Evaluating Data for Setting Calcium and Vitamin D Requirements in Adolescents

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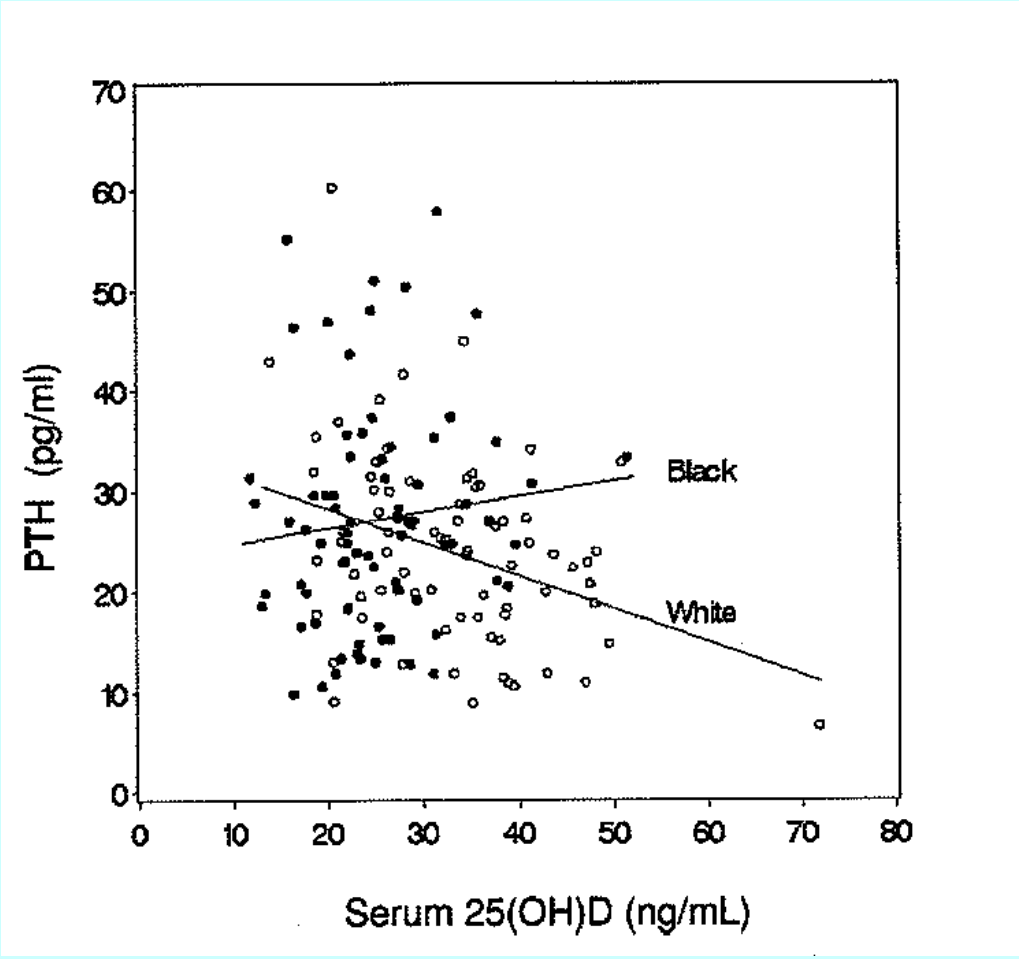
Vitamin D

What is the status cutoff for health in adolescents?

