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Acquiring adequate vitamin D during the Covid-19 pandemic: evidence for a protective role?

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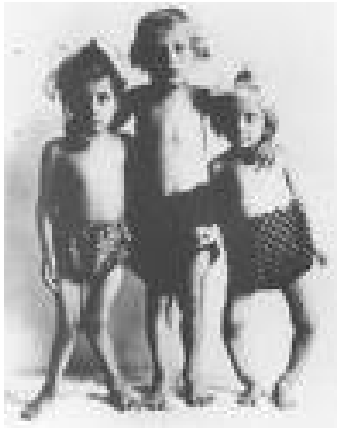
Vitamin D functions



Vitamin D is vital for bone health

- Bone growth, bone and muscle function

  Deficiency ➔ Rickets in children

  ➔ osteomalacia (soft bones) at all ages

Other potential benefits of vitamin D

- Immune system function
- Protection against certain cancers
- Anti-inflammatory

Vitamin D acquisition

Food – only small amounts:

- Oily fish (salmon, sardines, mackerel)
- Dairy: milk, egg yolks, cheese
- Fortified foods: cereals

MAIN SOURCE: SUNLIGHT EXPOSURE

- **90% of vitamin D requirement**

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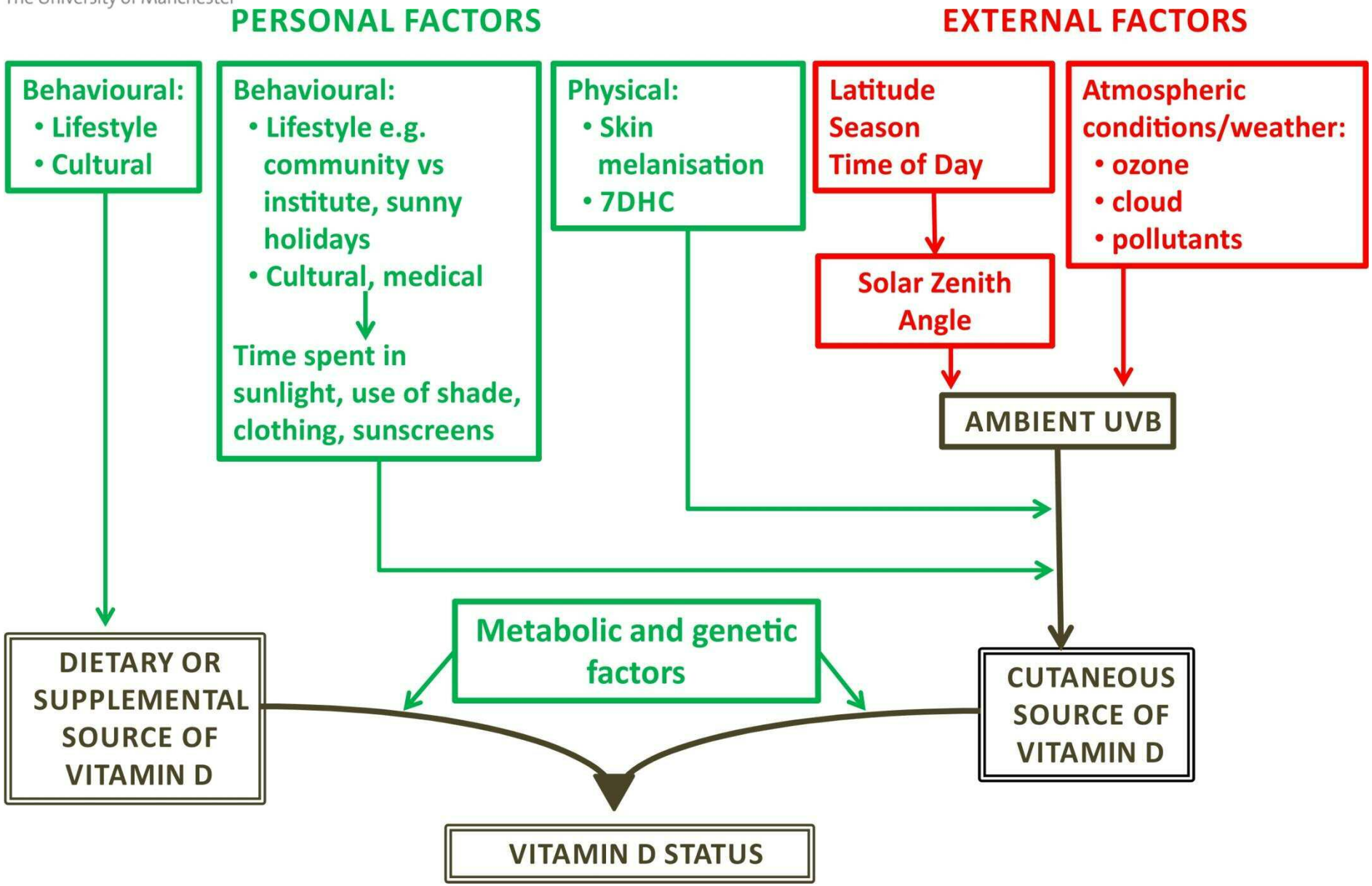

