Systemic therapies (S052): Glucocorticoid-Induced Osteoporosis (GIOP)

American Academy of Dermatology
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Nicole Fett MD MSCE
Associate Professor of Dermatology
Oregon Health and Science University
Conflicts of Interest and Disclosures

- I have no conflicts of interest
- I have no pertinent disclosures
  - UpToDate author and peer reviewer
  - Investigator for Hoffman-La Roche and Pfizer
  - Assistant Section Editor JAMA Derm
  - Education and Program Committee Medical Dermatology Society
  - Education and Program Committee Rheumatologic Dermatology Society
  - Materials review panel medical expert in dermatology for the Lupus Foundation of America
  - Board of Directors Association of Professors of Dermatology
  - President Elect Rheumatologic Dermatology Society
  - AAD Editor, Medical Dermatology Online Board Prep Question Bank
  - Associate Professor of Dermatology, OHSU
  - Dermatology Residency Program Director
  - Packer’s fan and owner
Objectives

• Recognize the time frame in which glucocorticoids affect bone metabolism
• Recognize the doses of glucocorticoids that affect bone metabolism
• Use the data presented to create a plan for prevention of glucocorticoid-induced osteoporosis in your patients on systemic steroids
Prevention of glucocorticoid induced osteoporosis

• Why to prevent
• When to start prevention
• How to prevent
• Risk benefit assessment

https://www.picmog.com/media/494979416736374332_351648302
Glucocorticoids and Bone

30–50% of chronic glucocorticoid users develop a fracture

Corticosteroid-induced Bone Loss

• Rapid decline in BMD during first 3 mos of glucocorticoid therapy
  – Peak at 6 mos
  – Gradual loss thereafter
  – Doses > 2.5 mg per day increase risk of vertebral and non-vertebral fracture

http://courses.washington.edu/bonephys/tx/
### Corticosteroids and Fractures


<table>
<thead>
<tr>
<th>Dose Category</th>
<th>Medium (n = 104 833)</th>
<th>High (n = 87 949)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fracture site</strong></td>
<td><strong>Rate (per 100 person-years)</strong></td>
<td><strong>Adjusted relative rate (95% CI)</strong></td>
</tr>
<tr>
<td>Non-vertebral</td>
<td>2.2</td>
<td>1.18 (1.11–1.26)</td>
</tr>
<tr>
<td>Forearm</td>
<td>0.4</td>
<td>0.99 (0.88–1.13)</td>
</tr>
<tr>
<td>Hip</td>
<td>0.4</td>
<td><strong>1.62 (1.38–1.90)</strong></td>
</tr>
<tr>
<td>Vertebral</td>
<td>0.4</td>
<td><strong>1.54 (1.29–1.84)</strong></td>
</tr>
</tbody>
</table>

- **2.5 to 7.5 mg/day**
- **> 7.5 mg/day**
## Corticosteroids and Fractures

### Table 2: Prevalence and the RR (95%CI) of fracture during glucocorticoid (GC) exposure (compared to past GC exposure)

