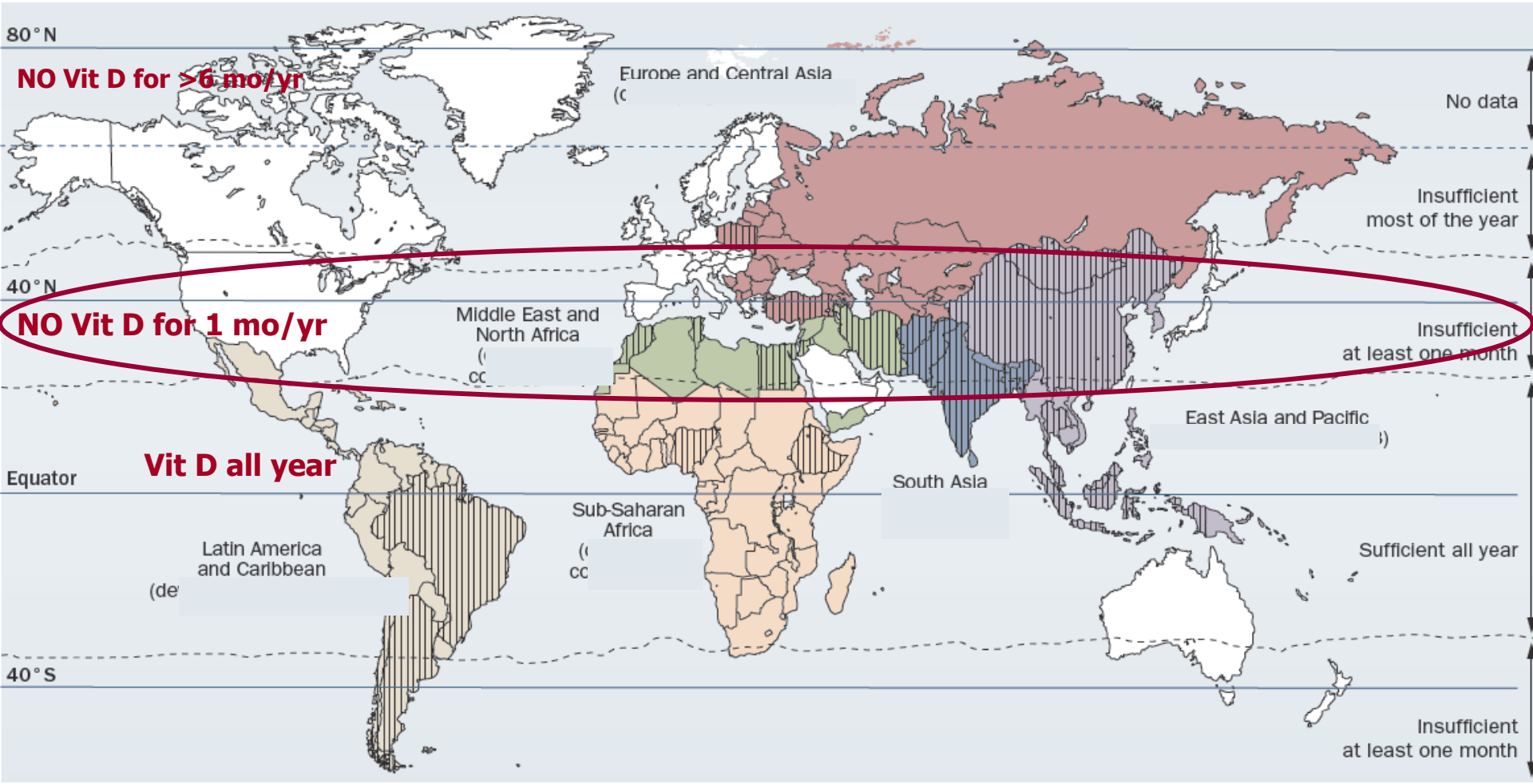
Vitamin D Synthesis by Latitude



World map relating latitude by geographic regions to skin ability to synthesize vitamin D