AGNIR: Ultraviolet Radiation, Vitamin D & Health, 2017

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UK national guidance on vitamin D

Pre-2016

- Aged 4-64y: Dietary intake not necessary
- RNI 10 µg (400 IU)/day for those "at risk":
  - ≥ 65 years; limited sunlight exposure; minority ethnic groups

2016: Scientific Advisory Committee on Nutrition Report

- RNI 10 µg (400 IU)/day for everyone aged 4 and over
- 97.5% of population to maintain 25OHD ≥25 nmol/L year-round

Actual Public Health England / NHS advice

- Aged ≥5: consider 10 µg/day supplement in autumn/winter
- Limited sunlight, minority ethnic groups: 10 µg/day year-round

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Vitamin D guidance during Covid-19

Coronavirus update

Consider taking 10 micrograms of vitamin D a day to keep your bones and muscles healthy.

This is because you may not be getting enough vitamin D from sunlight if you're indoors most of the day.

NHS

Dr Alison Tedstone, Chief Nutritionist, PHE, said:

" With many people spending more time indoors, particularly the more vulnerable groups and those 'shielding', there is a risk that some people may not be getting all the vitamin D they need from sunlight. It's important they consider taking a daily 10 micrograms vitamin D supplement to help protect bone and muscle health."

Public Health England

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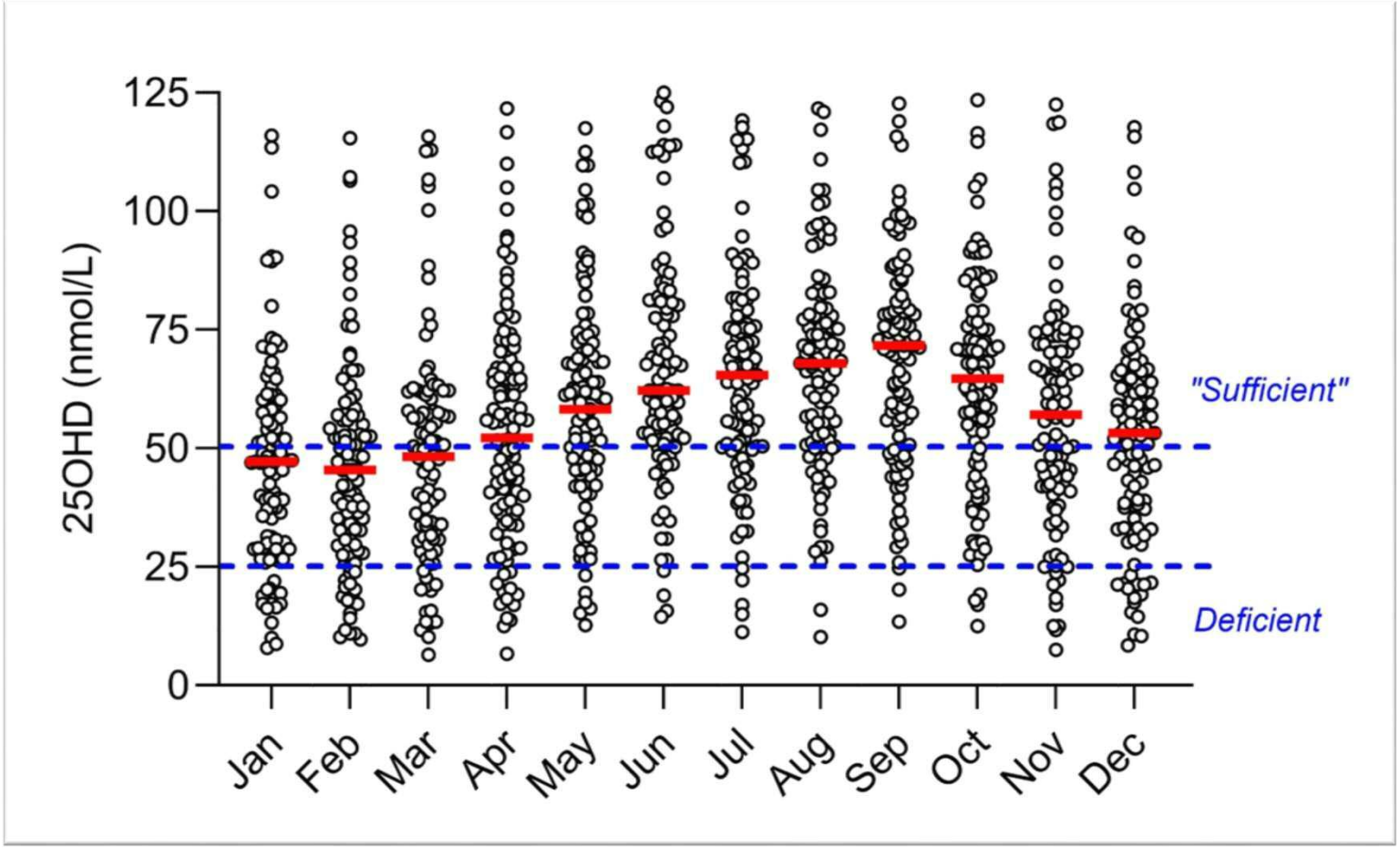
Monthly vitamin D status: White Caucasian adults aged 20 – 60 yrs



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Could vitamin D protect against Covid-19?

Proposed evidence - mechanistic

- Induction of antimicrobial peptides
- Reduction of pro-inflammatory cytokine production
- Induction of regulatory T-cells which inhibit inflammation

Proposed evidence - epidemiological

- Outbreak in winter when vitamin D levels are lowest
- Fewer cases in Southern Hemisphere (summer-end)
- More infections and greater severity in older people and ethnic minorities

