UCSF Benioff Children's Hospitals

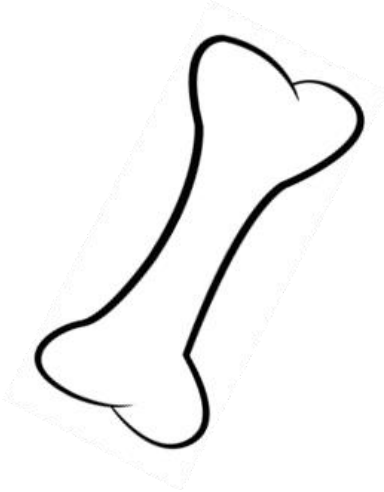
UCSF Health

Transgender Medicine and Bone Health

2021 Interdisciplinary Symposium on Osteoporosis (ISO2021)

Janet Y. Lee, MD, MPH, MAS
Assistant Professor of Pediatrics and of Medicine
Divisions of Pediatric Endocrinology & Endocrinology and Metabolism
University of California, San Francisco

13 May 2021

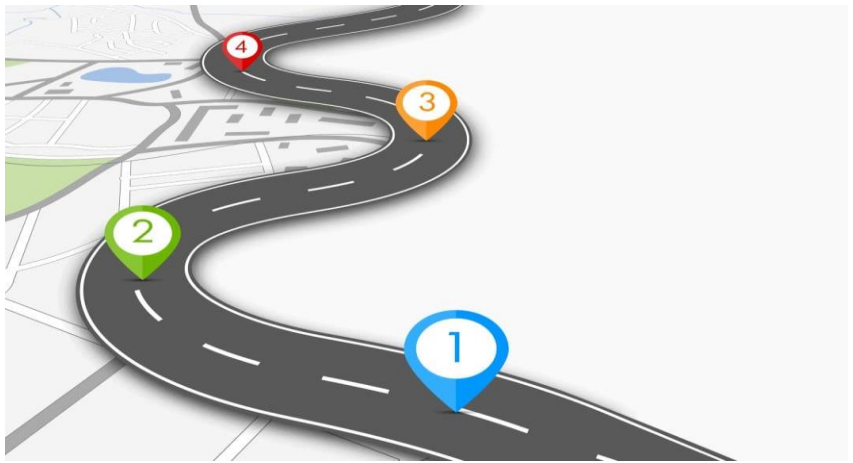


Disclosures

- No relevant conflicts of interest for this talk
  - I have served on advisory boards for Ultragenyx Pharmaceuticals
- I will be discussing non-FDA approved therapies

Roadmap

- Background & Brief Review: Gender
- Current Literature & Approach: Pediatrics
- Current Literature & Approach: Adults
- Summary & Future Directions
- Questions



Background: Let's Talk About Gender

Setting the Stage with the Lingo

- SEX: male/female/intersex
  - Assigned/designated/recorded at birth, birth-assigned/designated/recorded
- GENDER: Affirmed gender / gender identity (exists on a spectrum)
  - Binary
    - Transgender boy/man (female-to-male, transmasculine, trans man) & cisgender boy/man
    - Transgender girl/woman (male-to-female, transfeminine, trans woman) & cisgender girl/woman
  - Non-Binary
    - Agender, gender queer, gender fluid, non-binary transmasculine/transfeminine spectrum
- Gender non-conforming/diverse/expansive/creative
- **Transgender and Gender Diverse (TGD)**

Background: Gender Dysphoria

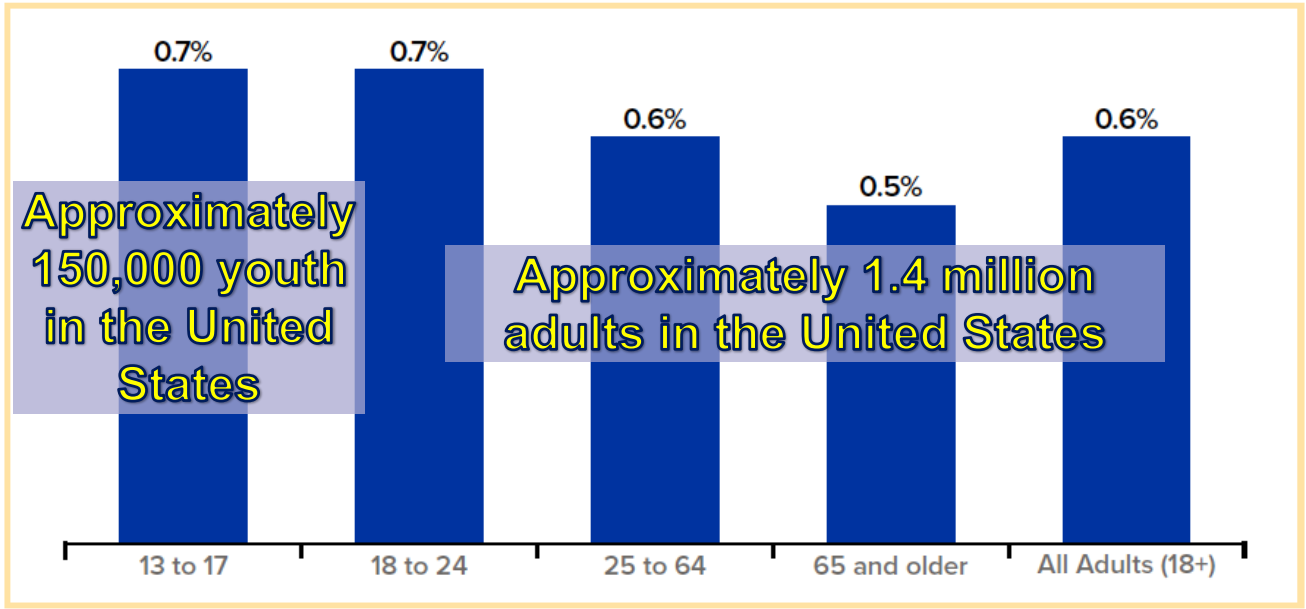
Diagnostic Criteria

- Recognized in the newest 2013 edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM)-V, defined as:
  - Marked difference between person's expressed/experienced gender & gender others would assign
  - Persist for at least 6 months
  - Children must verbalize this desire
  - Condition causes significant distress or impairment in functioning
- Previously known as "Gender Identity Disorder" in DSM-IV

Estimated Population in the United States

The Williams Institute – January 2017

Figure 1. Percentage of Individuals Who Identify as Transgender by Age



Using local probability surveys and national convenience samples %youth who identified as transgender ranged from **1.3% to 3.2%**.

Wilson BDM, Kastanis A. (2015). Sexual and gender minority disproportionality and disparities in child welfare: A population-based study. *Children and Youth Services Review, 58*, 11-17.
Johns MM, et al. (2019). Transgender Identity and Experiences of Violence Victimization, Substance Use, Suicide Risk, and Sexual Risk Behaviors Among High School Students — 19 States and Large Urban School Districts, 2017. *MMWR,* 69(3):67-71.

Herman JL, Flores AR, Brown TNT, Wilson BDM, Conron KJ. (2017). *Age of Individuals Who Identify as Transgender in the United States.* Los Angeles, CA: The Williams Institute.
Flores AR, Herman JL, Gates GJ, Brown TNT. (2016). *How Many Adults Identify as Transgender in the United States?* Los Angeles, CA: The Williams Institute.

UCSF Health
UCSF Benioff Children's Hospitals

Gender-Affirming Care of TGD Youth

United States – Brief History

- First described in the literature ~2007 – Boston Children's Hospital "Gender Management Service" (GeMS)
- 01/2009 – At UCSF, Dr. Steve Rosenthal treated his first pediatric TGD patient
- 09/2009 – The Endocrine Society publishes first Clinical Practice Guidelines focused on endocrine treatment of "transsexual" persons
- 05/2012 – The UCSF Child and Adolescent Gender Center (CAGC) – multidisciplinary clinic was formed

Edwards-Leeper and Spack. Psychological evaluation and medical treatment of transgender youth in an interdisciplinary "Gender Management Service" (GeMS) in a major pediatric center. J Homosex. 2012;59(3):321-36.

