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Signature Wellness
DR. ARNOLD'S OFFICE

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THE SIGNATURE WELLNESS WEEKLY

Strong Bones. Stronger Lives.

Looking After the Whole Person.

Better Questions. Better Understanding. Better Care.

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Dear Signature Wellness Community,

When we think about healthy aging, we often think about our heart, our weight, our energy, or our memory.

But there is another part of our health that deserves more attention: our bones.

We rarely think about our bones until something goes wrong. Unlike hot flashes, fatigue, or joint pain, bone loss often develops without symptoms. A person can feel perfectly healthy while their bones are gradually becoming weaker.

This week, I want to explore something that connects several important areas of health: hormones, bone strength, exercise, and the effects of medical treatments.

We will also look at an important question from my upcoming breast cancer book: when we are treating a serious disease, are we also looking after the rest of the person?

Because preventing disease is important. But so is preserving the ability to live well.

Is There a *Magic Estradiol Number?*

What the research actually tells us about estrogen, testosterone and protecting our bones.

Recently, several women have asked me whether their estradiol must exceed 200, 250, 300 or even 400 pmol/L to protect their bones. They have encountered these numbers in social-media discussions and understandably want to know whether a lower result means their treatment is failing.

The question is reasonable. Estrogen unquestionably matters for the skeleton. But the claim that there is one blood-test number separating "protected" from "unprotected" bones is much stronger than the evidence supports. To understand why, we need to look at what researchers actually measured, not just the numbers that appear in online posts.

How estrogen protects bone, and why a blood level is not the whole answer

Our bones are living tissue. Throughout life, one group of cells removes old bone and another replaces it. Estrogen helps restrain the cells that break bone down. When estrogen falls around menopause, bone breakdown can accelerate and bone density can decline, often before a woman notices any symptoms.

Estrogen treatment can play an important role in bone health and bone protection. There are three different ways a study might report "bone protection": a reduction in blood or urine markers of bone breakdown; a change in bone mineral density on a DXA scan; or fewer actual fractures. These are not interchangeable. A treatment may improve a laboratory marker without anyone having shown that a particular blood concentration prevents broken bones.

Why do people quote such different estradiol levels?

Different numbers arose from different kinds of research. Some investigators measured bone-turnover markers, others measured bone density, and others examined the relationship between estradiol and bone density in populations. The results were subsequently interpreted as treatment targets, even though the studies were not designed to test those targets.

> **8-10 pg/mL**
> **Approx. Canadian units:** 29-37 pmol/L
> **Why it appears in discussions:** Bone-density improvement observed in a randomized low-dose patch trial

> **40-50 pg/mL**
> **Approx. Canadian units:** 147-184 pmol/L
> **Why it appears in discussions:** Proposed targets in parts of the literature

54.5 pg/mL

Approx. Canadian units: 200 pmol/L

Why it appears in discussions: Cutoff discussed in UK transdermal estradiol research

60 pg/mL

Approx. Canadian units: 220 pmol/L

Why it appears in discussions: Frequently repeated threshold from older bone-turnover research

70 pg/mL

Approx. Canadian units: 257 pmol/L

Why it appears in discussions: Approximate association in an observational BMD analysis

100 pg/mL

Approx. Canadian units: 367 pmol/L

Why it appears in discussions: Occasionally promoted higher target, not validated for fracture prevention

The important point is not that one row is "right" and the others are "wrong." It is that they answer different questions. A concentration associated with a favorable marker is not automatically the minimum dose-response threshold for every woman. Nor does a number above that threshold guarantee that she will never fracture.

What did the original 60 pg/mL study show?

In 1992, Reginster and colleagues examined 262 women and compared serum estradiol with urinary markers of bone breakdown. Women with levels around 60-90 pg/mL tended to have lower markers than women with lower levels. The authors proposed that approximately 60 pg/mL might be needed to suppress bone resorption.

That was a useful physiological observation. But it was not a trial in which women were assigned to different estradiol targets and followed to see who lost bone or sustained fractures. The older estradiol assay and indirect urinary markers add uncertainty. It would therefore be misleading to tell a woman with an estradiol level of 150 pmol/L that this study proves her bones are unprotected.