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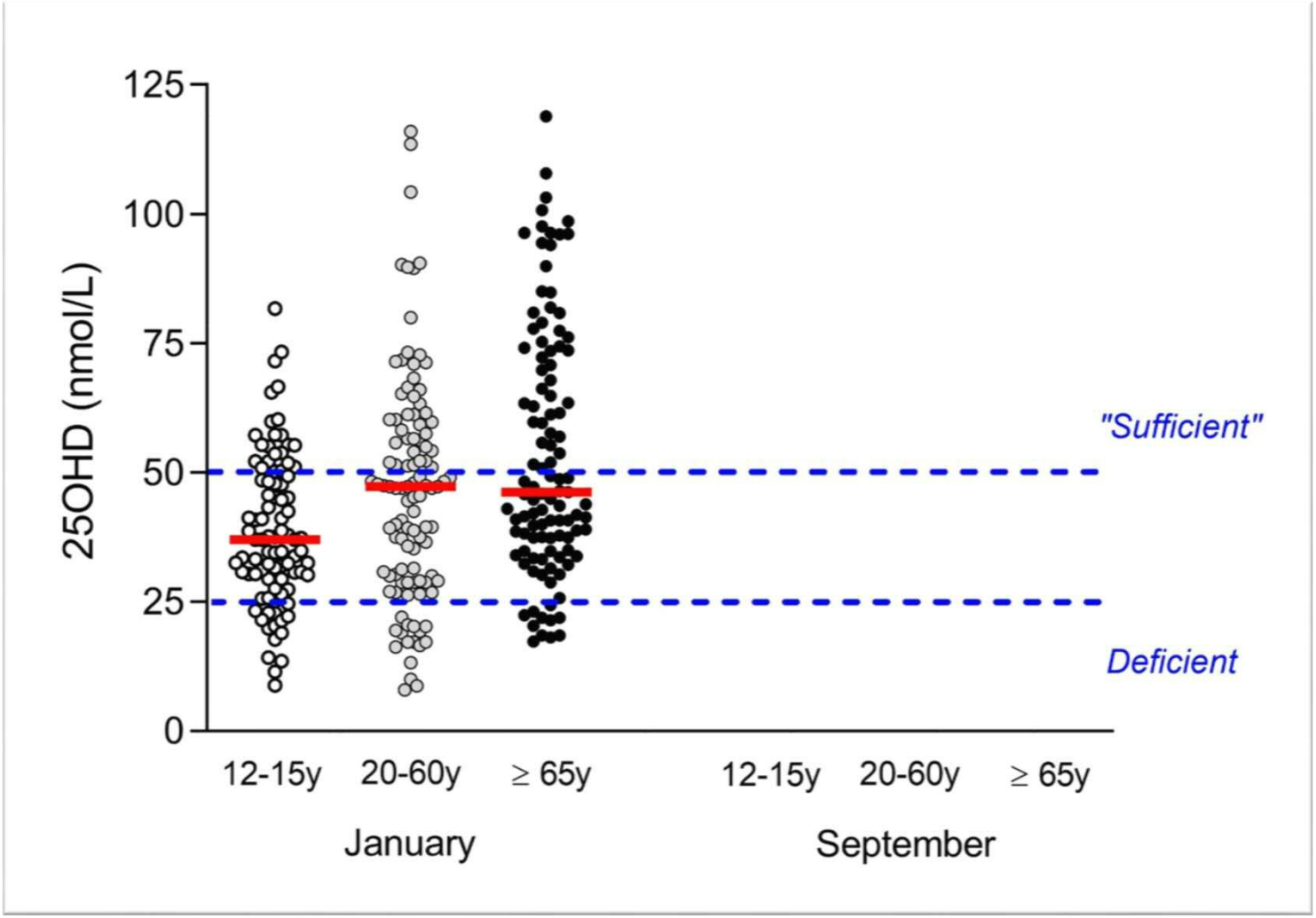
Vitamin D status in different age groups