Treatment Approach

DSM-V Gender Dysphoria (2013)

Mental Health Gender Specialist

Early Childhood	Late Childhood/Pre-Puberty	Early Puberty	Late Puberty	Adulthood

School Resources, Social Transition

Puberty Blockers: GnRH agonists

Gender-Affirming Sex Hormones

Surgeries

Fertility Preservation

UCSF Health

UCSF Benioff Children's Hospitals

The “Dutch treatment protocol”

Featured prominently in first iteration of Endocrine Society guidelines

- Puberty blockers after puberty starts
- Gender-affirming sex hormones initiated at 16 years (age of majority in The Netherlands)
- 2017 revised guidelines - updated language to suggest gender-affirming sex hormones could be initiated earlier (without specific recommended ages)

Gender-Affirming Medical Therapies

For TGD Youth – peer-concordant puberty timing model

- Puberty Blockers (GnRH agonists)
  - Eligible at Tanner Stage 2 of puberty
  - At UCSF, no monotherapy beyond 14 years
- Gender-Affirming Sex Hormones (Estrogen or Testosterone)
  - Timing of initiation is controversial!
  - At UCSF, had been around 14 years but often earlier
  - Practice dependent, but guidelines suggest hard limit of 16 years
- Other Medications (spironolactone, bicalutamide, etc)

Clinical Practice Guidelines

The Endocrine Society, UCSF Center of Excellence for Transgender Health, World Professional Association for Transgender Health

International Journal of Transgenderism, 13:165–232, 2011
Copyright © World Professional Association for Transgender Health
ISSN: 1553-2739 print / 1434-4599 online
DOI: 10.1080/15532739.2011.700873

Routledge
Taylor & Francis Group

Standards of Care for the Health of Transsexual, Transgender, and Gender-Nonconforming People, Version 7

Coleman, E., Bockting, W., Botzer, M., Cohen-Kettenis, P., DeCuypere, G., Feldman, J., Fraser, L., Green, J., Knudson, G., Meyer, W. J., Monstrey, S., Adler, R. K., Brown, G. R., Devor, A. H., Ehrbar, R., Ettner, R., Eyler, E., Garofalo, R., Karasic, D. H., Lev, A. I., Mayer, G., Meyer-Bahlburg, H., Hall, B. P., Pfaefflin, F., Rachlin, K., Robinson, B., Schechter, L. S., Tangpricha, V., van Trotsenburg, M., Vitale, A., Winter, S., Whittle, S., Wylie, K. R., & Zucker, K.

Guidelines for the Primary and Gender-Affirming Care of Transgender and Gender Nonbinary People

Center of Excellence for Transgender Health

Department of Family & Community Medicine

University of California, San Francisco

2nd Edition – Published June 17, 2016

Editor - Madeline B. Deutsch, MD, MPH

Endocrine Treatment of Gender-Dysphoric/ Gender-Incongruent Persons: An Endocrine Society* Clinical Practice Guideline

Wylie C. Hembree,[1] Peggy T. Cohen-Kettenis,[2] Louis Gooren,[3] Sabine E. Hannema,[4] Walter J. Meyer,[5] M. Hassan Murad,[6] Stephen M. Rosenthal,[7] Joshua D. Safer,[8] Vin Tangpricha,[9] and Guy G. T'Sjoen,[10]

[1]New York Presbyterian Hospital, Columbia University Medical Center, New York, New York 10032 (Retired); [2]VU University Medical Center, 1007 MB Amsterdam, Netherlands (Retired); [3]VU University Medical Center, 1007 MB Amsterdam, Netherlands (Retired); [4]Leiden University Medical Center, 2300 RC Leiden, Netherlands; [5]University of Texas Medical Branch, Galveston, Texas 77555; [6]Mayo Clinic Evidence-Based Practice Center, Rochester, Minnesota 55905; [7]University of California San Francisco, Benioff Children's Hospital, San Francisco, California 94143; [8]Boston University School of Medicine, Boston, Massachusetts 02118; [9]Emory University School of Medicine and the Atlanta VA Medical Center, Atlanta, Georgia 30322; and [10]Ghent University Hospital, 9000 Ghent, Belgium

***Cosponsoring Associations:** American Association of Clinical Endocrinologists, American Society of Andrology, European Society for Pediatric Endocrinology, European Society of Endocrinology, Pediatric Endocrine Society, and World Professional Association for Transgender Health.

Coleman E, Bockting W, Botzer M, et al. Standards of Care for the Health of Transsexual, Transgender, and Gender-Nonconforming People, Version 7. *International Journal of Transgenderism.* 2012;13(4):165-232.

Hembree WC, Cohen-Kettenis PT, Gooren L, et al. Endocrine Treatment of Gender-Dysphoric/Gender-Incongruent Persons: An Endocrine Society Clinical Practice Guideline. *J Clin Endocrinol Metab.* 2017;102(11):3869-3903

UCSF Health

UCSF Benioff Children's Hospitals

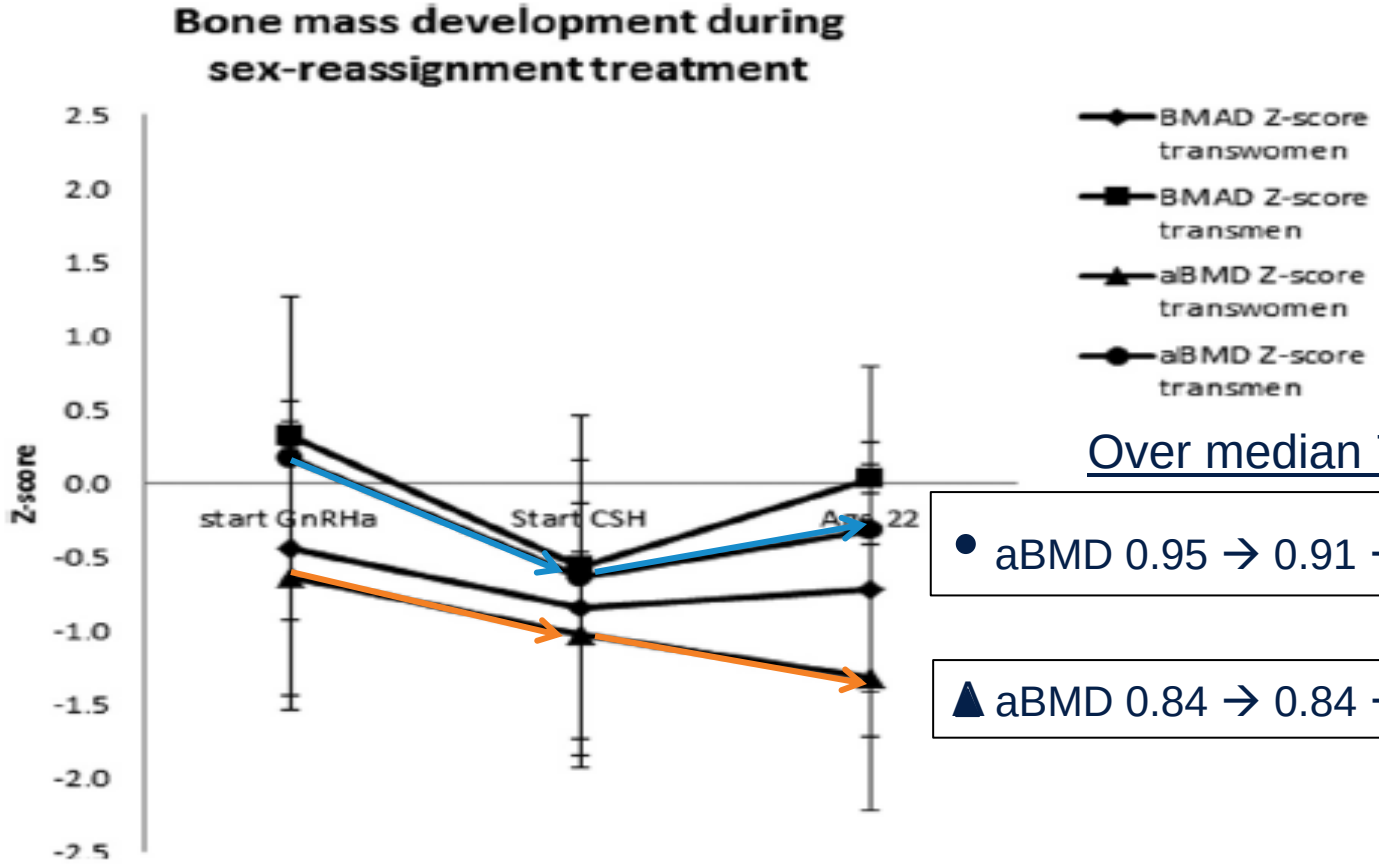
Bone Mass in Young Adulthood Following Gonadotropin-Releasing Hormone Analog Treatment and Cross-Sex Hormone Treatment in Adolescents With Gender Dysphoria