The studies that change how we interpret the claim

Two randomized trials are especially revealing because they measured actual bone density rather than relying solely on biochemical markers. In both, the women benefited at estradiol concentrations far below 220 pmol/L.

Prestwood et al., 2003

Treatment and measured estradiol: Oral estradiol 0.25 mg/day; mean ~26.1 pg/mL (96 pmol/L) at 3 years

Bone-density result compared with placebo: Lumbar spine +2.8 percentage points; total hip +3.6 points; femoral neck +2.6 points

Ettinger et al., 2004

Treatment and measured estradiol: 14 mcg/day estradiol patch; median ~8.6 pg/mL (32 pmol/L) at 2 years

Bone-density result compared with placebo: Lumbar spine +2.0 percentage points; total hip +1.2 points

Arrenbrecht & Boermans, 2002

Treatment and measured estradiol: 50 or 100 mcg/day patch; serum threshold not established

Bone-density result compared with placebo: Lumbar spine BMD +4.5% and +5.9%, respectively, versus -2.3% with placebo

Consider the first study. Prestwood and colleagues followed 167 women over 65 for three years. The women taking only 0.25 mg of oral estradiol daily had better bone-density outcomes than those taking placebo, even though their average estradiol concentration was approximately 96 pmol/L. This does not mean 96 pmol/L is an ideal target. It means a level well below 220 pmol/L can accompany a meaningful skeletal response.

Ettinger and colleagues went further: in 417 women aged 60-80, an ultralow-dose patch produced a measurable bone-density benefit with a median estradiol concentration around 32 pmol/L. That does not prove such a low concentration prevents fractures or provides maximum benefit. It does, however, contradict the idea that bone cannot respond to estrogen below 220 pmol/L.

The third trial reminds us that dose can matter: women using a 100-microgram patch gained somewhat more lumbar spine bone density than those using a 50-microgram patch. But showing a dose-response is not the same as proving a universal blood-level cutoff. Different women absorb and metabolize transdermal estradiol differently.

What about the newer 2026 paper promoting 60 pg/mL?

A 2026 review by Piette and Simon argues that serum estradiol around 60 pg/mL may optimize skeletal and other outcomes. A separate 2026 review by Stanczyk and colleagues challenges the validity of the proposed cutoffs. Neither publication is a randomized trial that assigned women to specific blood-level targets and then measured fractures.

You may also encounter a claim that levels above 60 pg/mL provide "95-100% bone protection." That phrase needs careful interpretation. It is not evidence that 95-100% of fractures are prevented. The underlying calculation and the exact definition of "protection" have not been verified in the materials reviewed. A percentage based on bone-turnover markers or stable DXA results cannot be presented as a fracture-reduction percentage.

Now the surprising part: men need estradiol too

Most people associate estrogen with women and testosterone with men. Biology is more interesting. Men naturally convert some testosterone to estradiol through an enzyme called aromatase. That estradiol helps limit bone breakdown. Testosterone supports muscle and other aspects of skeletal health, but estradiol is particularly important for the regulation of bone resorption.

This explains why a man with apparently adequate testosterone may still face skeletal problems if estradiol is driven too low, for example by medication that blocks aromatization. It also explains why the goal during testosterone treatment should not automatically be to suppress estrogen as much as possible.

What do estradiol numbers mean in men?

Studies in men have identified a range in which very low estradiol is associated with increased bone turnover and fracture risk. The relevant concentrations are considerably lower than the 60 pg/mL figure often quoted for women. But these are research associations, not guaranteed safety boundaries or universal prescriptions.

Below 10 pg/mL
Approx. pmol/L: Below 37
How to interpret the research: Marked deficiency; increased concern about bone resorption

10-15 pg/mL
Approx. pmol/L: 37-55
How to interpret the research: Low range associated with skeletal risk in some studies

15-20 pg/mL
Approx. pmol/L: 55-73
How to interpret the research: Approximate transition region in observational fracture research

20-30 pg/mL
Approx. pmol/L: 73-110
How to interpret the research: Generally above the lowest-risk-associated ranges in many cohorts

Above 30 pg/mL
Approx. pmol/L: Above 110
How to interpret the research: No demonstrated need to deliberately raise levels further solely for bone protection

This table should not be used to diagnose osteoporosis or to adjust a man's medication without context. Assay accuracy matters, especially at low levels. A DXA scan, prior fracture history and other risk factors remain more informative than estradiol alone.