Serum PTH inversely related to vitamin D status in white but not black girls



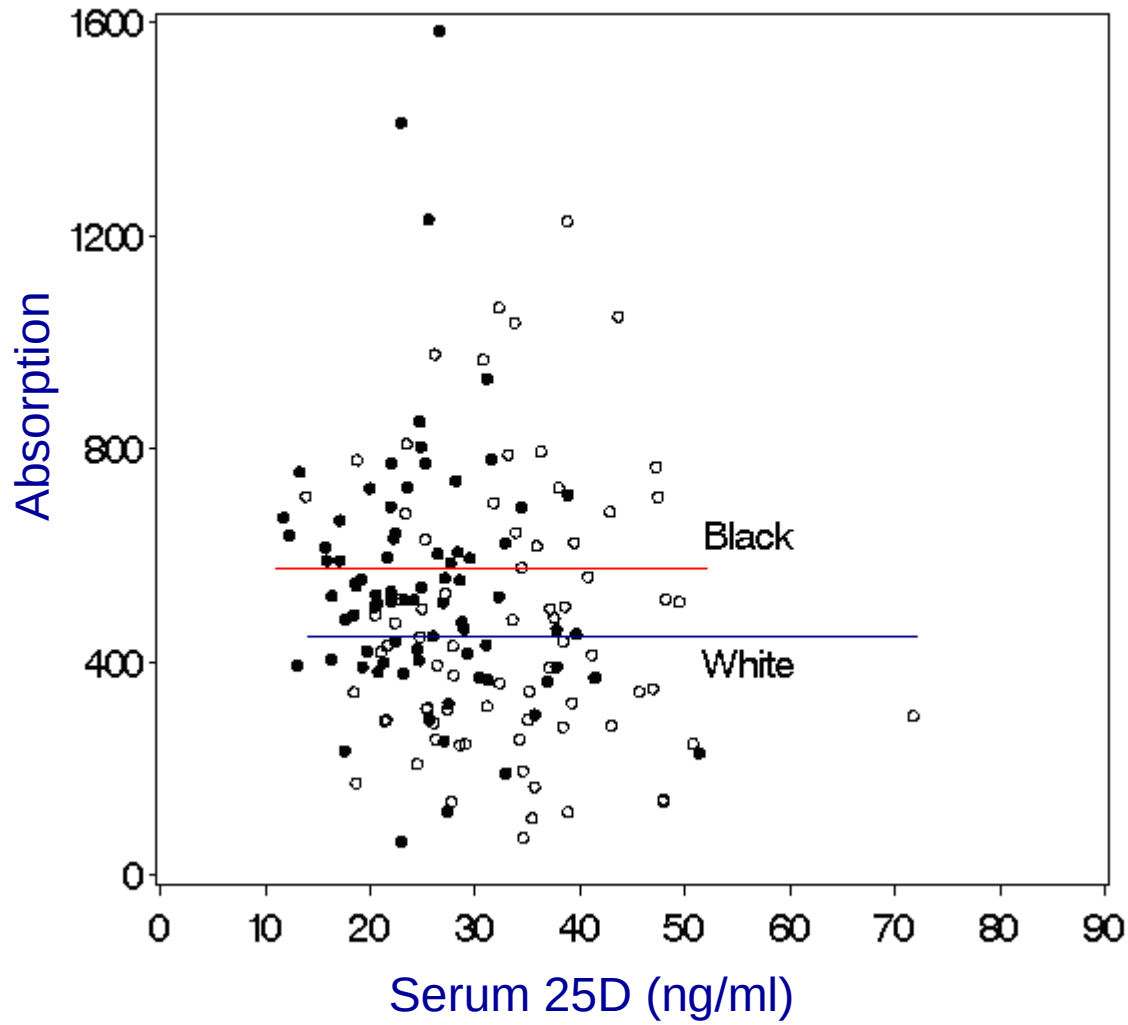
Weaver et al JCEM 93:3907, 2008

Vitamin D status did not affect Ca absorption in Black or White girls

Black > white
p=0.003

Agrees with Abrams et al, 2005