<table>
<thead>
<tr>
<th>Daily GC dose* (mg/day)</th>
<th>Previous cumulative GC exposure (g)</th>
<th>Prevalence</th>
<th>Clinical osteoporotic fracture RR (95%CI)</th>
<th>Femur/hip fracture RR (95%CI)</th>
<th>Clinical vertebral fracture RR (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;2.5</td>
<td>≤1</td>
<td>3.3%</td>
<td>1.05 (0.70–1.59)</td>
<td>0.67 (0.28–1.62)</td>
<td>2.11 (0.87–5.10)</td>
</tr>
<tr>
<td></td>
<td>&gt;1</td>
<td>0.8%</td>
<td>1.41 (1.14–1.73)</td>
<td>1.04 (0.68–1.59)</td>
<td>3.22 (2.09–4.95)</td>
</tr>
<tr>
<td>2.5–4.9</td>
<td>≤1</td>
<td>1.9%</td>
<td>1.67 (1.33–2.10)</td>
<td>1.47 (0.97–2.23)</td>
<td>2.60 (1.49–4.53)</td>
</tr>
<tr>
<td></td>
<td>&gt;1</td>
<td>8.6%</td>
<td>1.41 (1.23–1.62)</td>
<td>1.46 (1.15–1.85)</td>
<td>1.83 (1.26–2.66)</td>
</tr>
<tr>
<td>5–7.4</td>
<td>≤1</td>
<td>8.3%</td>
<td>1.33 (1.17–1.52)</td>
<td>1.48 (1.18–1.85)</td>
<td>2.21 (1.62–3.03)</td>
</tr>
<tr>
<td></td>
<td>&gt;1</td>
<td>26.0%</td>
<td>1.81 (1.67–1.96)</td>
<td>1.64 (1.42–1.90)</td>
<td>3.99 (3.33–4.79)</td>
</tr>
<tr>
<td>7.5–14.9</td>
<td>≤1</td>
<td>4.5%</td>
<td>1.95 (1.65–2.29)</td>
<td>2.25 (1.72–2.94)</td>
<td>3.36 (2.30–4.92)</td>
</tr>
<tr>
<td></td>
<td>&gt;1</td>
<td>16.9%</td>
<td>2.17 (1.97–2.39)</td>
<td>2.48 (2.11–2.91)</td>
<td>4.78 (3.88–5.88)</td>
</tr>
<tr>
<td>15–29.9</td>
<td>≤1</td>
<td>6.3%</td>
<td>1.53 (1.32–1.78)</td>
<td>1.96 (1.54–2.51)</td>
<td>2.12 (1.44–3.13)</td>
</tr>
<tr>
<td></td>
<td>&gt;1</td>
<td>5.1%</td>
<td>2.84 (2.45–3.30)</td>
<td>2.62 (1.98–3.48)</td>
<td>8.89 (6.83–11.58)</td>
</tr>
<tr>
<td>≥30</td>
<td>≤1</td>
<td>15.3%</td>
<td>1.21 (1.08–1.35)</td>
<td>0.93 (0.73–1.18)</td>
<td>1.85 (1.39–2.46)</td>
</tr>
<tr>
<td></td>
<td>1–5</td>
<td>2.1%</td>
<td>2.00 (1.52–2.63)</td>
<td>1.28 (0.67–2.48)</td>
<td>7.06 (4.54–10.98)</td>
</tr>
<tr>
<td></td>
<td>&gt;5</td>
<td>0.9%</td>
<td>3.63 (2.54–5.20)</td>
<td>3.13 (1.49–6.59)</td>
<td>14.42 (8.29–25.08)</td>
</tr>
</tbody>
</table>

6 mos, 4.5 mos, 2 mos

Corticosteroids and Bone

- Highest rate of bone loss occurs in the first 6 mos
- Low doses of corticosteroids increase fracture risk
- Short course of corticosteroids increase fracture risk
Hip Fractures Increase Risk of Mortality

Vertebral Fractures Increase Risk of Mortality

How do we manage these patients?
How do we manage these patients?

• Step 1: Consider how long your patient will be on corticosteroids the day you write the prescription.
Counseling for EVERYONE on Glucocorticoids

- Calcium intake of 1200 to 1500 mg/day
- Vitamin D supplementation
- Weight bearing activities
- Smoking cessation
- Avoid > 2 ETOH/day
- Maintain normal body weight
Timing and duration of GC affect BMD