Two studies explain why we take low estradiol seriously in men

In a 2016 experiment, Finkelstein and colleagues suppressed normal sex-hormone production in 400 men aged 20-50 and then gave different testosterone doses. Some participants also received anastrozole, which prevented testosterone from being converted to estradiol. By separating these hormones, the researchers could ask which one was responsible for changes in bone turnover.

The answer was revealing: when estradiol was suppressed, bone resorption increased and some measures of bone health deteriorated even when testosterone was replaced. Under the study conditions, estradiol above approximately 10 pg/mL, together with testosterone above about 200 ng/dL, generally avoided short-term deterioration. But this was a 16-week experiment, not a study proving a lifelong fracture-prevention target.

The second study followed 2,639 older Swedish men for approximately 3.3 years. Mellström and colleagues found that lower estradiol, particularly below roughly 16 pg/mL (59 pmol/L), was associated with more fractures. For each standard-deviation decrease in estradiol, fracture hazard was about 34% higher. This is more directly relevant to the outcome patients care about, a broken bone. However, because it was observational, it cannot establish that raising a man's estradiol above 16 pg/mL will prevent a fracture.

Why are the two numbers different? One study manipulated hormones for 16 weeks in younger men and measured short-term skeletal responses; the other observed fractures over years in older men. Their findings reinforce the importance of avoiding severe estradiol deficiency, not the existence of a single universal target.

What women and men have in common, and what is different

Here is the larger picture. Estradiol matters to both sexes, but the studies use different populations, different outcomes and different methods. It would be a mistake to apply a target proposed for postmenopausal women to men, or to treat an observational male fracture threshold as a validated treatment target.

> **Does estradiol contribute to bone maintenance?**
> **Postmenopausal women:** Yes
> **Men:** Yes

> **Can skeletal benefit occur at low E2?**
> **Postmenopausal women:** Yes; randomized BMD evidence
> **Men:** Yes; short-term experimental evidence

> **Frequently discussed range**
> **Postmenopausal women:** 40-60 pg/mL, proposed, not validated
> **Men:** ~10-20 pg/mL, risk-associated, not validated

> **Does a specific serum level guarantee fracture protection?**
> **Postmenopausal women:** No
> **Men:** No

> **Is 60 pg/mL universally necessary?**
> **Postmenopausal women:** Not established
> **Men:** Not established

For men receiving testosterone, this evidence is a reason to be cautious about reflexively prescribing an aromatase inhibitor merely because an estradiol result is above a laboratory reference range. There may be circumstances in which treatment is justified, but suppressing estradiol without a clear reason can undermine an important pathway for skeletal health.

What should you do with your own results?

If you are concerned about osteopenia or osteoporosis, start with the questions that directly affect fracture risk: Have you had a low-trauma fracture? Is a DXA scan appropriate? Are there medications or medical conditions contributing to bone loss? Are your nutrition, resistance exercise and balance training adequate? Is treatment indicated based on your overall risk?

Estradiol measurements can sometimes help clarify poor absorption or an unexpected response to hormone therapy. They should not replace those questions. A number that is useful in one clinical situation may not be the right target for another person.

At Signature Wellness, our approach is to listen, examine the evidence and individualize care. **The goal is not to chase a number. It is to preserve strong bones, reduce fractures and help you remain active and independent.**

Explore the research

- Prestwood et al., JAMA 2003
- Ettinger et al., JAMA 2004
- Finkelstein et al., JCI 2016
- Mellström et al., MrOS Sweden 2008
- Piette & Simon 2026
- Stanczyk et al., 2026

What Else Can We Do *to Protect Our Bones?*

Hormones are only one part of the story.

Osteopenia means that bone density is lower than expected but has not reached the conventional bone-density threshold for osteoporosis.

Osteoporosis involves greater skeletal fragility and an increased risk of fractures.