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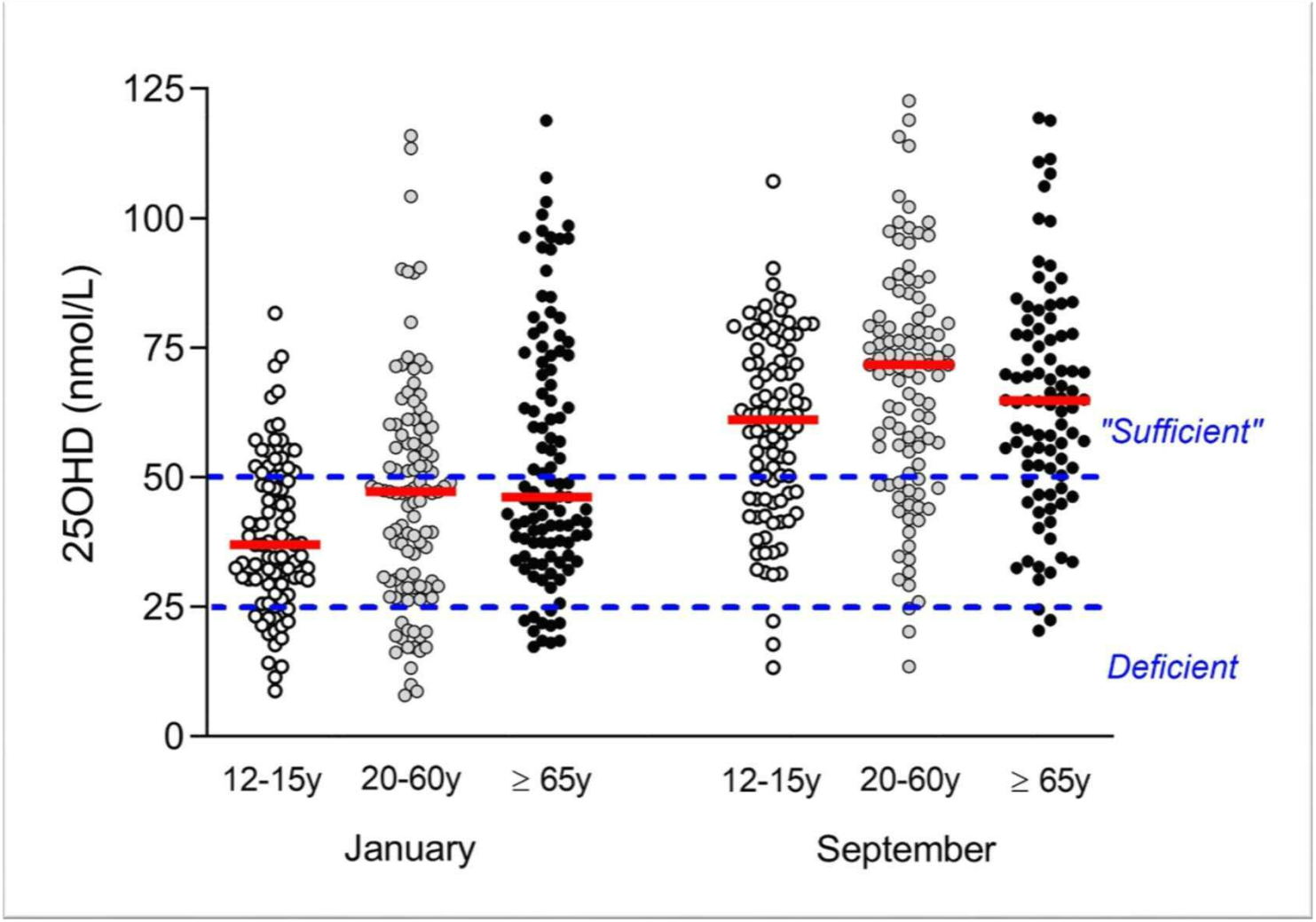
Vitamin D status in different age groups