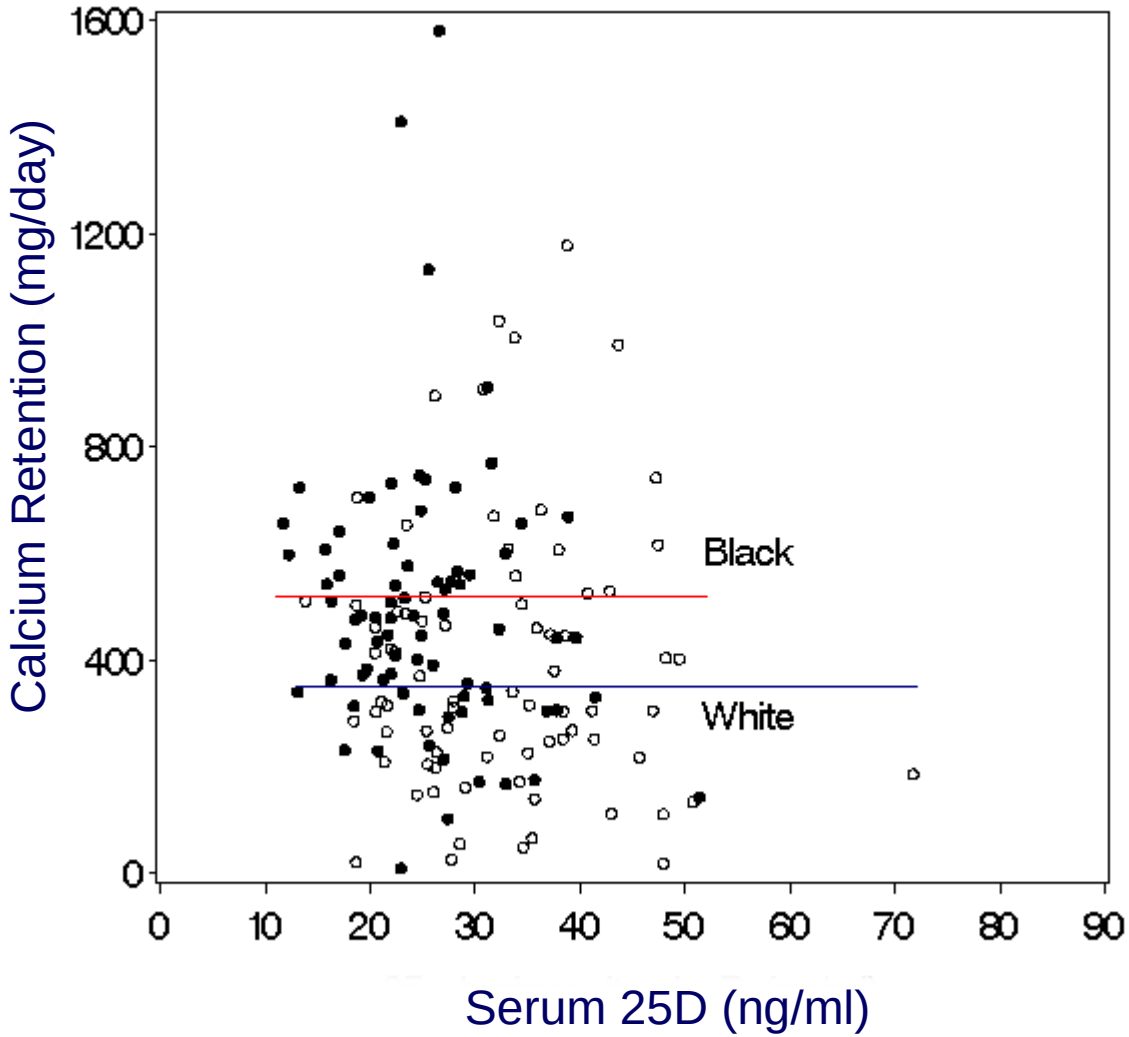
Weaver CM. JCEM 93:3907, 2008



Vitamin D status did not affect Ca retention in black or white girls

Black > white
p=0.003

Weaver CM. JCEM 93:3907, 2008



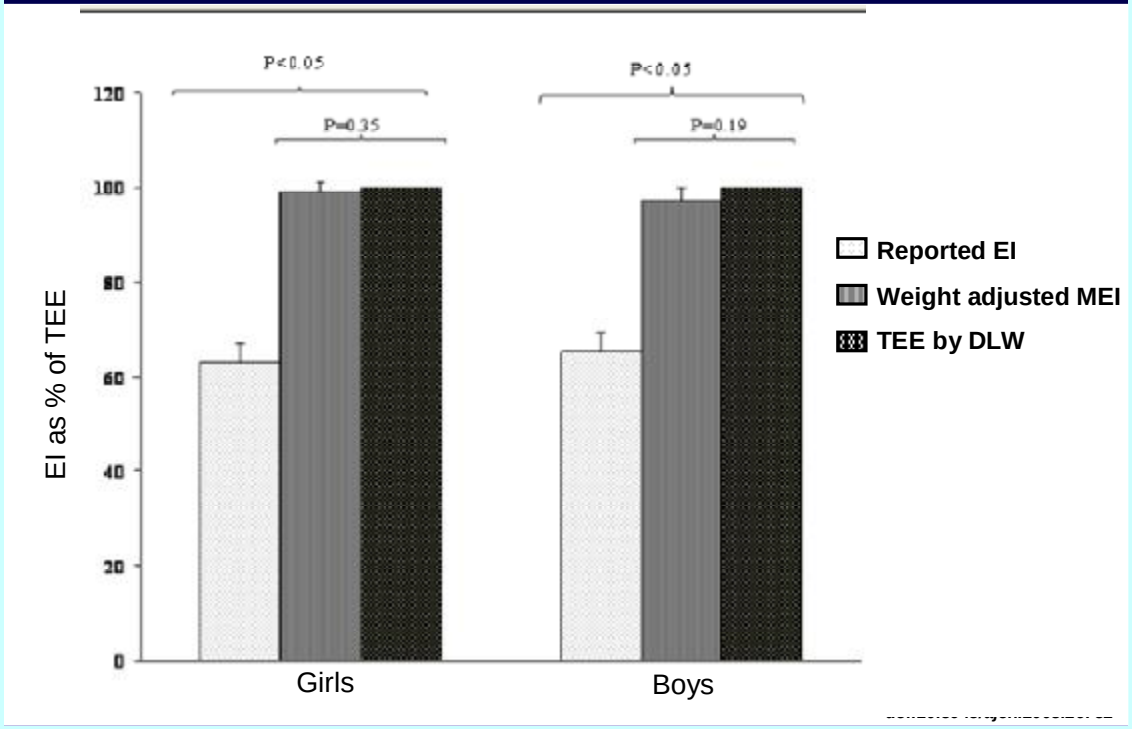