Neither condition should be ignored. But neither should be approached as though everyone requires the same treatment.

Know your actual fracture risk

A bone-density test, commonly called a DXA scan, helps us assess bone strength. However, bone density is not the only factor that determines fracture risk.

Age, previous fractures, family history, medications, smoking, and other health conditions all matter.

A person with osteopenia and a previous fragility fracture may need more intensive treatment than someone with a lower bone-density measurement but otherwise low fracture risk.

The goal is to identify who is most likely to experience a fracture and intervene appropriately.

Nutrition matters

Bones need adequate nutrition. Calcium is essential for maintaining bone structure, and vitamin D helps the body absorb calcium. For most adults, obtaining calcium through food is usually adequate.

Protein is also important. Protein supports muscle maintenance and physical function, both of which contribute to mobility and fall prevention.

Strength training: One of the most important investments in healthy aging

Many people associate strength training with building muscle, improving appearance, or losing weight. But strength training is also important for bone health.

Bones respond to the physical forces placed upon them. When muscles contract against resistance, they place mechanical loads on the skeleton. Appropriate progressive loading helps maintain or improve bone strength.

Strength training also improves muscle function, stability, and the ability to recover from a loss of balance. This matters because preventing a fracture involves more than improving bone density.

> ***It also involves preventing the fall that might cause the fracture.***

Walking is excellent for cardiovascular health and general fitness. But walking alone may not provide enough progressive loading to meaningfully improve bone density. That is why resistance training deserves a place alongside regular walking and other aerobic activities.

Canadian osteoporosis guidelines recommend progressive resistance training at least twice weekly, together with balance and functional exercises. Depending on individual ability, training might include squats, resistance bands, weights, step-ups, or exercises designed to strengthen the back and hips.

For people with osteoporosis, previous spinal fractures, or significant fracture risk, exercise selection and progression should be individualized to avoid unsafe loading or movements.

The important message is that it is never too late to begin improving strength and function.

Meet Chris Yap: Strength Training Is About More Than Weight Loss

Many Signature Wellness clients have already been introduced to **Chris Yap**, who works with patients through our Fitness & Nutrition Program.

We have previously discussed the importance of preserving muscle during weight optimization, particularly for people using medications that help reduce appetite and body weight. But Chris's work is not limited to weight management.

Building and maintaining strength is an important part of healthy aging for both women and men.

A woman entering menopause may want to protect muscle and bone as her hormones change.

A man in his sixties may want to improve strength, balance, and long-term mobility.

Someone with osteopenia may benefit from a carefully designed resistance-training program.

And someone losing weight may need guidance to ensure that weight loss does not come at the expense of muscle strength.

Chris can help clients with individualized fitness assessments, exercise planning, nutrition, accountability, and personal training.

The goal is not to make everyone follow the same workout. It is to develop a program appropriate for the individual, their abilities, and their health goals.

Interested in working with Chris?

Contact the Signature Wellness team and ask about our Fitness & Nutrition Program with Chris Yap.

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Please let our team know if you have osteoporosis, previous fractures, or other conditions that may require modifications to your exercise program.

When exercise and nutrition are not enough

Some people will also benefit from medication to reduce fracture risk. Depending on individual circumstances, options may include menopausal hormone therapy, bisphosphonates or bone-building medications.

These treatments work differently and are not interchangeable. The right approach depends on the person's fracture risk, medical history, preferences, and treatment goals.

Bone health is not one treatment. It is a long-term strategy.

[Read Osteoporosis Canada's prevention and treatment guidance]

3. FROM MY UPCOMING BREAST CANCER BOOK

Who Is Looking After the Rest of Me?

Treating the disease matters. So does protecting the woman living with it.

Over the past several months, I have been working on my upcoming book: **Who Is Looking After the Rest of Me?**

The title reflects a question I believe deserves far more attention in breast cancer care.

When a woman receives a breast cancer diagnosis, the medical focus naturally turns toward treating the cancer.

What surgery is needed?

Will chemotherapy help?

Should she receive radiation?

Would endocrine therapy reduce the risk of recurrence?

These are important questions, and they deserve careful, evidence-based answers. But they are not the only questions.