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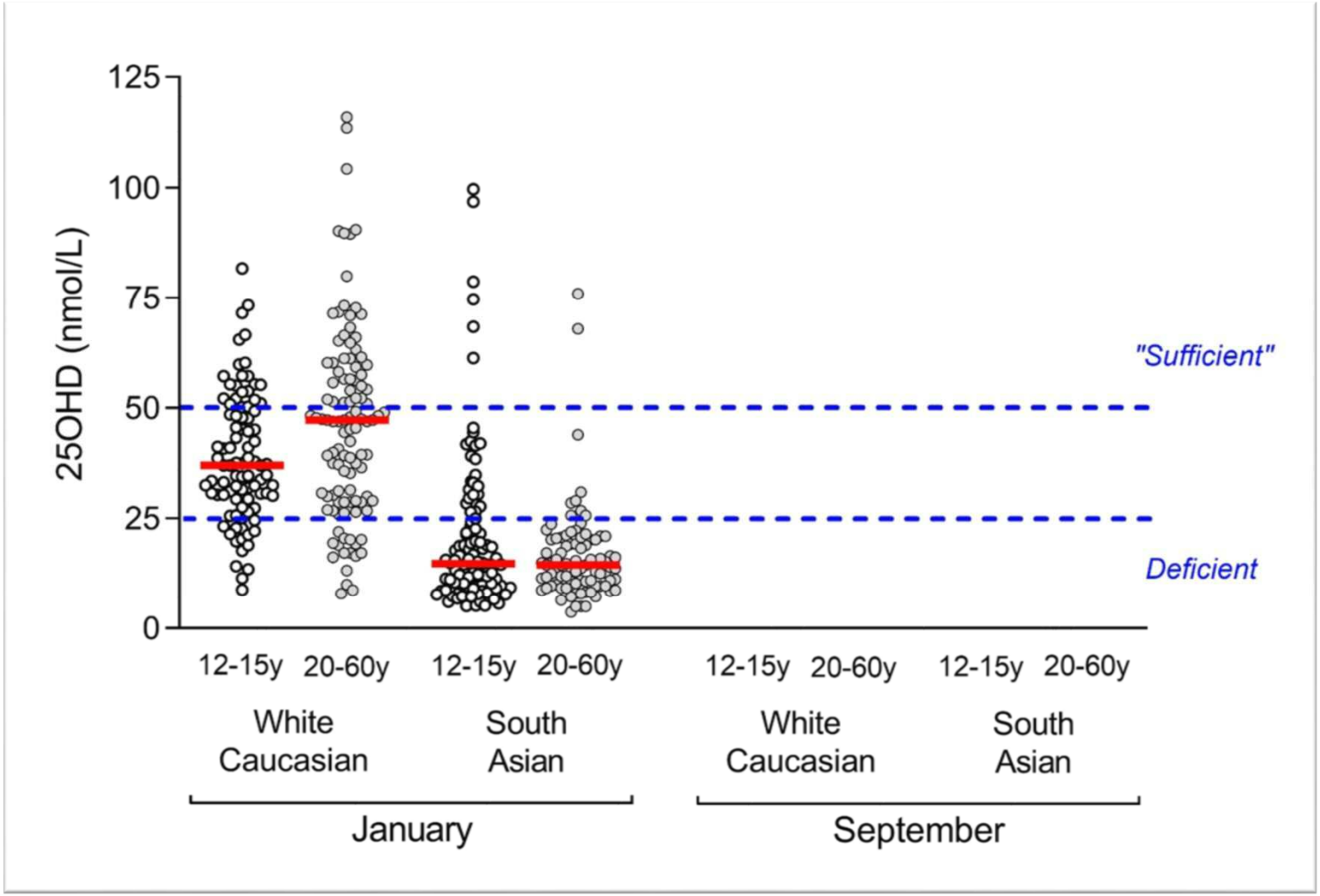
Vitamin D status in different ethnicities