<table>
<thead>
<tr>
<th>Glucocorticoid exposure subgroups</th>
<th>Adjusted&lt;sup&gt;a&lt;/sup&gt; difference in T-score (95 % CI), femoral neck</th>
<th>Adjusted&lt;sup&gt;a&lt;/sup&gt; difference in T-score (95 % CI), lumbar spine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never use (N=39,562)</td>
<td>0 [reference]</td>
<td>0 [reference]</td>
</tr>
<tr>
<td>Recent short course (N=2,644)</td>
<td>0.02 (−0.01 to 0.05)</td>
<td>0.05 (0.0 to 0.10)</td>
</tr>
<tr>
<td>Recent prolonged course (N=2,896)</td>
<td>−0.13 (−0.16 to −0.10)</td>
<td>−0.18 (−0.23 to −0.13)</td>
</tr>
<tr>
<td>Remote short course (N=6,453)</td>
<td>0.09 (0.09 to 0.11)</td>
<td>0.07 (0.04 to 0.11)</td>
</tr>
<tr>
<td>Remote prolonged course (N=825)</td>
<td>−0.03 (−0.08 to 0.02)</td>
<td>0.04 (−0.04 to 0.12)</td>
</tr>
</tbody>
</table>

Timing and duration of GC affect fracture risk

Table 3  Unadjusted and adjusted incidence of fracture by glucocorticoid exposure

<table>
<thead>
<tr>
<th></th>
<th>No glucocorticoid exposure (N=39,252)</th>
<th>Recent short course (N=2,644)</th>
<th>Recent prolonged course (N=2,896)</th>
<th>Remote short course (N=6,453)</th>
<th>Remote prolonged course (N=825)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Follow-up time, years (SD)</td>
<td>5.2 (3.0)</td>
<td>4.6 (3.0)</td>
<td>5.4 (3.1)</td>
<td>4.1 (2.8)</td>
<td>4.6 (2.9)</td>
</tr>
<tr>
<td>Major fractures, N (%)</td>
<td>2120 (5.4)</td>
<td>140 (5.3)</td>
<td>223 (7.7)</td>
<td>297 (4.6)</td>
<td>55 (6.7)</td>
</tr>
<tr>
<td>Major fractures, adjusted HR (95 % CI)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.0 (reference)</td>
<td>1.16 (0.97–1.38)</td>
<td>1.25 (1.07–1.45)</td>
<td>1.14 (1.00–1.29)</td>
<td>1.29 (0.99–1.69)</td>
</tr>
<tr>
<td>Hip fractures, N (%)</td>
<td>432 (1.1)</td>
<td>32 (1.2)</td>
<td>52 (1.8)</td>
<td>52 (0.8)</td>
<td>9 (1.1)</td>
</tr>
<tr>
<td>Hip fractures, adjusted HR (95 % CI)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.0 (reference)</td>
<td>1.26 (0.87–1.83)</td>
<td>1.61 (1.18–2.20)</td>
<td>0.98 (0.72–1.32)</td>
<td>1.05 (0.54–2.03)</td>
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How do we manage these patients?

• Step 1: Consider how long your patient will be on corticosteroids the day you write the prescription.
  – < 3 months = calcium, vitamin D, wt bearing, avoid etoh, stop smoking
  – > 3 months = you are going to thin their bones
2017 American College of Rheumatology Guideline for the Prevention and Treatment of Glucocorticoid-Induced Osteoporosis

LENORE BUCKLEY,1 GORDON GUYATT,2 HOWARD A. FINK,3 MICHAEL CANNON,4 JENNIFER GROSSMAN,5 KAREN E. HANSEN,6 MARY BETH HUMPHREY,7 NANCY E. LANE,8 MARINA MAGREY,9 MARC MILLER,10 LAKE MORRISON,11 MADHUMATHI RAO,12 ANGELA BYUN ROBINSON,13 SUMONA SAHA,6 SUSAN WOLVER,14 RAVEENDHARA R. BANNURU,12 ELIZAVETA VAYSBROT,12 MIKALA OSANI,12 MARAT TURGUNBAEV,15 AMY S. MILLER,15 AND TIMOTHY MCAULINDON12
ACR scope

• For “everyone” taking GC >2.5 mg/day for > 3 mos
  – Inhaled Glucocorticoids not included
  – Renal failure (GF < 30 ml/min) not included
• Two groups, > 40, < 40
  – Not enough data for prediction tools < 40 yrs
• GRADE methodology
  – Recommendations based on relative benefits and harms, quality of evidence, and patient values and preferences
How do we manage these patients?