Daniel Klink, Martine Caris, Annemieke Heijboer, Michael van Trotsenburg, and Joost Rotteveel

Center of Expertise on Gender Dysphoria (D.K., M.v.T., J.R.); Department of Pediatrics, Division of Endocrinology (D.K., M.C., J.R.); Department of Clinical Chemistry (A.H.); and Department of Obstetrics and Gynaecology (M.v.T.), VU University Medical Center, de Boelelaan 1118 1081 HZ Amsterdam, The Netherlands

J Clin Endocrinol Metab, February 2015, 100(2):E270–E275

- 15 trans women, 19 trans men
- BMD by DXA: prior to GnRHa, at start of Cross-Sex Hormones (CSH), at 22 yrs
- Mean age 14.9-15 years, median Tanner 4-5
- GnRHa monotherapy duration: median 1.3-1.5 years
- CSH duration: median 5.4-5.8 years



Over median 7 years

- aBMD 0.95 → 0.91 → 0.99 (+4.2%)

- aBMD 0.84 → 0.84 → 0.93 (+10.7%)

Figure 1. Longitudinal *z*-score (mean ± SD) development of the LS from start medical treatment until the age of 22 years in transmen and transwomen.

Effect of pubertal suppression and cross-sex hormone therapy on bone turnover markers and bone mineral apparent density (BMAD) in transgender adolescents

Mariska C. Vlot [a,b], Daniel T. Klink [c,d], Martin den Heijer [b,c], Marinus A. Blankenstein [a], Joost Rotteveel [c,d], Annemieke C. Heijboer [a,*]

[a] Department of Clinical Chemistry, Endocrine Laboratory, VU University Medical Center, de Boelelaan 1117, 1081 HV, Amsterdam, The Netherlands
[b] Department of Internal Medicine, section Endocrinology, VU University Medical Center, de Boelelaan 1117, 1081 HV, Amsterdam, The Netherlands
[c] Center of Expertise on Gender Dysphoria, VU University Medical Center, de Boelelaan 1117, 1081 HV, Amsterdam, The Netherlands
[d] Department of Pediatric Endocrinology, VU University Medical Center, de Boelelaan 1117, 1081 HV, Amsterdam, The Netherlands

Bone 95 (2017) 11–19

- **42 trans men**, **28 trans women**
- Median age (bone age) **15.1 yrs (15 yrs)** / **13.5 yrs (13.5 yrs)**
- Median Tanner Stage **5 (2-5)** / **3 (2-5)**
- BMD by DXA: prior to GnRHa, prior to CSH, 2 years after CSH
- Subdivided into young and old cohorts based on bone age
  - Transgender boys **<14 years and ≥14 years**
  - Transgender girls **<15 years and ≥15 years**
- Bone turnover markers: ± 90 days, non-fasting

Bone Turnover Markers and BMAD

D0 – prior to GnRHa, C0 – prior to CSH, C24 – 24 months after CSH

- P1NP & ICTP decreased more in the **“young”** vs. **“old”** cohorts
  - Trans men:
    - P1NP **783 → 324 → 186** vs. **110 → 127 → 101**
    - ICTP **24 → 11 → 12** vs. **7 → 6.9 → 8.2**
  - Trans women:
    - P1NP **935 → 363 → 204** vs. **191 → 140 → 119**
    - ICTP **23 → 13 → 10** vs. **12 → 7.4 → 6.8**
- LS BMAD Z-scores by DXA: lower in trans women, especially younger

Bone Development in Transgender Adolescents Treated With GnRH Analogues and Subsequent Gender-Affirming Hormones

Sebastian E. E. Schagen,[1] Femke M. Wouters,[2] Peggy T. Cohen-Kettenis,[3] Louis J. Gooren,[4] and Sabine E. Hannema[5]

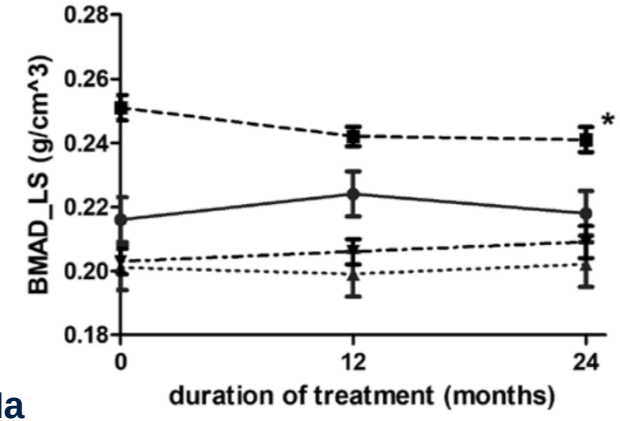
The Journal of Clinical Endocrinology & Metabolism, 2020, Vol. 105, No. 12, 1–12
doi:10.1210/clinem/dgaa604
Clinical Research Article

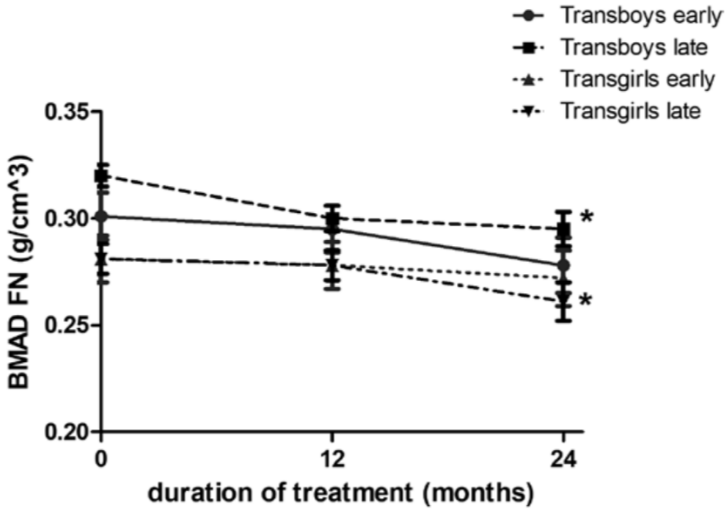
- Observational prospective study (1998-2009) – some previously reported (Klink et al 2015 and Vlot et al 2017): 54 trans girls and 73 trans boys
  - GnRHa (2-4 years): 51 trans girls & 70 trans boys
  - GnRHa + hormones (3 years): 36 trans girls and 42 trans boys
- BMAD Z-scores, fasting serum bone markers (P1NP/P3NP/osteocalcin, 1CTP)
- Early-pubertal group (Tanner 2-3)
  - GnRHa: 15 trans girls and 14 trans boys
  - GnRHa + hormones: 10 trans girls and 5 trans boys
- Late-pubertal group (Tanner 4-5)
  - GnRHa: 36 trans girls and 56 trans boys
  - GnRHa + hormones: 26 trans girls and 37 trans boys

BMAD and BMAD z-scores during GnRHa

After 2 years of GnRHa

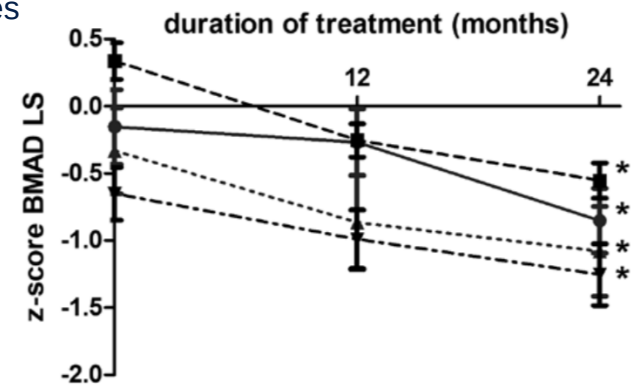
BMAD Z-scores <-2 in:
4 trans girls at hip
3 trans girls at LS
2 trans boys at hip