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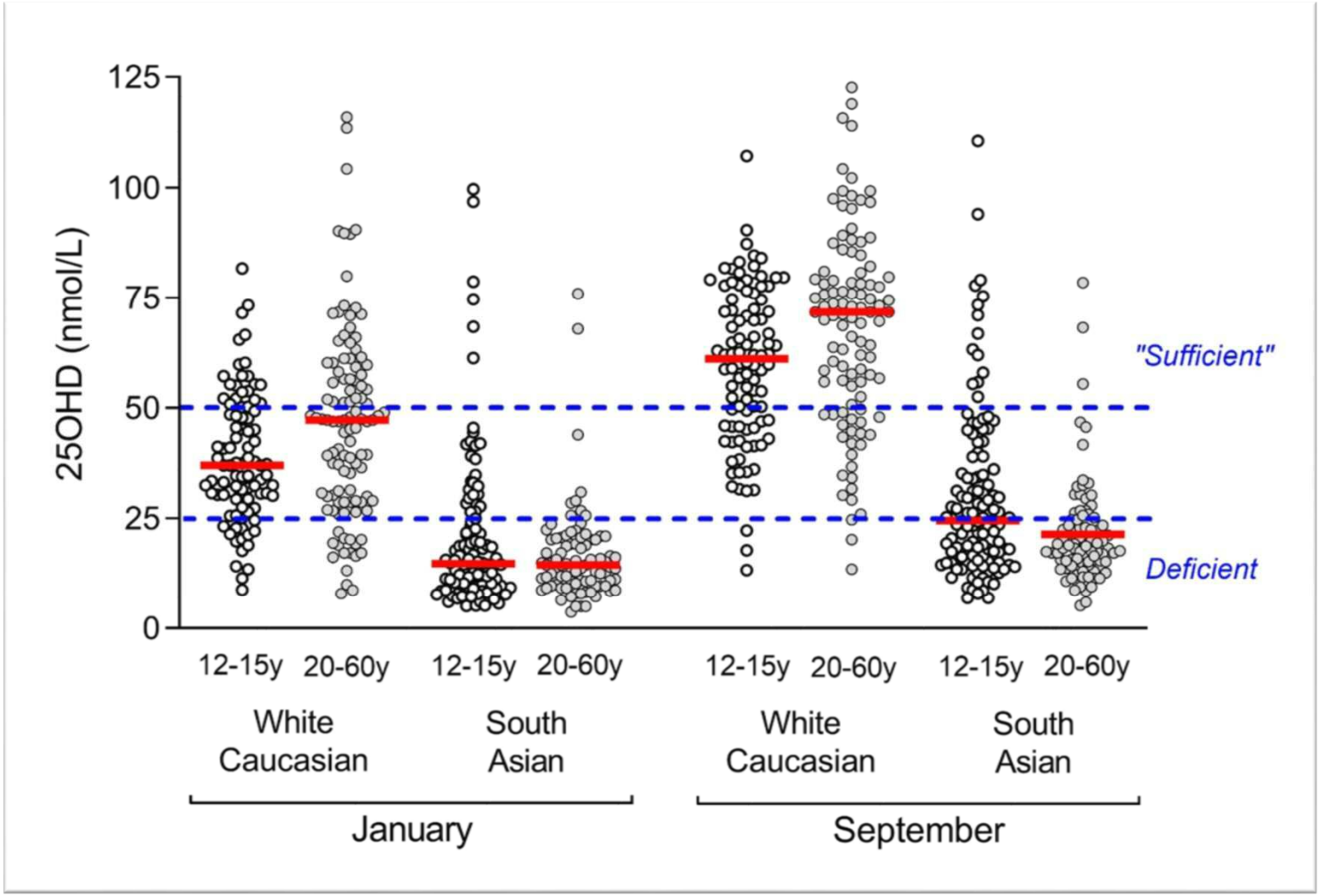
Vitamin D status in different ethnicities



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Could vitamin D protect against Covid-19?

Coronavirus update

Consider taking 10 micrograms of vitamin D a day to keep your bones and muscles healthy.

This is because you may not be getting enough vitamin D from sunlight if you're indoors most of the day.

There have been some news reports about vitamin D reducing the risk of coronavirus. However, there is currently not enough evidence to support this.

Do not buy more vitamin D than you need.

NHS

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Associations between vitamin D and Covid-19

CLINICAL ENDOCRINOLOGY

LETTER | Free Access

Low serum 25-hydroxyvitamin D (25[OH]D) levels in patients hospitalised with COVID-19 are associated with greater disease severity

Grigorios Panagiotou, Su Ann Tee, Yasir Ihsan, Waseem Athar, Gabriella Marchitelli, Donna Kelly, Christopher S. Boot,

> medRxiv. 2020 Jun 27;2020.06.25.20137323. doi: 10.1101/2020.06.25.20137323. Preprint

Factors Associated with Hospitalization and Disease Severity in a Racially and Ethnically Diverse Population of COVID-19 Patients