• Step 2: Risk stratify your patient
Risk Stratifying Our Patients


**Calculation Tool**

Please answer the questions below to calculate the ten year probability of fracture with BMD.

**Questionnaire:**

1. Age (between 40 and 90 years) or Date of Birth
   - Age: [ ]   [ ]   [ ]   [ ]
   - Date of Birth: [ ]   [ ]   [ ]   [ ]
2. Sex
   - [ ] Male
   - [ ] Female
3. Weight (kg)
4. Height (cm)
5. Previous Fracture
6. Parent Fractured Hip
7. Current Smoking
8. Glucocorticoids
9. Rheumatoid arthritis
10. Secondary osteoporosis
11. Alcohol 3 or more units/day
12. Femoral neck BMD (g/cm²)

**Weight Conversion**

- Pounds ➞ kg
- Convert

**Height Conversion**

- Inches ➞ cm
- Convert

---

**About the risk factors**

- [ ] No
- [ ] Yes

---

**Country:** US (Caucasian)
# Fracture Risk Assessment

<table>
<thead>
<tr>
<th></th>
<th>Adults ≥ 40 yrs</th>
<th>Adults &lt; 40 yrs</th>
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<tbody>
<tr>
<td><strong>High Fracture Risk</strong></td>
<td>Prior osteoporotic fracture</td>
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<tr>
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<td>Hip or spine BMD T score ≤ -2.5 in men ≥ 50 and PMW</td>
<td></td>
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<td>FRAX (*1.15 non-hip fracture if taking &gt; 7.5 mg/day) 10 yr risk non-hip fracture ≥ 20%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FRAX (*1.2 hip fracture if taking &gt; 7.5 mg/day) 10 yr risk hip fracture ≥ 3%</td>
<td></td>
</tr>
<tr>
<td><strong>Moderate Fracture Risk</strong></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Low Fracture Risk</strong></td>
<td></td>
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## Fracture Risk Assessment

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<td></td>
<td>Hip or spine BMD T score &lt; -2.5 in men ≥ 50 and PMW</td>
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<td>FRAX (*1.15 non-hip fracture if taking &gt; 7.5 mg/day) 10 yr risk non-hip fracture ≥ 20%</td>
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<tr>
<td></td>
<td>FRAX (*1.2 hip fracture if taking &gt; 7.5 mg/day) 10 yr risk hip fracture ≥ 3%</td>
<td></td>
</tr>
<tr>
<td><strong>Moderate Fracture Risk</strong></td>
<td>FRAX (*1.15 non-hip fracture if taking &gt; 7.5 mg/day) 10 yr risk non-hip fracture 10-19%</td>
<td>Hip or spine BMD Z score &lt; -3 OR Rapid bone loss (≥10% at hip or spine over 1 year) AND Continuing GC at ≥ 7.5 mg/day for ≥ 6 mos</td>
</tr>
<tr>
<td></td>
<td>FRAX (*1.2 hip fracture if taking &gt; 7.5 mg/day) 10 yr risk hip fracture &gt;1 and &lt;3%</td>
<td></td>
</tr>
</tbody>
</table>
## Fracture Risk Assessment

<table>
<thead>
<tr>
<th>Fracture Risk</th>
<th>Adults &gt; 40 yrs</th>
<th>Adults &lt; 40 yrs</th>
</tr>
</thead>
</table>
| **High Fracture Risk** | Prior osteoporotic fracture  
Hip or spine BMD T score ≤ -2.5 in men ≥ 50 and PMW  
FRAX (*1.15 non-hip fracture if taking > 7.5 mg/day) 10 yr risk non-hip fracture ≥ 20%  
FRAX (*1.2 hip fracture if taking > 7.5 mg/day) 10 yr risk hip fracture > 3% | Prior osteoporotic fracture |
| **Moderate Fracture Risk** | FRAX (*1.15 non-hip fracture if taking > 7.5 mg/day) 10 yr risk non-hip fracture 10-19%  
FRAX (*1.2 hip fracture if taking > 7.5 mg/day) 10 yr risk hip fracture >1 and <3% | Hip or spine BMD Z score < -3 OR Rapid bone loss (≥10% at hip or spine over 1 year) AND Continuing GC at ≥ 7.5 mg/day for ≥ 6 mos |
| **Low Fracture Risk** | FRAX (*1.15 non-hip fracture if taking > 7.5 mg/day) 10 yr risk non-hip fracture <10%  
FRAX (*1.2 hip fracture if taking > 7.5 mg/day) 10 yr risk hip fracture ≤1% | None of the above risk factors other than GC treatment |