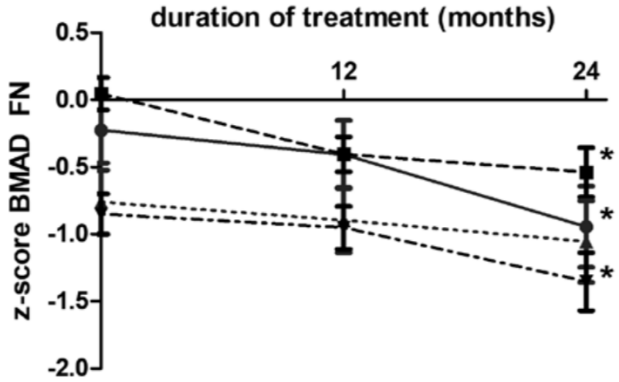




After 3 years of GnRHa

4 trans boys
11 trans girls
→ further decline in Z-scores





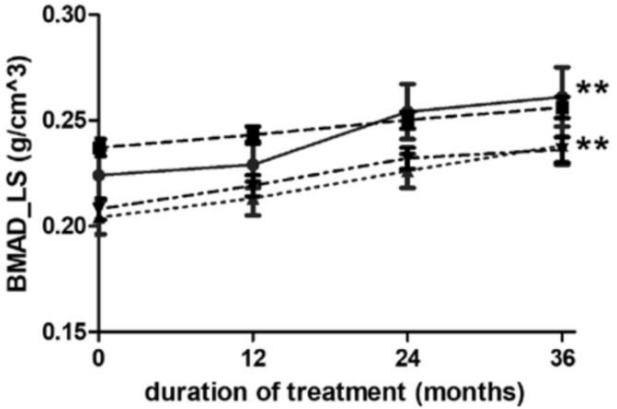
BMAD and BMAD z-scores during GnRHa and gender affirming hormones

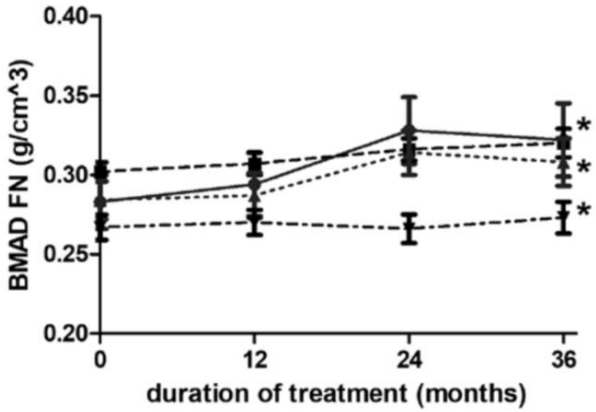
After 3 years of GAH

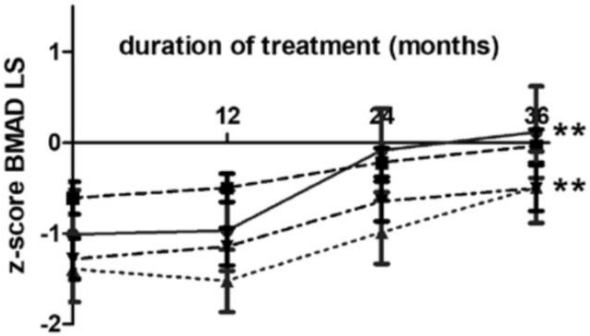
BMAD Z-scores <-2 in:

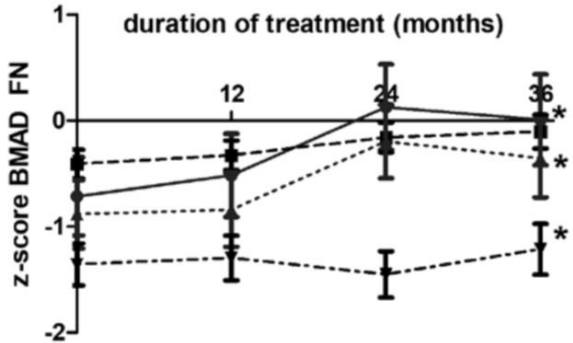
3 trans girls at hip

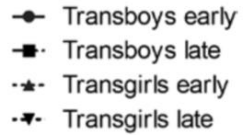
3 trans girls at LS



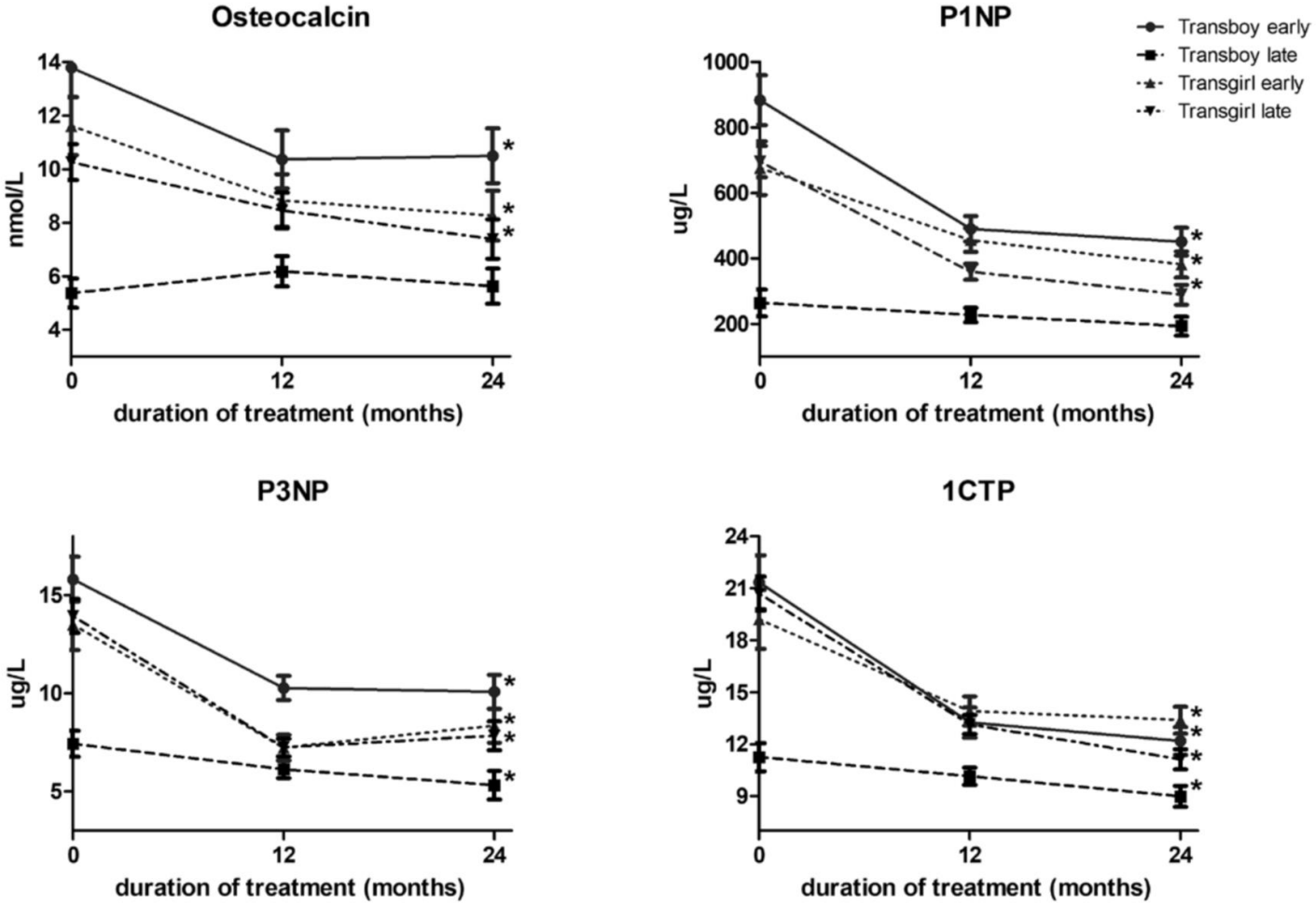




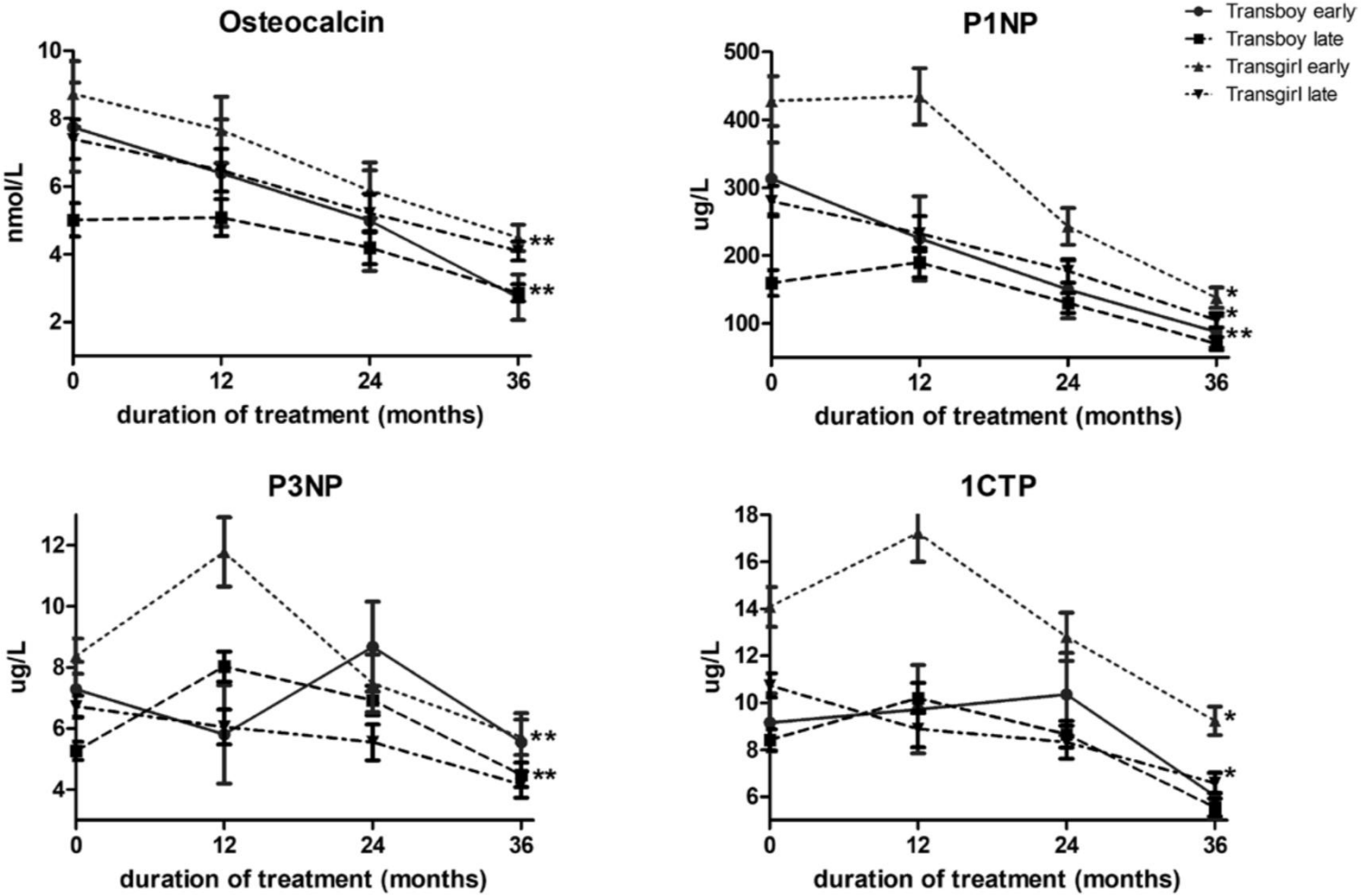




Serum bone markers during GnRHa treatment



Serum bone markers during GnRHa and gender affirming hormones



Journal of Bone and Mineral Research
JBMR
ASBMR
The American Society for Bone and Mineral Research

Original Article | Open Access

Development of Hip Bone Geometry During Gender-Affirming Hormone Therapy in Transgender Adolescents Resembles That of the Experienced Gender When Pubertal Suspension Is Started in Early Puberty

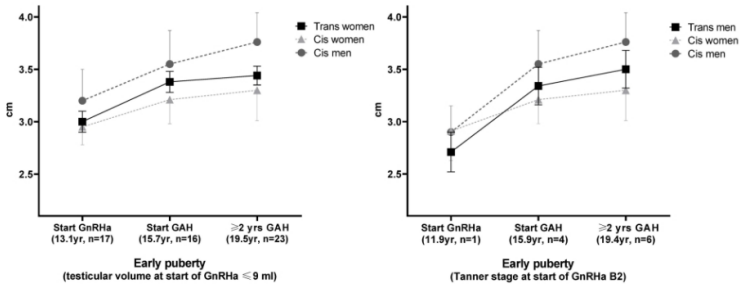
Maria ATC van der Loos, Ilse Hellinga, Mariska C Vlot, Daniel T Klink, Martin den Heijer, Chantal M Wiepjes

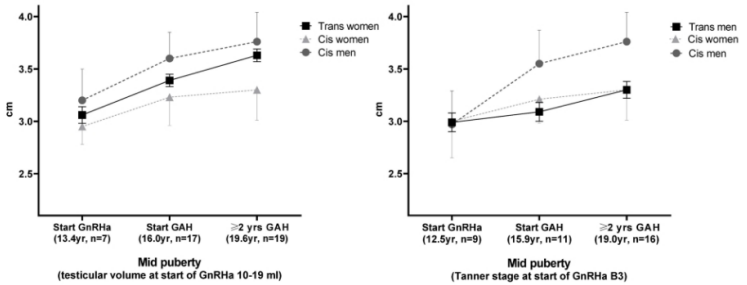
First published: 28 January 2021 | https://doi.org/10.1002/jbmr.4262

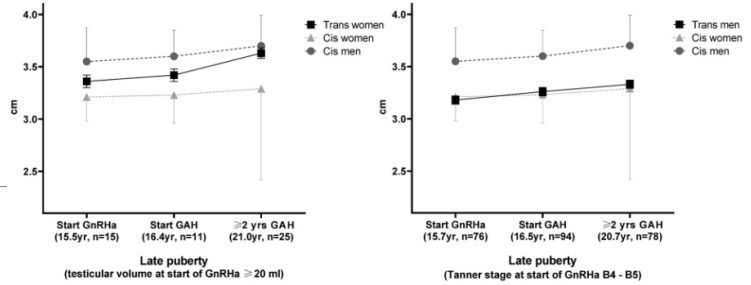
- N = 322 (**106 trans women** and **216 trans men**), pediatric treatment
- Subgroups by Tanner stage: early (**32**-**8**), mid (**30**-**22**), late puberty (**44**-**186**) groups
- Hip Structure Analysis software on DXA - subperiosteal width (SPW) & endocortical diameter (ED) at start of GnRHa & GAH / after ≥ 2 yrs of GAH
- Individuals who started GnRHa during early puberty resembled reference curves for SPW & ED of experienced gender

