

**HIGH ALTITUDE HYPOXIA AND BIRTH WEIGHT: A COMPREHENSIVE STUDY OF >10,000 BABIES.** R Soria,<sup>1</sup> E Vargas,<sup>1</sup> C E Blanco,<sup>2</sup> D J Barker,<sup>3</sup> D A Giussani.<sup>4</sup> <sup>1</sup>IBBA, Bolivia; <sup>2</sup>GROW, Maastricht, Netherlands; <sup>3</sup>Southampton, United Kingdom; <sup>4</sup>Physiology, Cambridge, United Kingdom.

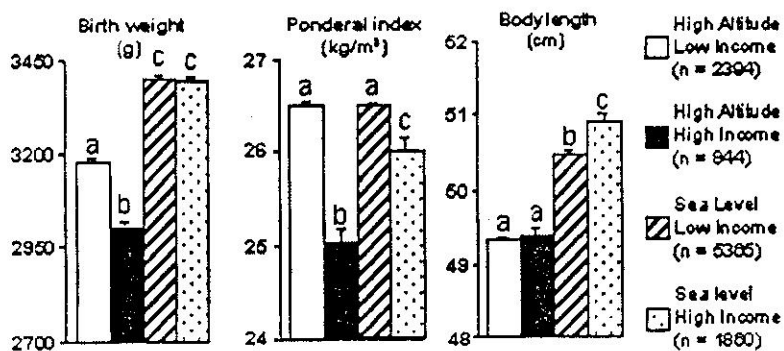
Birth weight decreases with increasing altitude (Moore et al. *Placenta* 25(A):S60, 2004). Because most high altitude populations are also impoverished, the extent to which this reduction in fetal growth is governed by hypoxia or undernutrition remains unclear. Our preliminary study of 400 birth records compared the effects of altitude vs. economic status on birth weight in babies born at term in Bolivia, as this country contains high and low altitude cities with populations of striking economic divergence (Giussani et al. *Ped Res* 49(4): 490, 2001). That study concluded that high altitude had a greater effect than maternal economic status on birth weight. This study investigated >10,000 birth records to assess the effects of altitude vs. maternal economic status in Bolivian babies at term.

**Methods:** Over 2 years >30,000 records from pregnancies between 1975-1985 were obtained from obstetric clinics and hospitals attended by high and low-income families in La Paz (3600 m) and Santa Cruz (420 m). Of these, only singleton, healthy pregnancies of non-smoking mothers that reached term (>37 weeks) were assessed.

**Results:** Analysis of >10,000 records revealed that altitude had a marked effect in decreasing birth weight (Fig). In sea level pregnancies, there was no effect of economic status on birth weight. In high altitude pregnancies, counter-intuitively, birth weight was most affected in babies from high- relative to low-income groups. The ponderal index (PI), which when reduced predicts an increased risk of cardiovascular disease at adulthood (Barker et al. *BMJ* 306:422, 1993), was only reduced in babies from high, but not low, income groups at altitude. At sea level, the reduced PI in high vs. low income groups was due to differences in body length rather than weight at birth.

**Conclusions:** Altitude rather than low economic status reduces birth weight in Bolivia. In La Paz, low, relative to high, income families have greater residence ancestry at altitude. Thus, generations at altitude may protect against IUGR. Future work will relate these data at birth to current adult cardiovascular function in these specific Bolivian cohorts.

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Different letters are significantly different (ANOVA on rank data + Dunn's Test,  $P < 0.05$ )