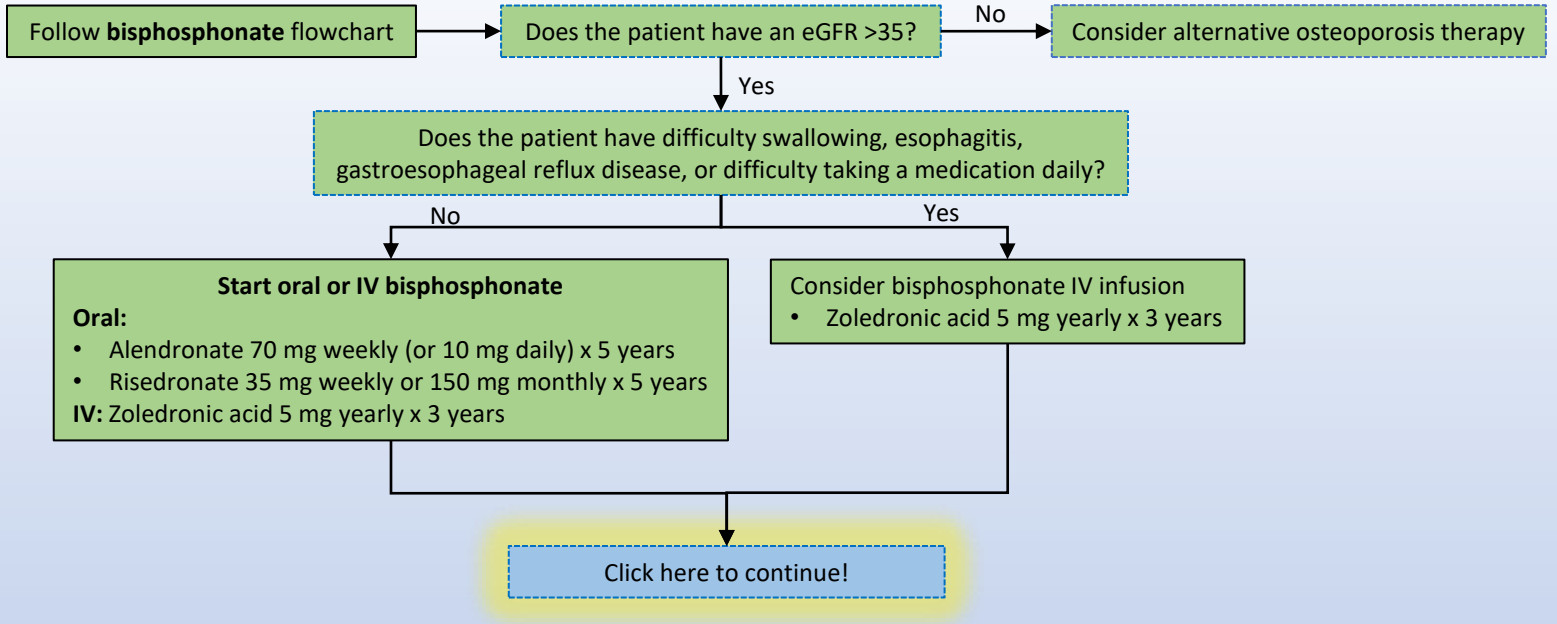
Initiation

Maintenance

Reassessment

Full Flowchart



Initiation

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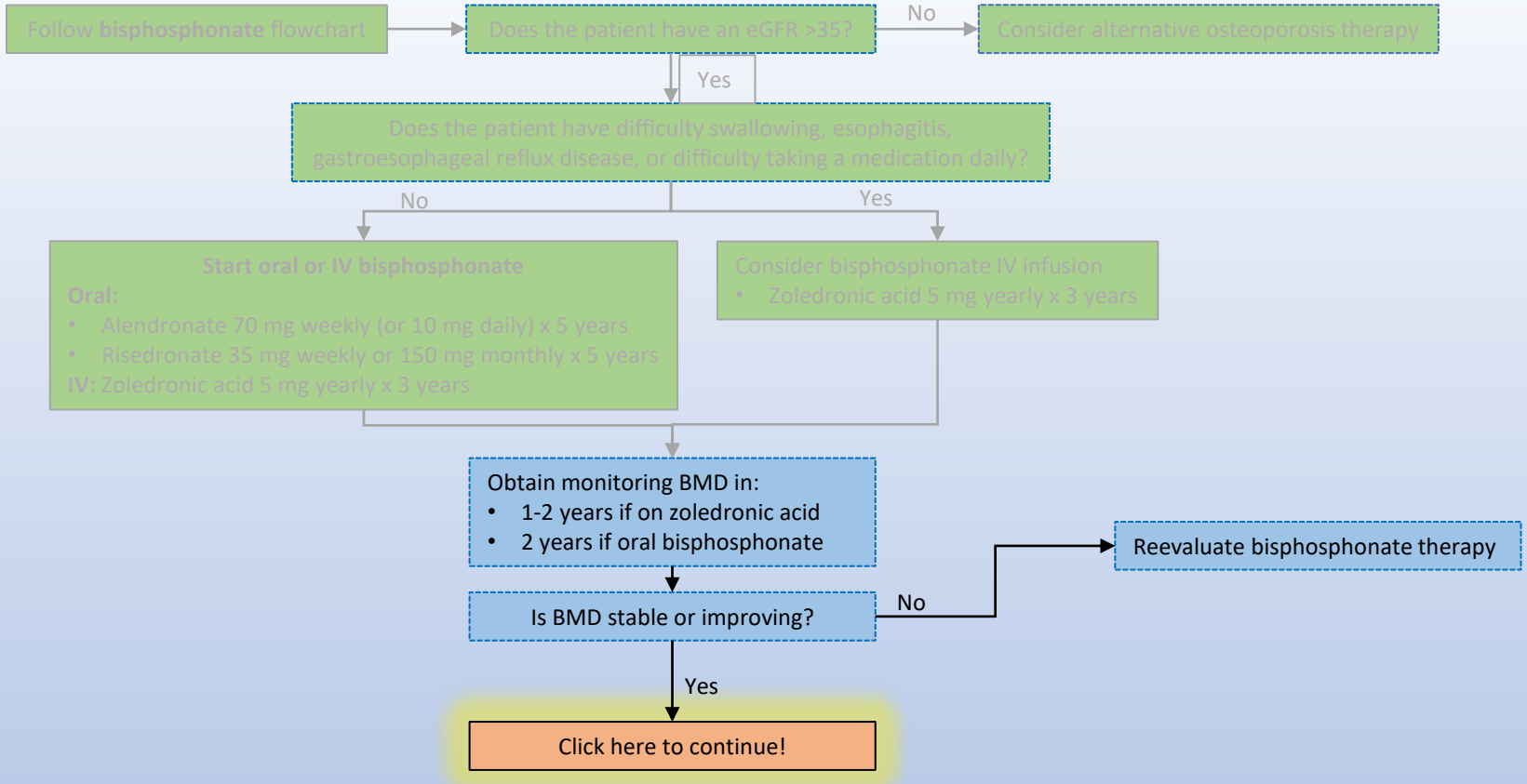
Full Flowchart



Initiation

Full Flowchart

Follow **bisphosphonate** flowchart → Does the patient have an eGFR >35? No → Consider alternative osteoporosis therapy

Yes

Does the patient have difficulty swallowing, esophagitis, gastroesophageal reflux disease, or difficulty taking a medication daily?

No

Start oral or IV bisphosphonate

Oral:
- Alendronate 70 mg weekly (or 10 mg daily) x 5 years
- Risedronate 35 mg weekly or 150 mg monthly x 5 years

IV: Zoledronic acid 5 mg yearly x 3 years

Yes

Consider bisphosphonate IV infusion
- Zoledronic acid 5 mg yearly x 3 years

Maintenance

Obtain monitoring BMD in:
- 1-2 years if on zoledronic acid
- 2 years if oral bisphosphonate

Is BMD stable or improving? No → Reevaluate bisphosphonate therapy

Yes

Reassessment

Complete 5 years of oral or 3 years of IV bisphosphonate therapy, then determine fracture risk using bone density and FRAX

Low Risk: ***"Normal"***
- ❑ No prior osteoporotic fracture; and
- ❑ BMD: > -1.0; and
- ❑ FRAX: <3% at hip and <20% major fracture

Moderate Risk: ***Osteopenia***
- ❑ No prior osteoporotic fracture; and
- ❑ BMD: <-1.0 and > -2.5; and
- ❑ FRAX: <3% at hip and <20% major fracture

High Risk: ***Osteoporosis***
- ❑ Prior osteoporotic fracture; or
- ❑ BMD: ≤ - 2.5; or
- ❑ FRAX: ≥3% at hip OR ≥ 20% of major fracture

Very High Risk: ***Osteoporosis with high-risk features***
- ❑ Multiple osteoporotic fractures; and
- ❑ BMD: ≤ - 2.5

Consider a bisphosphonate holiday

Did BMD improve?

Yes → Continue bisphosphonate use (no holiday) or consider alternative antiresorptive agent

No → Reevaluate bisphosphonate therapy

Initiation

Full Flowchart

Follow **bisphosphonate** flowchart → Does the patient have an eGFR >35?