Subperiosteal width

Trans women



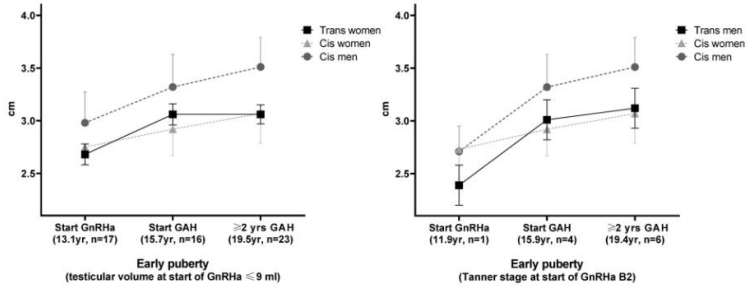


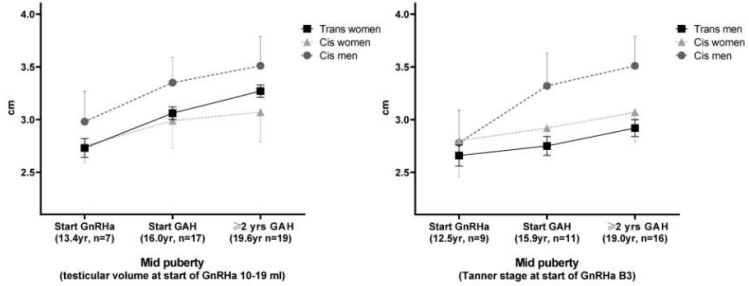


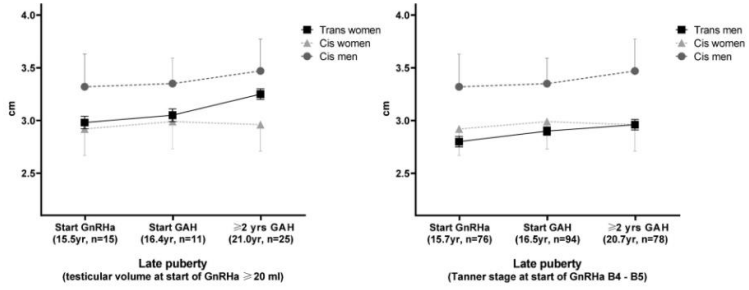
Trans men

Endocortical diameter

Trans women







Trans men

ospitals

Summary of Dutch Pediatric TGD Bone Data

- Transfeminine adolescent youth have lower pre-treatment BMD Z-scores (male reference ranges)
- All BMD Z-scores drop as expected on GnRHa monotherapy
- Transfeminine BMD Z-scores continue dropping in some youth despite estradiol therapy for several years
- Bone turnover markers decrease with gender-affirming medical therapy
- There may be differential effects on bone depending on pubertal stage at which gender-affirming medical therapy starts
- Bone geometry resembles references of experienced gender in TGD individuals who start GnRHa in early puberty

The Impact of Early Medical Treatment in Transgender Youth

NIH/NICHD R01, multiple PI format

- First longitudinal observational study of transgender youth funded by NIH
- Multiple sites: UCSF, CHLA, Boston Children's, Lurie Children's
- **Early Puberty Cohort (n = 95), initiating puberty blockers**
- Late Puberty Cohort (n = 301), initiating gender-affirming sex hormones, some treatment naïve and some already on blockers
- Measures: mental health, psychological well-being, metabolic and physiologic parameters, **bone health measures (DXA or QCT), vitamin D status, dietary calcium intake and physical activity assessments (PAQ-C)**

Low bone mineral density in early pubertal transgender/gender diverse youth: Findings from the Trans Youth Care Study

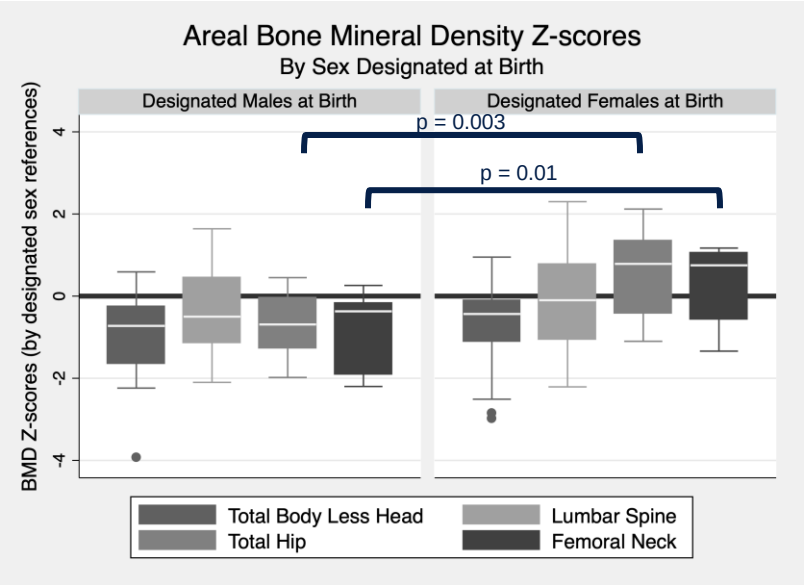
Janet Y Lee, MD, MPH, MAS ✉, Courtney Finlayson, MD, Johanna Olson-Kennedy, MD, Robert Garofalo, MD, MPH, Yee-Ming Chan, MD, PhD, David V Glidden, PhD, Stephen M Rosenthal, MD

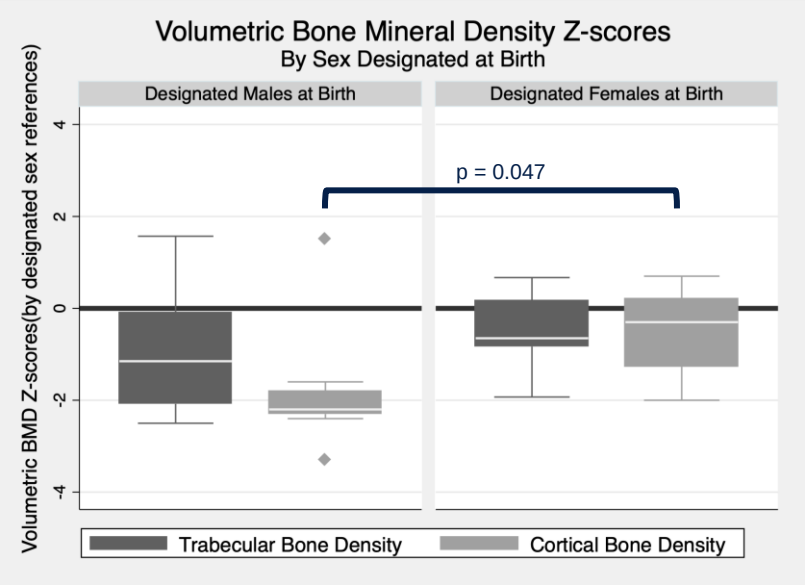
Journal of the Endocrine Society, bvaa065, https://doi.org/10.1210/jendso/bvaa065
Published: 02 July 2020 **Article history** ▾

- 63 TGD youth in **Tanner Stage 2-3** (63.5% Tanner 2)
  - 33 designated males at birth (trans feminine)
  - 30 designated females at birth (trans masculine)
- DXA or QCT (hip and spine) prior to gender-affirming medical therapy, physical activity (PAQ-C: 1 = lowest activity, 5 = highest activity), dietary calcium intake, 25-OHD
- 30% designated males at birth and 13% designated females at birth had 1+ BMD Z-score <-2
- TGD youth with low BMD (n = 14) scored lower on PAQ-C, 2.32 ± 1.71 vs. 2.76 ± 0.61 (p = 0.01)
- All TGD youth had sub-optimal calcium intake ~500-600mg/day

Areal & Volumetric BMD Z-scores

By Sex Designated at Birth





UCSF Health UCSF Benioff Children's Hospitals

Multivariate Linear Regression Models

Significant predictors of BMD Z-scores

- Predictors included: sex designated at birth, PAQ-C score, BMI Z-score, Tanner stage, age, dietary calcium intake, serum 25-OH D.
- Positive predictors for TBLH BMD Z-scores: BMI Z-scores ($p < 0.0001$)
- Positive predictors for TH BMD Z-scores: female sex ($p = 0.04$) and 25-OH D ($p = 0.048$)
- Negative predictor of TH BMD Z-score: age ($p = 0.049$)
- Negative predictor of FN BMD Z-score: age ($p = 0.02$)
- Summary:
  - higher BMI Z-scores → higher TBLH BMD Z-scores
  - female sex and higher 25-OHD → higher TH BMD Z-scores
  - later age → lower hip BMD Z-scores

Summary

- We found a high prevalence of low BMD in early-pubertal TGD youth prior to GnRHa therapy, trans feminine > trans masculine
- Differences were most pronounced and significant at hip sites, reflecting potential impact of decreased physical activity
- Lower physical activity observed overall, but significantly lower in trans feminine than in trans masculine and lower in the low BMD group than in the normal BMD group
- TGD youth may not be achieving optimal dietary calcium intake
- Longitudinal data analyses forthcoming
- Coming soon!: prospective study on the skeletal effects of puberty suppression in early pubertal TGD youth over one year, utilizing DXA and HR-pQCT (n = 30)