How do we manage these patients?

• Step 3: Based on risk, start therapy
Figure 3. Initial pharmacologic treatment for adults.

Calcium and Vitamin D and Lifestyle Modifications

Low Risk

No Further Treatment
Monitor with yearly clinical fracture risk assessment with BMD testing every 2-3 years depending on risk factors.
**Children ages 4–17 years with an osteoporotic fracture who are continuing treatment with GCs at a dose of ≥0.1 mg/kg/day for ≥3 months**

Treat with an oral bisphosphonate (IV bisphosphonate if oral treatment contraindicated) plus calcium and vitamin D over treatment with calcium and vitamin D alone.

**Conditional recommendation** because of very low-quality antifracture data in children but moderate-quality evidence of low harms of oral bisphosphonates in children and less potential harm of oral over IV bisphosphonates
Who needs a bisphosphonate on day 1?

• Any age with h/o OP fracture
• Age ≥ 30 yrs and very high dose GC*
• Age <40 yrs
  – Z score < -3 and prednisone ≥ 7.5mg /day*
  – > 10% BMD loss/yr on prednisone ≥ 7.5mg/day*
• Men ≥ 50 yrs and Post-menopausal women
  – T score ≤ 2.5
  – OP FRAX ≥ 10%
  – Hip FRAX > 1%

*Not planning a pregnancy during treatment
Glucocorticoids, Bisphosphonates and Bone

Cochrane Meta-analysis Prevention of GIOP

- **Incident vertebral fractures (12 to 24 months)**
  - 12 trials (1343 participants)
  - 46/597 new vertebral fractures w/o tx vs 31/746 in bisphosphonate group
    - Relative improvement: 43% (9% to 65% better) with bisphosphonates
    - Absolute increased benefit: 2% fewer people sustaining fractures with bisphosphonates (5% fewer to 1% more)
    - NNT: 31 (20 to 145)

- **Incident non-spinal fractures (12 to 24 months)**
  - 9 trials (1245 participants)
  - 55/1000 new non-spinal fractures w/o tx vs 42/1000 people taking bisphosphonates
  - Absolute benefit: 1% fewer people (4% fewer to 1% more) sustaining non-spinal fractures when taking bisphosphonates

- **Lumbar spine bone mineral density (BMD) at 12 months**
  - 23 trials (2042 participants)
  - Lumbar spine BMD on bisphosphonates 3.50% higher (2.90% to 4.10%)
  - NNT: 3 (2 to 3) for 12 months

- **Femoral neck (top of thigh bone) BMD at 12 months**
  - 18 trials (1665 participants)
  - Femoral neck BMD on bisphosphonates 2.06% higher (1.45% to 2.68% more)
  - NNT: 5 (4 to 7) for 12 months

- **Serious adverse events**
  - 15 trials (1703 participants)
  - 162/1000 people controls vs 147/1000 (range 120 to 181) taking bisphosphonates
  - Absolute increased harm: 0% more serious adverse events (2% fewer to 2% more) with bisphosphonates
How do we manage these patients?

- Step 4: Based on risk, get DXA
**Figure 1.** Initial fracture risk assessment.

How do we manage these patients?

• Step 5: If GC continued, assess therapeutic efficacy periodically
Figure 2. Reassessment of fracture risk.
Figure 2. Reassessment of fracture risk.