No → Consider alternative osteoporosis therapy

Yes → Does the patient have difficulty swallowing, esophagitis, gastroesophageal reflux disease, or difficulty taking a medication daily?

No → **Start oral or IV bisphosphonate**

Oral:
- Alendronate 70 mg weekly (or 10 mg daily) x 5 years
- Risedronate 35 mg weekly or 150 mg monthly x 5 years

IV: Zoledronic acid 5 mg yearly x 3 years

Yes → Consider bisphosphonate IV infusion
- Zoledronic acid 5 mg yearly x 3 years

Maintenance

Obtain monitoring BMD in:
- 1-2 years if on zoledronic acid
- 2 years if oral bisphosphonate

Is BMD stable or improving?

No → Reevaluate bisphosphonate therapy

Yes →

Reassessment

Complete 5 years of oral or 3 years of IV bisphosphonate therapy, then determine fracture risk using bone density and FRAX

Low Risk: ***"Normal"***
- ❑ No prior osteoporotic fracture; and
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- ❑ Prior osteoporotic fracture; or
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Very High Risk: ***Osteoporosis with high-risk features***
- ❑ Multiple osteoporotic fractures; and
- ❑ BMD: ≤ - 2.5

Consider a bisphosphonate holiday

Did BMD improve?

Yes → Continue bisphosphonate use (no holiday) or consider alternative antiresorptive agent

No → Reevaluate bisphosphonate therapy

Does the patient have an eGFR >35?

PEARL: Bisphosphonates are NOT recommended for patients with severe renal impairment

FDA has contraindications and warning on renal impairment for bisphosphonates due to risk of renal failure at creatinine clearance cutoffs of 30-35 ml/min.

Click for more information on eGFR cutoffs with bisphosphonates!

Initiation

Full Flowchart

Consider alternative osteoporosis therapy

Click for more info on first line osteoporosis therapy!

Maintenance

Reassessment

Does the patient have difficulty swallowing, esophagitis, gastroesophageal reflux disease, or difficulty taking a medication daily?

PEARL: Oral bisphosphonates can cause erosive esophagitis, worsen GERD, and have low rates of adherence.

- Oral bisphosphonates are associated with erosive esophagitis and may worsen GERD especially in those with poorly controlled symptoms or with dysphagia.
- Oral bisphosphonates also require either daily, weekly, or monthly dosing and adherence rates for oral bisphosphonates are low.

Click for more information on adverse effects of oral bisphosphonates!

Obtain monitoring BMD in:
- **1-2 years if on zoledronic acid**
- **2 years if oral bisphosphonate**

PEARL: BMD should be rechecked when the results influence clinical management or at the point of an expected significant change in bone density.

- There is no consensus on the optimal frequency of BMD monitoring!
- Our expert opinion is to recheck BMD after 1-2 years on zoledronic acid and 2 years for all other bisphosphonates.

Click for more information on checking BMD after starting bisphosphonates!