Approach to Transgender/Gender Diverse Youth

During Suppression of Puberty

- Endocrine Society Suggestions (baseline & every 1-2 years):
  - Bone age radiograph to assess growth
  - Bone density using DXA
- **"BMD should be monitored into adulthood (until the age of 25-30 y or until peak bone mass has been reached)."**
- No specific bone-related recommendations for TGD youth initiating gender-affirming medical therapy in late adolescence
- My own suggestions: Consider baseline DXA in all TGD youth (maybe even pre-puberty) who have risk factors for low BMD (eating disorders, low BMI, low physical activity, etc)

Hembree WC, Cohen-Kettenis PT, Gooren L, et al. Endocrine Treatment of Gender-Dysphoric/Gender-Incongruent Persons: An Endocrine Society Clinical Practice Guideline. *J Clin Endocrinol Metab.* 2017;102(11):3869-3903

Bone Density in Transgender Women

When compared with cisgender men reference data

- Prior to treatment:
  - Lower aBMD at spine, total hip, and femoral neck
  - Van Caenegem E et al; Fighera TM et al
- On gender-affirming estrogen therapy:
  - Stable to increased aBMD
  - Sing-Ospina N et al; Van Caenegem E et al; Mueller A et al; Dittrich R et al; Reutrakul S et al; Wiepjes CM et al

Bone Density in Transgender Men

When compared with cisgender women reference data

- Overall – more favorable BMD measurements
- Prior to treatment:
  - Similar aBMD at spine, total hip, and femoral neck
  - Van Caenegem E et al; Haraldsen IR et al
- On gender-affirming testosterone therapy:
  - Stable to increased aBMD
  - Sing-Ospina N et al; Van Caenegem E et al; Fighera et al; Wiepjes CM et al; Turner et al; Mueller et al; Pelusi et al

JBMR®

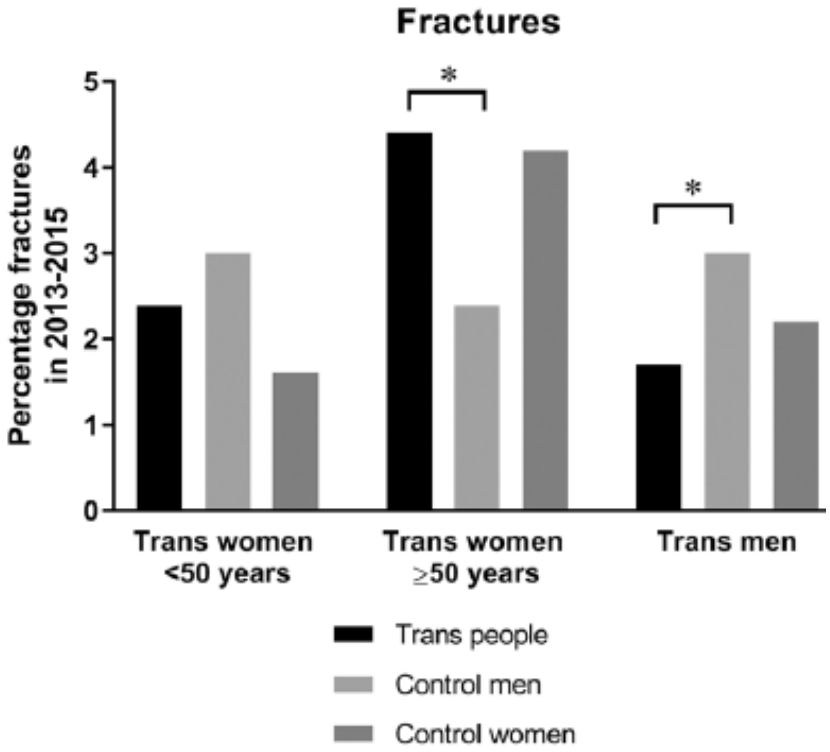
Fracture Risk in Trans Women and Trans Men Using Long-Term Gender-Affirming Hormonal Treatment: A Nationwide Cohort Study

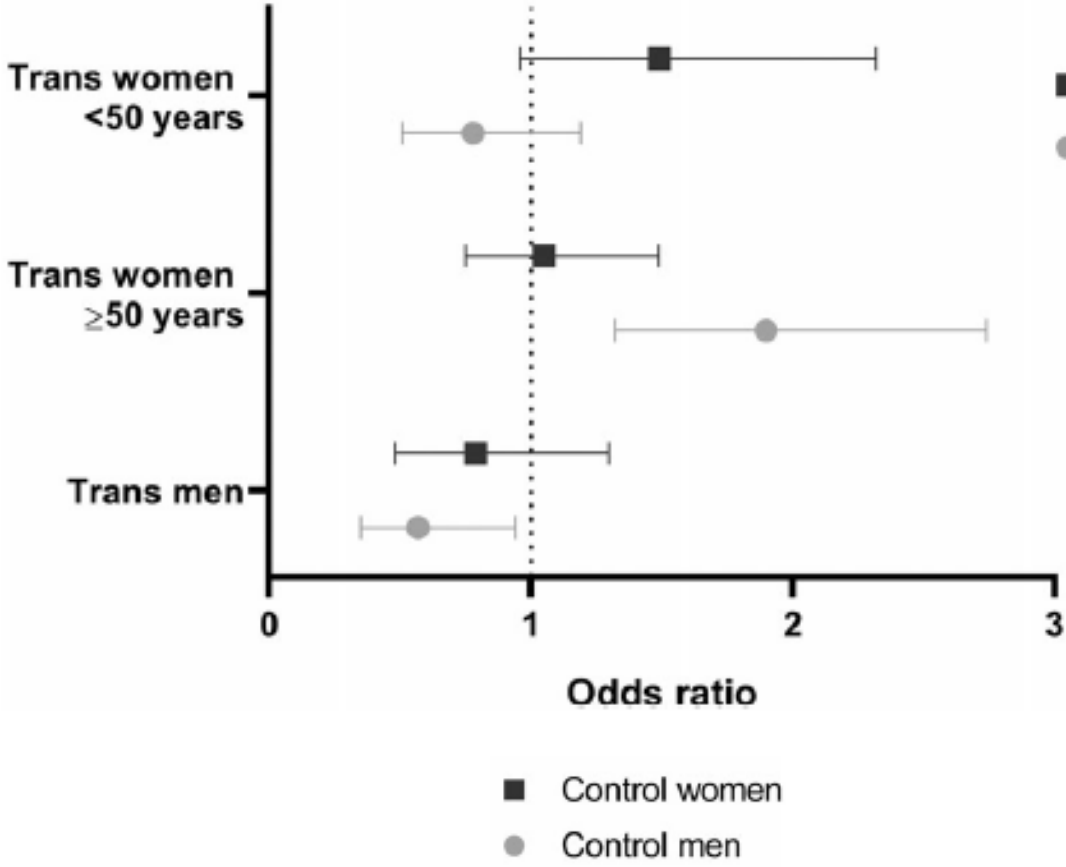
Journal of Bone and Mineral Research, Vol. 35, No. 1, January 2020, pp 64–70.
DOI: 10.1002/jbmr.3862

Chantal M Wiepjes,[1,2] Christel JM de Blok,[1,2] Annemieke S Staphorsius,[2] Nienke M Nota,[1,2] Mariska C Vlot,[1,2] Renate T de Jongh,[1] and Martin den Heijer[1,2]

[1]Department of Endocrinology, Amsterdam UMC, VU University Medical Center, Amsterdam, the Netherlands
[2]Center of Expertise on Gender Dysphoria, Amsterdam UMC, VU University Medical Center, Amsterdam, the Netherlands

- **1089 trans women <50 yrs (38 ± 9 yrs)** and **934 trans women ≥50 yrs (60 ± 8 yrs)**
- **1036 trans men (40 ± 14 yrs)**
- Median **8 yrs** and **19 yrs** of estrogen, **9 yrs** of testosterone
- Median age at start of hormone therapy: **26 yrs**, **40 yrs**, **25 yrs**
- 5 age-matched reference men and 5 age-matched reference women
- Fracture data: medical visits 2013-2015





UCSF Health UCSF Benioff Children's Hospitals

Summary

- Transfeminine individuals of all ages tend to have lower BMD Z-scores prior to treatment (when compared to sex designated at birth)
- In transfeminine youth, lower physical activity may contribute to low BMD Z-scores
- TGD youth may have sub-optimal dietary calcium intake
- TGD youth may not return to baseline BMD Z-scores after several years of gender-affirming sex hormones
- Fracture risk may be higher in older trans women compared with cis men (and in younger trans women compared with cis women)

Approach to Transgender/Gender Diverse Adult

Endocrine Society Clinical Practice Guidelines (2017)

- Transgender Male:
  - Screening for osteoporosis should be conducted in those who have had gonadectomy and stop testosterone treatment, are not compliant with hormone therapy, or develop risks for bone loss.
- Transgender Female:
  - Consider BMD testing at baseline. In individuals at low risk, screening for osteoporosis should be conducted at age 60 years or in those who are not compliant with hormone therapy (and have had gonadectomy or are on blocker therapy).