Unpublished data -

1000 IU/d for 4 weeks did not increase Ca absorption or retention in adolescent girls.

Calcium

No status indicator and estimates of dietary intake are fraught with error

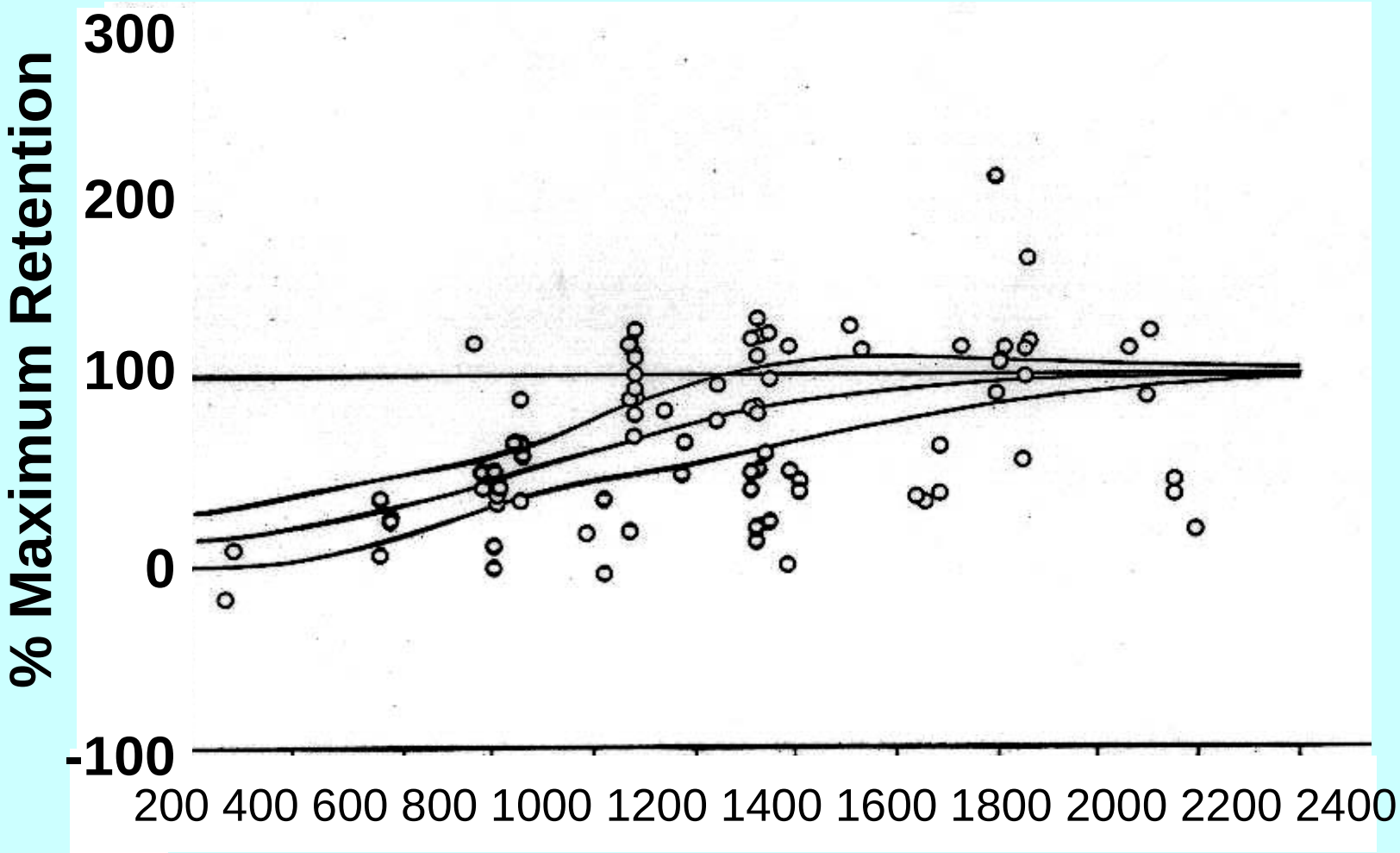
Underreporting error for energy intake in overweight boys and girls was 35±18%



Singh, AJCN 89:1744, 2009

To achieve a range in known calcium intakes in various populations, metabolic balance studies have been used by most countries. We don’t have the data to use RCTs for setting Ca requirements.