1. History of OP fracture OR
2. Z score < -3 at hip or spine OR
3. > 10%/year loss of BMD at hip or spine OR
4. Very high dose GCs OR
5. Other OP risk factors

No additional reassessment other than clinical fracture risk reassessment every 12 mo

Children

Adolescents < 40 Years

No BMD testing

Yes

BMD testing every 2-3 years whether treated or untreated
Figure 2. Reassessment of fracture risk.
Figure 2. Reassessment of fracture risk.
Figure 2. Reassessment of fracture risk.
How do we manage these patients?

• **Step 1:** Consider how long your patient will be on corticosteroids the day you write the prescription.
  – < 3 months = calcium, vitamin D, wt bearing, avoid etoh, stop smoking
  – > 3 months = you are going to thin their bones

• **Step 2:** Risk stratify your patient

• **Step 3:** Based on risk, start therapy

• **Step 4:** Based on risk, get DXA

• **Step 5:** Cont GC? Assess therapeutic efficacy periodically
Who needs a bisphosphonate on day 1?

- Any age with h/o OP fracture
- Age $\geq 30$ yrs and very high dose GC*

- Age $< 40$ yrs
  - $Z$ score $< -3$ and prednisone $\geq 7.5$mg /day*
  - $> 10\%$ BMD loss/yr on prednisone $\geq 7.5$mg/day*

- Men $\geq 50$ yrs and Post-menopausal women
  - $T$ score $\leq 2.5$
  - OP FRAX $\geq 10\%$
  - Hip FRAX $> 1\%$

*Not planning a pregnancy during treatment
Risk and Benefit Assessment of Bisphosphonates
Reported Bisphosphonate Side Effects

• Atrial fibrillation
• Osteonecrosis of the jaw
• Upper gastrointestinal adverse events
• Esophageal cancer
• Atypical femur fractures (AFF)
• Renal safety

Reported Bisphosphonate Side Effects

- Atrial fibrillation
- Osteonecrosis of the jaw
- Upper gastrointestinal adverse events
- Esophageal cancer
- Atypical femur fractures (AFF)
- Renal Insufficiency

Reported Bisphosphonate Side Effects

Risks vs Benefits

• Risk of ONJ & AFF miniscule compared to risk of fracture
  – NNT for 8 years to prevent 1 vertebral fracture: 3
  – NNT for 8 years to prevent 1 non-vertebral fracture: 7
  – NNH for ONJ: 1000 to 100,000
  – NNH for AFF: 1282 if treated for 8 years
Who needs a bisphosphonate on day 1?

- Any age with h/o OP fracture
- Age $\geq 30$ yrs and very high dose GC*

- Age $<$40 yrs
  - Z score $<$ -3 and prednisone $\geq 7.5$mg /day*
  - $>$ 10% BMD loss/yr on prednisone $\geq 7.5$mg/day*

- Men $\geq 50$ yrs and Post-menopausal women
  - T score $\leq 2.5$
  - OP FRAX $\geq 10$
  - Hip FRAX $>$ 1%

*Not planning a pregnancy during treatment
Case

Ms. B is a 65 yr old female who presents to your clinic with a 6 month history of desquamation of her gingiva and erosions and crusting on her scalp, trunk and extremities. She has lost 15 pounds. She has not history of prior fractures, does not smoke nor drink etoh and does not have a family history of osteoporotic fracture.
How do we manage these patients?

• **Step 1:** Consider how long your patient will be on corticosteroids the day you write the prescription.
  – < 3 months = calcium, vitamin D, wt bearing, avoid etoh, stop smoking
  – > 3 months = you are going to thin their bones
• **Step 2:** Risk stratify your patient
• **Step 3:** Based on risk, start therapy
• **Step 4:** Based on risk, get DXA
• **Step 5:** Cont GC? Assess therapeutic efficacy periodically
How do we manage these patients?