What happens to her sleep?

Her sexual health?

Her relationships?

Her emotional well-being?

Her ability to exercise, work, or enjoy her everyday life?

And what happens to her bones?

When treating breast cancer affects bone health

Many breast cancers are hormone-sensitive. For these cancers, treatments that reduce estrogen production or block estrogen's effects can substantially reduce the risk of recurrence.

But estrogen also plays an important role in maintaining bone strength.

Aromatase inhibitors, commonly prescribed to postmenopausal women with hormone-receptor-positive breast cancer, significantly reduce estrogen production. That can accelerate bone loss and increase fracture risk.

For younger women, chemotherapy may cause early menopause. Ovarian suppression can also reduce estrogen levels dramatically.

These effects are not simply minor inconveniences. They may have consequences for a woman's mobility, independence, and long-term health.

A 2025 international scientific statement emphasized the importance of evaluating bone health in women receiving aromatase inhibitors and providing appropriate preventive or therapeutic treatment. Depending on individual risk, that may involve bone-density monitoring, exercise, vitamin D assessment, and medications that protect against fractures.

The Treatment Gap

In my book, I describe something I call **The Treatment Gap**.

It is the space between what oncology needs to do to reduce cancer recurrence and what the woman needs in order to live well enough to tolerate that treatment.

Imagine a woman who begins endocrine therapy after breast cancer. Her treatment may be providing an important reduction in her risk of recurrence.

But over time, she develops joint pain, poor sleep, loss of strength, and declining bone density. She may find it increasingly difficult to exercise. Activities she once enjoyed become uncomfortable. Eventually, she begins wondering whether she can continue her medication.

The answer should not simply be that she must tolerate every symptom because her cancer treatment is important. Nor should she be encouraged to abandon an effective treatment without understanding the consequences.

Instead, we need to ask how we can preserve the benefits of her cancer treatment while addressing the problems that threaten her quality of life.

Can her pain be treated?

Can her sleep be improved?

Can she receive help with exercise and rebuilding strength?

Has her bone density been assessed?

Would bone-protective medication be appropriate?

And perhaps most importantly:

Who is responsible for making sure these concerns are actually addressed?

Treat the cancer. Care for the woman.

This is not an argument against effective breast cancer treatment. Quite the opposite.

When we identify and manage the physical and emotional consequences of treatment, we may help women remain on therapies that are important for reducing recurrence.

The important principle is that cancer treatment and whole-person care should not be competing priorities. A woman should not have to choose between receiving effective cancer treatment and having her other health concerns taken seriously. She deserves both.

That is one of the central messages of *Who Is Looking After the Rest of Me?*

> ***Breast cancer deserves excellent treatment. The woman living with breast cancer deserves excellent care.***

My hope is that this book will help women understand their individual risks, recognize their options, and participate more confidently in decisions that affect not only their cancer, but the rest of their lives.

I'll be sharing more from the book in the coming weeks.

Further reading:

2025 International Position Statement on Aromatase Inhibitor-Associated Bone Loss

Health is about more than avoiding disease. *It is about preserving the ability to live well.*

A blood test can tell us something about hormone levels. A bone-density scan can tell us something about skeletal strength. A scale can tell us how much someone weighs.

But none of those measurements, on its own, tells us how well that person is living.

Can they climb stairs comfortably?

Can they carry their groceries?

Can they enjoy time with their grandchildren?

Can they recover from an illness and return to the activities that matter to them?

These are also important measures of health. This week's discussion has been about bones, but the message extends much further.

Good medicine requires scientific evidence.

Great care requires understanding the individual person to whom that evidence applies.

Until next week,

Dr. George M. Arnold, MD, FRCSC, FSOGC, ABAARM, FAARM
Signature Wellness

LET'S TALK ABOUT YOUR LONG-TERM HEALTH

Whether you are concerned about menopause, testosterone, bone density, strength, weight optimization, or maintaining your health as you age, our team can help you explore your options.

To learn more about individualized hormone care or working with Chris Yap through our Fitness & Nutrition Program, contact Signature Wellness.

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This newsletter provides general educational information and does not replace individualized medical assessment or treatment advice.

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