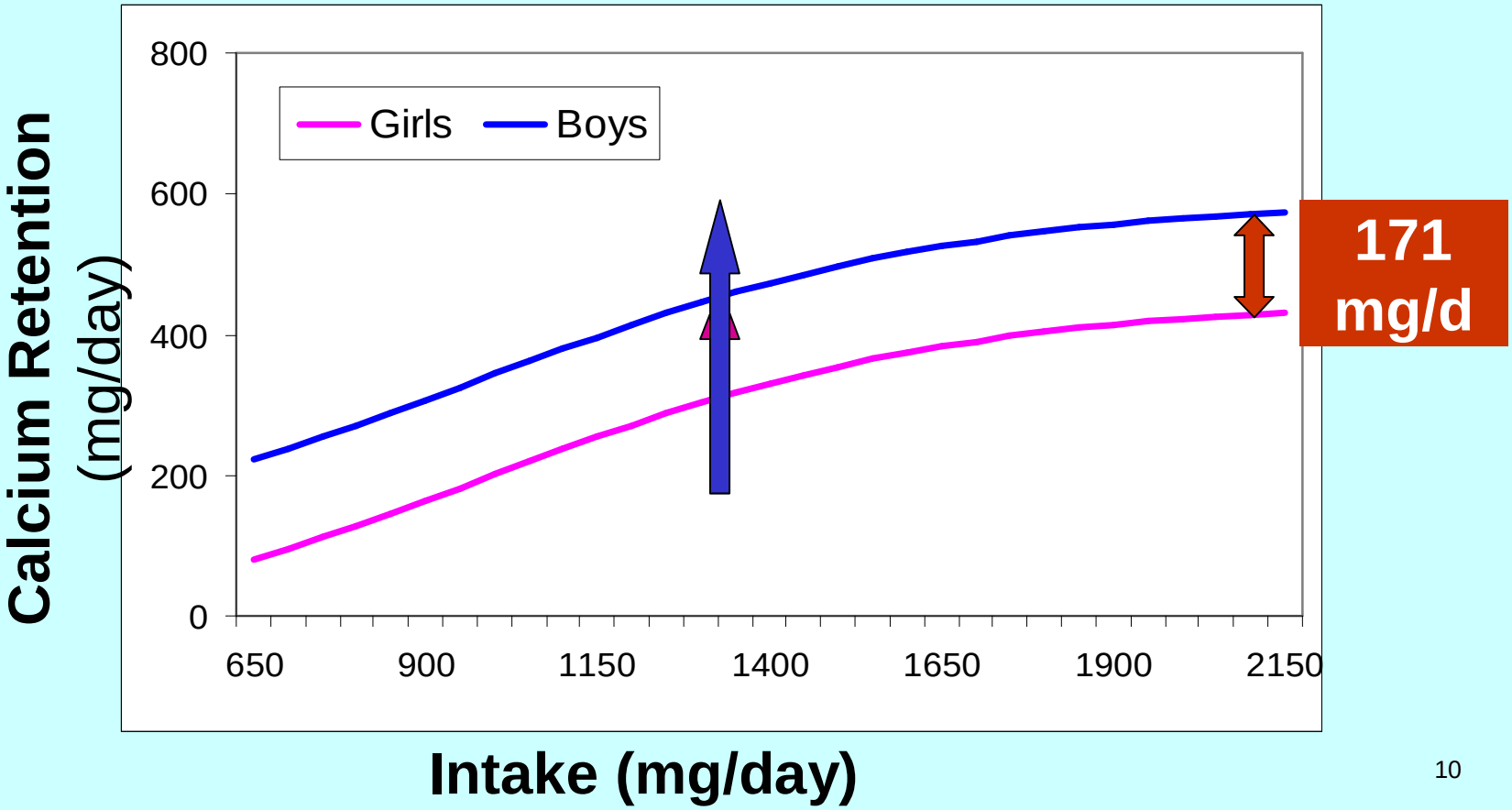
Maximal Calcium Retention as a Function of Intake (Basis for Current Requirements)



Jackman et al., AJCN, 1997

Newer Data

Calcium retention was greater in white boys compared to white girls but the intake for maximal retention was not different from girls (1140 mg/d vs 1300 mg/d)



Braun et al., AJCN, 84:4142006

Pubertal White Boys

Calcium intake for maximal retention by balance =1140 mg/d

Mean Maximal Ca retention =442 mg/d

Longitudinal total body BMC accrual on Ca intakes =1140±392 mg/d

Mean Ca retention =359 mg/d

Hill et al JCEM 93:4743, 2008

Target the Questions

How does it work?	Can it be studied in people?	Specific effects?	How good is the translation?
Basic Research	Translational Research	Efficacy Studies	Effectiveness Research

Don’t confuse effectiveness studies and efficacy studies – all are relevant

Conclusions

- No good data to set vitamin D requirements in adolescents.
- During puberty, balance studies predict total body BMC accrual when calcium intakes are considered.
- BMI and body size influence calcium retention/ requirements.
- To quantitate the role of calcium intake on metabolism and retention, there is no substitute for controlled feeding studies = efficacy studies.
- To determine effectiveness of calcium supplementation, RCTs are useful.