Hembree WC, Cohen-Kettenis PT, Gooren L, et al. Endocrine Treatment of Gender-Dysphoric/Gender-Incongruent Persons: An Endocrine Society Clinical Practice Guideline. *J Clin Endocrinol Metab.* 2017;102(11):3869-3903

When to order DXA: TGD Individuals

International Society for Clinical Densitometry (ISCD) 2019 Official Position

- Baseline BMD if:
  - Gonadectomy or endogenous sex steroid-lowering treatment before gender-affirming hormone therapy
  - Hypogonadism without gender-affirming hormone therapy
- Follow BMD if:
  - Results will influence patient management (low BMD, individuals on GnRHa, non-adherence to hormones, other risk factors)
  - Testing intervals individualized, every 1-2 yrs until stable/improved

Interpretation of DXA: TGD Individuals

International Society for Clinical Densitometry (ISCD) 2019 Official Position

- T- and Z-score calculations
  - T-scores: Caucasian female normative database for all TGD individuals regardless of ethnicity
  - Z-scores: Use normative database matching gender identity, but may also request normative database matching sex designated at birth
- Non-binary individuals:
  - Normative database that matches sex designated at birth
- Osteoporosis: T-score ≤-2.5 in TGD individuals ≥50 years old

Bone Densitometry in Transgender and Gender Nonconforming (TGNC) Individuals: The 2019 ISCD Official Positions

Harold N. Rosen,[1,] Ole-Petter R. Hamnvik,[2] Unnop Jaisamrarn,[3] Alan O. Malabanan,[1] Joshua D. Safer,[4] Vin Tangpricha,[5,6] Lalita Wattanachanya,[7,8] and Swan S. Yeap[9]*

[1] *Division of Endocrinology and Metabolism, Department of Medicine, Beth Israel Deaconess Medical Center, Boston, MA, USA;* [2] *Division of Endocrinology, Diabetes and Hypertension, Department of Medicine, Brigham and Women's Hospital, Boston, MA, USA;* [3] *Department of Obstetrics and Gynecology, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand;* [4] *Mount Sinai Health System, Icahn School of Medicine at Mount Sinai, Center for Transgender Medicine and Surgery, New York, NY, USA;* [5] *Division of Endocrinology, Metabolism & Lipids, Department of Medicine, Emory University School of Medicine, Atlanta, GA, USA;* [6] *Atlanta VA Medical Center, Decatur, GA, USA;* [7] *Division of Endocrinology and Metabolism, Department of Medicine, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand;* [8] *Excellence Center for Diabetes, Hormone, and Metabolism, King Chulalongkorn Memorial Hospital, Bangkok, Thailand; and* [9] *Department of Medicine, Subang Jaya Medical Centre, Subang Jaya, Selangor, Malaysia*

Journal of Clinical Densitometry: Assessment & Management of Musculoskeletal Health, vol. ■, no. ■, 1–10, 2019

1094-6950/■:1–10/$36.00
https://doi.org/10.1016/j.jocd.2019.07.004

Future Directions

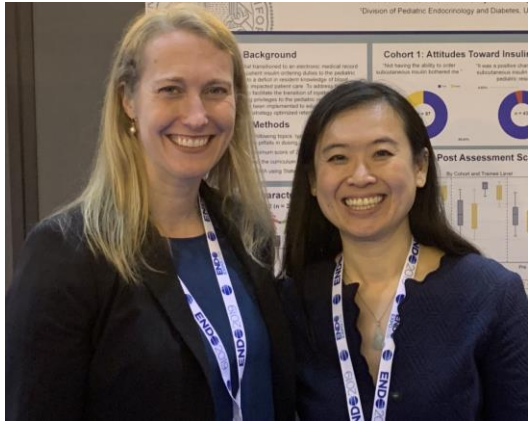
Answers still needed!

- Which reference standards should we be using for DXA?
- When is peak bone mass achieved in TGD youth who initiate gender-affirming medical therapy in early puberty (and is it less than expected)?
- What is the fracture risk in TGD individuals who initiate gender-affirming medical therapy in early puberty?
- How could we time initiation of gender-affirming sex hormones to optimize bone mass?
- What strategies can be used to mitigate low BMD if discovered in TGD youth and young adults?
- How should we assess and interpret BMD in non-binary individuals?

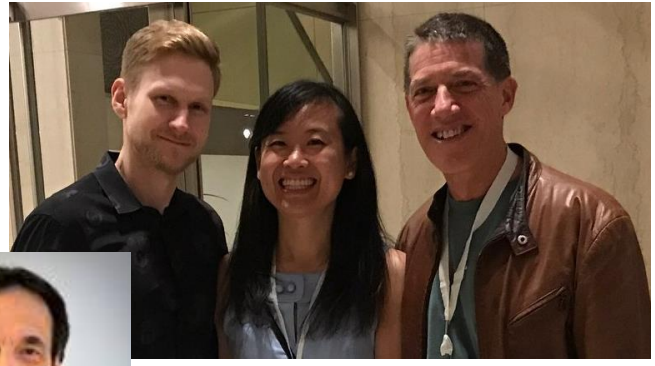
With Much Gratitude to:

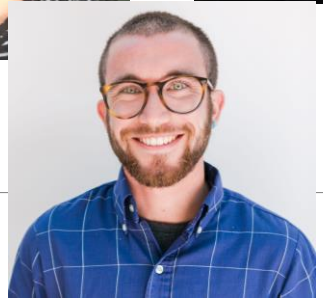
- Research/Career Mentors:
  - **Stephen Rosenthal, MD**
  - **Anne Schafer, MD**
  - **Andrew Burghardt, BS**
  - **Richard Souza, PT, PhD**
  - Jenise Wong, MD, PhD
  - Ellen Fung, RD, PhD
  - Carl Grunfeld, MD, PhD
  - Dolores Shoback, MD
  - Edward Hsiao, MD, PhD
  - Roger Long, MD
  - Srinath Sanda, MD
- Pediatric and Adult Endocrine Fellowships
- UCSF Child and Adolescent Gender Center:
  - Meredith Russell, PNP, MSN
  - Stanley Vance, MD
  - Diane Ehrensaft, PhD
  - Erica Anderson, PhD
  - Jessie Cohen, LCSW
  - Julia Baghai, RN, MSN
- **Study participants and families**
- Advisors/Collaborators:
  - Ann Schwartz, PhD
  - Dennis Black, PhD
  - David Glidden, PhD
  - Bo Fan, MD
  - Thomas Link, MD, PhD
- Funding Sources:
  - NIDDK: 2T32DK007161-43 (2017-2018)
  - NIDDK: 2T32DK007418-37 (2018-2019)
  - NICHD: 1F32HD098763-01 (2019-2020)
  - UCSF CTSI Pilot Award for Established Investigators
  - UCSF Department of Radiology Seed Grant
  - UCSF CCMBM Voucher Program Award
  - Pediatric Endocrine Society Clinical Scholar Award
  - UCSF CCMBM Pilot Award for Junior Investigators

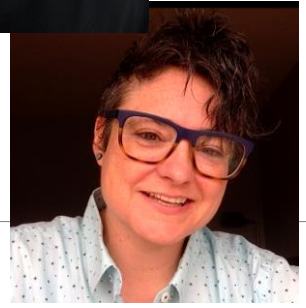
UCSF Health UCSF Benioff Children's Hospitals



Thanks!







UCSF Benioff Children's Hospitals

Thank You

Questions?

UCSF Health UCSF Benioff Children's Hospitals