73.2	79.5	81.1	84.1	86.6	85.8	84.9	7575	and the second second
% Bad DXA (< -2.5) w/RX	74.2	74.2	73.6	73.1	73.3	70.1	60.8	62.9	74.2	76.7	and the second second	The second day
Rod EPAX (Hip > 3%: Other > 20%) w/RX	14.4	1 1.2	, 0.0		and the second second	for the second second second	and the states	Marian ada 6		Carl St. Concerning and St.	and the second second	THE SAL
Dad 1100 (11) 2 570, Outer 2 2070) W/IX					The state of the						A CONTRACTOR OF THE OWNER	and the second second
PX Compliance	Jan 07	Mar 08	Aug 09	Aug 10	Oct 11	No. of Lot of Lot	Contraction of the last		and the second second	Contraction States	and the second second	Les and the
Py dispensed in the last 180 days	65.8%	63.4%	63.2%	59.5%	55.7%	Contraction of the second	and the second second	and the second second	The case of the lot	Line and the	and	The second states
rix dispensed in the last 100 days	05.070	03.470	00.270	00.070	00.170		N					the second se

For Strong Bones: Calcium

Recommended Calcium Intake

		<u>Amount in mg/day</u>
•	Children and Adolescents	
٠	1 through 3 years	700
٠	4 through 8 years 9 through 18 years	1000 1300
٠	Adult Women and Men	
•	19 through 50 years	1000
	> 50 years	<i>1200</i>
•	Pregnant and Lactating Women	
٠		
٠	18 through 50 years	1000

Dietary Sources of Calcium

- Sardines, canned with bones 3oz 324mg
- Milk 8 fl oz. 302
- Yogurt 8 oz.
- Cheddar cheese 1½ oz.
- Cottage cheese 2 cups
- Orange juice 6fl oz.
- Tofu, w/calcium ½ cup

302mg 300mg 306mg 276mg 250mg 204mg

For Strong Bones: Vitamin D

Recommended Vitamin D Intake

		Amount in IU/day
٠	Children and Adolescents	
٠	1 through 3 years	600 - 2500
٠	4 through 8 years	600 - 3000
•	9 through 18 years	600 - 4000
•	Adult Women and Men	
•	19 through 50 years	600 - 4000
	> 70 years	<i>800</i> - 400
٠	Pregnant and Lactating Women	
٠	18 through 50 years	600 - 4000

18 through 50 years ٠

Dietary Sources of Vitamin D

- Milk
 Baked herring
 Baked salmon
 Ganned tuna
 Sardines
 Note the sale of th
- Raisin bran cereal³/₄ cup 42 IU
- Pork sausage 1 oz. 31 IU
- Egg yolk 1 25 IU

Initiate

Preparation	% E. calcium	Formulation	Elemental Calcium/tab
Calcium carbonate	40	500 mg (Tums) 550 mg (Rolaids) 650mg/ 1250 mg (Oscal) 1500 mg (Caltrate)	200 mg 220 mg 260 mg / 500 mg 600 mg
Tricalcium Phosphate	39	300 mg/ 600 mg (Posture)	117 mg / 234 mg
Calcium Citrate	21	950 / 1500 / 2500 mg (Citracal)	200 mg / 315 mg 500 mg (liquitab)
Calcium lactate	13	325 mg / 650 mg	42 mg / 85 mg
Calcium gluconate	9	500 mg / 650 mg 1000 mg	45 mg / 59 mg 90 mg
Calcium glubionate	7	1.8 g/5ml (Neo-Calglucon)	126 mg





Patient

- 62 yo women comes in for follow-up visit
- Her BMI is increased, has HTN, is on SSRIs and PPIs
- PSH includes, plate placement for R forearm fracture 3 years ago, when he fell on ice
- Has lost 2" of height
- BMD by DXA lowest in LS -2.0SD





Take home message

- Fractures are common
- They are deadly with significant impact on morbidity and mortality
- We together need to make sure that as minimum all patients with minimal trauma fractures/high risk medications are found treated.

DO IT RIGHT! AND PREVENT FRACTURES!

The Bone-Healthy Way of Life and Exercise