Angelico Mendy, Senu Apewokin, Anjanette A Wells, Ardythe L Morrow

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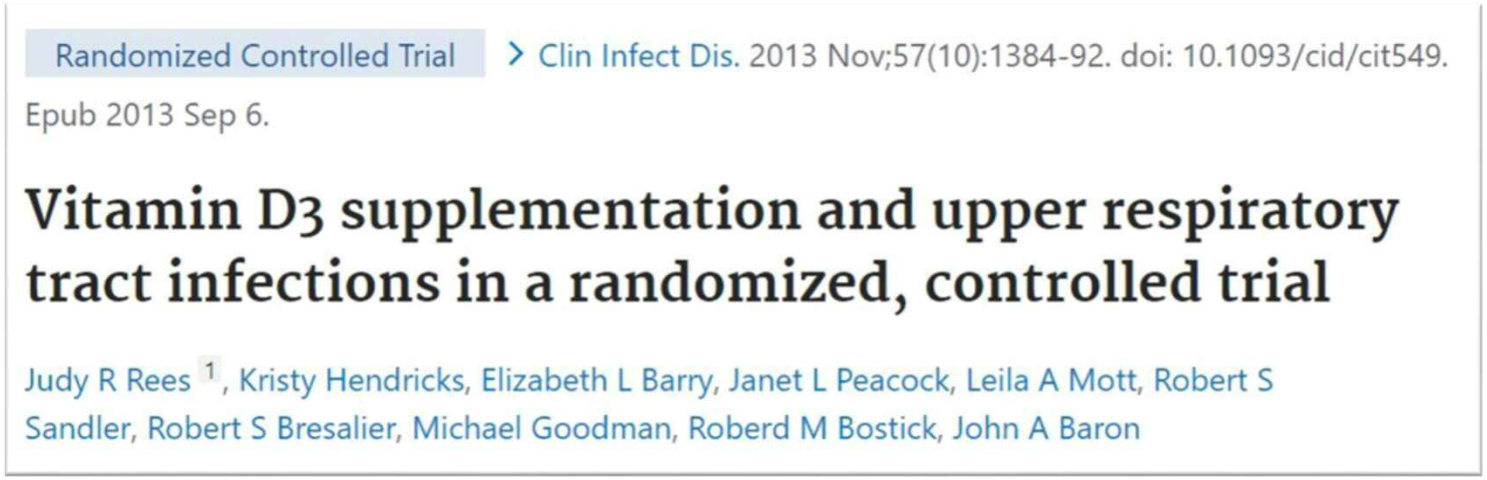
Vitamin D and respiratory tract infections



Randomized Controlled Trial > Clin Infect Dis. 2013 Nov;57(10):1384-92. doi: 10.1093/cid/cit549. Epub 2013 Sep 6.

Vitamin D3 supplementation and upper respiratory tract infections in a randomized, controlled trial

Judy R Rees [1], Kristy Hendricks, Elizabeth L Barry, Janet L Peacock, Leila A Mott, Robert S Sandler, Robert S Bresalier, Michael Goodman, Roberd M Bostick, John A Baron

- No effect of vitamin D supplementation on incidence or duration
- None of the study population were vitamin D deficient

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Vitamin D and respiratory tract infections

Review > BMJ. 2017 Feb 15;356:i6583. doi: 10.1136/bmj.i6583.

Vitamin D supplementation to prevent acute respiratory tract infections: systematic review and meta-analysis of individual participant data

Adrian R Martineau [1 2], David A Jolliffe [3], Richard L Hooper [3], La

Meta-Analysis > Health Technol Assess. 2019 Jan;23(2):1-44. doi: 10.3310/hta23020.

Vitamin D supplementation to prevent acute respiratory infections: individual participant data meta-analysis

Adrian R Martineau [1 2], David A Jolliffe [1], Lauren Greenberg [1], John F Aloia [3], Peter Bergman [4], Gal

- 10,933 patients from 25 randomised controlled trials
- Vitamin D reduced risk of RTI in all participants
- Effect stronger in those with vitamin D deficiency

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Could vitamin D protect against Covid-19?

1st July 2020

Public Health England

SACN Rapid Review

"..evidence currently does not support vitamin D supplementation to prevent ARTIs in the general UK population."

NICE Rapid Evidence Summary

"..currently no evidence to support taking vitamin D supplements to reduce the risk or severity of Covid-19."

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Conclusions

- Conflicting evidence on protective role of vitamin D in RTIs
- Largest meta-analysis indicates a protective effect, especially in those deficient
- Too few data to evaluate impact on Covid-19
- **Vital to maintain adequate vitamin D for bone and muscle health**

Acknowledgements

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Biostatistics:

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