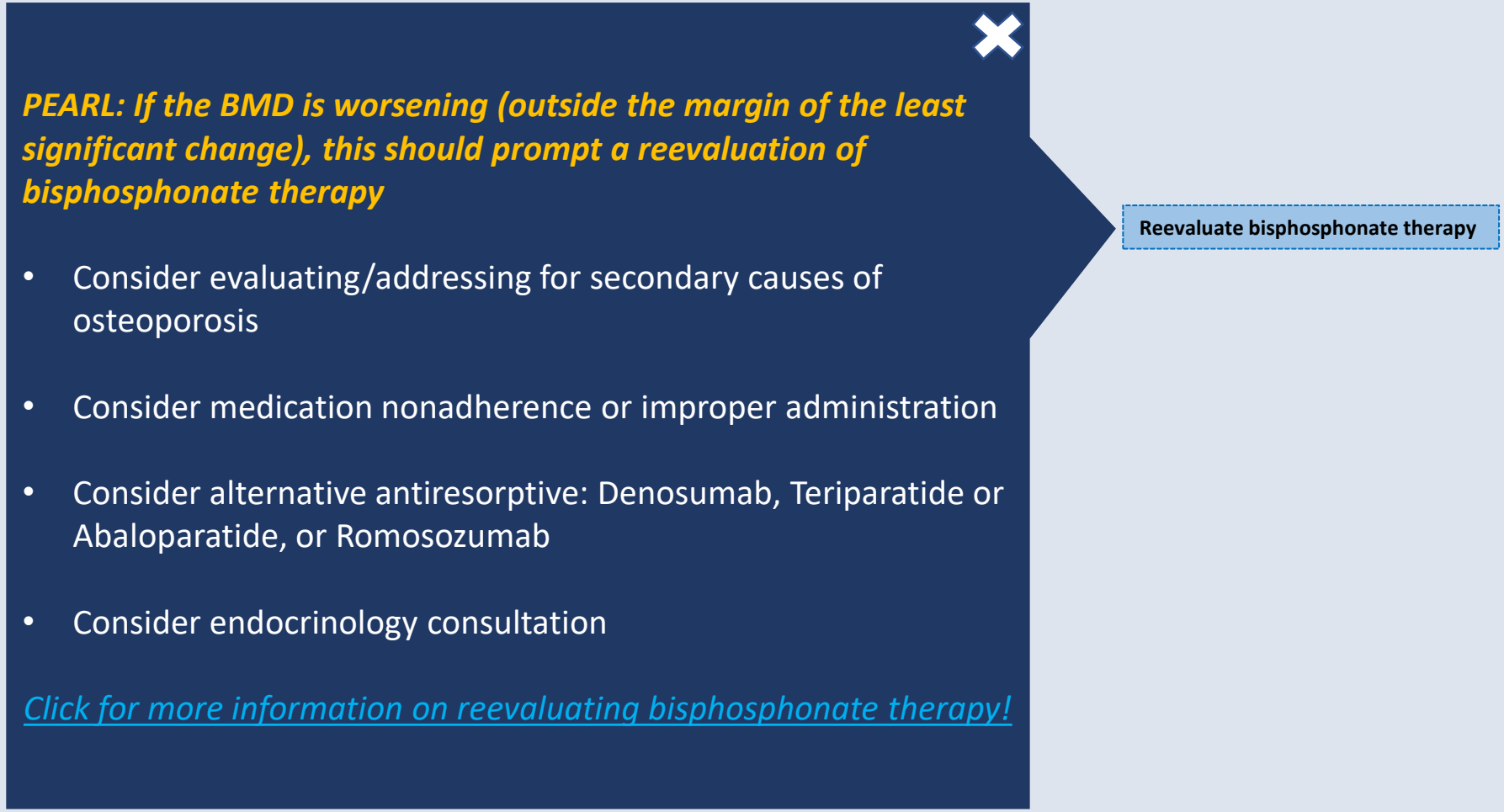
A change in BMD should consider what the machine specific "**least significant change**" is to account for precision errors

- Also, a falsely high improved score can result from a fracture as the bone is "denser"!

If the BMD is improved or unchanged, this suggests therapy is working as intended

If the BMD is worsening (outside the margin of the **least significant change**), this should prompt a reevaluation of bisphosphonate therapy

Is BMD stable or improving?


Maintenance
Reassessment
PEARL: If the BMD is worsening (outside the margin of the least significant change), this should prompt a reevaluation of bisphosphonate therapy
Consider evaluating/addressing for secondary causes of osteoporosis
Consider medication nonadherence or improper administration
Consider alternative antiresorptive: Denosumab, Teriparatide or Abaloparatide, or Romosozumab
Consider endocrinology consultation
Click for more information on reevaluating bisphosphonate therapy!
Reevaluate bisphosphonate therapy

PEARL: A bisphosphonate holiday should only be considered in a patient at low to moderate risk of fracture. A holiday aims to reduce the already low chance of ONJ and AFF while not compromising the risk of fracture.

A bisphosphonate holiday could be considered **only** if the patient is at low to moderate risk of fracture

If holiday is taken, the maximum recommended duration is 5 years.

- Fracture risk and BMD should be re-evaluated every 2 to 4 years after discontinuation.
- Consider restarting antiresorptive therapy earlier than 5 years if significant decline in bone mineral density, fracture, or increased clinical risk for developing fracture

Click for more information on bisphosphonate holidays!

Consider a bisphosphonate holiday

Initiation

Full Flowchart

Maintenance

Reassessment

After a completed course of bisphosphonate therapy, if the patient is at high or very high risk of fracture additional antiresorptive therapy is indicated

It would be reasonable to continue bisphosphonates or to consider another antiresorptive agent

Continue bisphosphonate use (no holiday) or consider alternative antiresorptive agent

PEARL: If the BMD is worsening (outside the margin of the least significant change), this should prompt a reevaluation of bisphosphonate therapy

- Consider evaluating/addressing for secondary causes of osteoporosis
- Consider medication nonadherence
- Consider alternative antiresorptive: Denosumab, Teriparatide or Abaloparatide, or Romosozumab
- Consider endocrinology consultation

Click for more information on reevaluating bisphosphonate therapy!

Reevaluate bisphosphonate therapy