Tavera-Mendoza & White, Sci. Am 2007

Nutritional Rickets in ME

- Prevalence 27% in 197 children <5 yrs North Yemen
- No population-based incidence rates, but estimates
  - 10% Egypt
  - 1% Kuweit , < 2yrs, 1981-86
  - 0.5% of Saudis < 2 yrs 1997-1999
- **Rates 100 folds higher than incidence rates in developed western countries: 3-7/100,000**
- **Accounts for substantial number of hospital admissions**
  - 1.8% of hospital admission in Saudi Arabia
  - 6.5 % in admissions of newborns in Kuweit
  - 10.6% of infants admission with acute illness in Jordan

El-Hajj Fuleihan, *Clinical Reviews in Bone and Mineral* 2009
Vitamin D deficiency in Middle East and its Health consequences

Hypovitaminosis D: Adults ME and Africa

Mean 25-OHD	10 ng/ml in Lebanese, Saudi, Emirati, Iranian	El-Hajj Fuleihan et al., 1999; Ghannam et al., 1999; Gannage et al., 2000; Saadi et al., 2006; Arabi et al., 2006
%< 10ng/ml	60-66% Lebanese, Jordanian, Iranian	El-Hajj Fuleihan et al., 1999; Mishal et al., 2001 Hashemipour et al., 2006
% < 15ng/ml	48% Tunisia	Meddeb et al., 2005
Elderly % < 10ng/ml	37% Lebanese men and 56% Lebanese women	Arabi et al., 2006
	8% men and 14% women	LASA Lips et al. 2004

Adapted from El-Hajj Fuleihan. Clinical Reviews in Bone and Mineral Metabolism , 2009

Vitamin D intakes recommended by the IOM and the Endocrine Society (ES) Practice Guidelines Committee / Adults

	IOM recommendations			ES recommendations for patients at risk for vitamin D deficiency	
Life stage group	**EAR**	**RDA**	**UL**	**Daily**	**UL**
Adults					
19-30 yr	400 IU (10 µg)	600 IU (15 µg)	4,000 IU (100 µg)	1500–2,000 IU	10,000 IU
31-50 yr	400 IU (10 µg)	600 IU (15 µg)	4,000 IU (100 µg)	1,500–2,000 IU	10,000 IU
51-70 yr	400 IU (10 µg)	600 IU (15 µg)	4,000 IU (100 µg)	1,500–2,000 IU	10,000 IU
> 70 yr	400 IU (10 µg)	600 IU (20 µg)	4,000 IU (100 µg)	1,500–2,000 IU	10,000 IU

Hypovitaminosis D in EMR

- **Hypovitaminosis D is strikingly common in "apparently healthy" individuals, lowest levels are in the Middle East-silent precursor of CNDs**
  - Predictors age, gender, veiling, season, parity, SES
  - Genetic polymorphisms in metabolic pathway may contribute: CYP21R

- **This has a negative impact on musculoskeletal health**
  - Vit D status inversely correlates with PTH (R=-0.2 to-0.37) and directly with bone mass (R=0.2-0.35)-Elderly with OP have lower 25-OHD, and higher levels of PTH
  - 25-OHD level positively correlates with bone mass
  - RCT show that Ca/D (> 700IU/day) reduce falls and fracture risk.
  - Deleterious impact on maternal & neonatal health is anticipated but not established (*Morley et al. JCEM 2006, Javaid et al. Lancet 2006)*

- **There may be an effect on non-classical outcomes need for RCT**
  - Cardiovascular: for eg Pre-ecclampsia *(Bodnar JCEM 2007)*
  - Insulin resistance & DM including gestational diabetes: *(Pittas Diabetes Care 2007)*
  - Infections

Hypovitaminosis D in EMR

- **Assay variation somewhat limits comparability across studies and is a major obstacle in advancing field-Need for QA programs**
- **Calcium intake does, and VDR polymorphisms may, modulate effect of hypovitaminosis D on major outcomes**
- **Recommendations in western populations need to be adjusted upwards in Eastern Meditterranean Region**
- **Evidence lacks to define optimal dose in:**
  - pregnant and breast-feeding women, infants, pre-pubertal children and the elderly in the EMR and for non-classical outcomes worldwide
- **Meanwhile, suggest increments in recommended doses**
  - **To achieve desirable 25-OHD level 25-30 ng/ml**