• **Step 1:** Consider how long your patient will be on corticosteroids the day you write the prescription.
  – < 3 months = calcium, vitamin D, wt bearing, avoid etoh, stop smoking
  – > 3 months = you are going to thin their bones

• **Step 2:** Risk stratify your patient

• **Step 3:** Based on risk, start therapy

• **Step 4:** Based on risk, get DXA

• **Step 5:** Cont GC? Assess therapeutic efficacy periodically
How do we manage these patients?

• Step 1: Consider how long your patient will be on corticosteroids the day you write the prescription.
  - < 3 months = calcium, vitamin D, wt bearing, avoid etoh, stop smoking
  - > 3 months = you are going to thin their bones

• Step 2: Risk stratify your patient

• Step 3: Based on risk, start therapy

• Step 4: Based on risk, get DXA

• Step 5: Cont GC? Assess therapeutic efficacy periodically

Calcium and Vitamin D and Lifestyle Modifications

**Moderate/High Risk**

<table>
<thead>
<tr>
<th>Age &lt; 40 Years</th>
<th>Age ≥ 40 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. History of OP fracture(s) OR 2. Z score &lt; -3 at hip or spine and prednisone ≥ 7.5 mg per day OR 3. &gt; 10%/year loss of BMD at hip or spine and prednisone ≥ 7.5 mg per day OR 4. Very high dose GCs and ≥ 30 years</td>
<td>1. History OP fracture(s) OR 2. Men ≥ 50 years and PMP women with a BMDT score ≤ -2.5 at the hip or spine OR 3. FRAX (GC-adjusted) 10-year risk for major osteoporotic fracture ≥ 10% OR 4. FRAX (GC-adjusted) 10-year risk for hip fracture &gt; 1% OR 5. Very high dose GCs</td>
</tr>
</tbody>
</table>

**Women Not of Childbearing Potential and Men**

Treat with an oral bisphosphonate
Other suggested therapies (in order of preference):
- IV bisphosphonates
teriparatide
denosumab
raloxifene for PMP women if no other therapy is available

Weight Conversion

<table>
<thead>
<tr>
<th>Pounds</th>
<th>kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td></td>
</tr>
</tbody>
</table>

Height Conversion

<table>
<thead>
<tr>
<th>Inches</th>
<th>cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>64</td>
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</tr>
</tbody>
</table>

X 1.15 = 21.85
X 1.2 = 7.44

06795915
Individuals with fracture risk assessed since 1st June 2011
Case

Ms. B is started on 60 mg daily of prednisone while awaiting approval of rituximab infusion. She is also started on calcium 1200 mg daily, vitamin D 1000 units daily and counseled on weight bearing activity. Alendronate 70 mg once per week is prescribed with counseling to take it with a large glass of water and to remain upright for 30 minutes after taking it.
How do we manage these patients?

• **Step 1:** Consider how long your patient will be on corticosteroids the day you write the prescription.
  – < 3 months = calcium, vitamin D, wt bearing, avoid etoh, stop smoking
  – > 3 months = you are going to thin their bones

• **Step 2:** Risk stratify your patient

• **Step 3:** Based on risk, start therapy

• **Step 4:** Based on risk, get DXA

• **Step 5:** Cont GC? Assess therapeutic efficacy periodically
Initial T-score -1 and 1.5 at vertebra and hip, respectively
Case

8 months have passed. Ms. B received rituximab infusion 6 months ago. Her oral and cutaneous lesions have cleared. She was able to taper off her prednisone last month. She is wondering what medications she needs to continue and when she is due for her next DXA.
Case

• Ok to stop:
  – Calcium
  – Vitamin D
  – Alendronate
• No need for DXA
How do we manage these patients?

• **Step 1:** Consider how long your patient will be on corticosteroids the day you write the prescription.
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  – > 3 months = you are going to thin their bones

• **Step 2:** Risk stratify your patient

• **Step 3:** Based on risk, start therapy

• **Step 4:** Based on risk, get DXA

• **Step 5:** Cont GC? Assess therapeutic efficacy periodically