37th Annual Meeting

HUMAN BIOLOGY ASSOCIATION

Program
of the
37th Annual Meeting
to be held in
Portland, Oregon
Hilton Portland
April 11–12, 2012

PROGRAM COMMITTEE:
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Heather Norton
Amanda Thompson
Virginia J. Vitzthum

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GREETINGS FROM HBA PROGRAM COMMITTEE CHAIR

The 37th Annual Meeting of the Human Biology Association will be held at the Hilton Portland and Executive Tower on Wednesday and Thursday, April 11 and 12, 2012. Nonmembers who register for the meeting are welcome to attend. Registration is less costly online (available at: www.humbio.org) before April 6, 2012 but is also available at the meeting. Registration will be in the Plaza Foyer on Tuesday, April 10, 2012 (5:00 p.m.–8:00 p.m.) and Wednesday, April 11, 2012 (8:00 a.m.–5:00 p.m.). On Thursday, April 12, 2012 from 8:00 to 11:30 a.m. registration will be in the Grand Ballroom Foyer.

A detailed schedule of presentations and events, abstracts of the presentations, and an index of the author’s names and presentation slot follow this summary (also see www.humbio.org). Wednesday morning’s poster session will be held in the Broadway I/II/III/IV on the Plaza level. Wednesday afternoon’s plenary session and the Pearl Memorial Lecture by Cynthia Beall will be in the Grand Ballroom II on the Ballroom level. The dinner reception on Wednesday evening as well as the Award luncheon on Thursday will be held on the 23rd floor in Alexander’s room. The four podium sessions on Thursday will be held on the Ballroom level in the Parlors. Following the Thursday podium sessions we remain on the Ballroom level for the annual business meeting in the Galleria South, and the HBA student reception in the Galleria North. Please note that events take place on multiple levels in the hotel conference space; maps of the Ballroom, Plaza, and third floor levels are included in the program.

The opening poster session begins at Wednesday 8:30 a.m. It consists of 62 presentations clustered into several poster groups: adaptation, applied human biology, demography and disease, genetics, growth and development, physiology and biomarkers, populations in transition, and reproduction. The poster session affords a unique opportunity to discuss the presented research one-on-one with individual investigators. Authors of odd-numbered posters will be present from 8:30 to 10:00 a.m. for discussion of their work. Authors of even numbered posters will be present from 10:00 to 11:30 for discussion of their work. Posters will remain up until 4:00 p.m. for viewing.

The Plenary session, “A Half-Century of High Altitude Studies in Anthropology” has been organized by Michael A. Little and Ralph M. Garruto. HBA President William Leonard will welcome speakers and attendees to open the session at 1:00 p.m. on Wednesday, April 11. At 5:00 p.m. the Pearl Memorial Speaker, Cynthia Beall, will discuss “Fifty Years of Research on High-Altitude Adaptation in Anthropology: Instrumentation Advances, Research Designs and Selected Discoveries.” The day concludes with our evening dinner reception. Please plan to join the festivities!

Thursday’s Scientific Program consists of 23 presentations organized into four podium sessions: “Life History, Health and Disease” and “Mediators and Moderators of Growth and Development” during the morning, and “Applied Human Biology-Risk, Stress and Adjustment” and “Populations in Transition” during the afternoon.

The Annual Awards Luncheon will begin at noon on Thursday. We urge you to purchase your luncheon tickets well in advance! The recipients of the Edward E. Hunt, Jr. Student prizes for outstanding research presentations will be announced, and the HBA Executive Committee will have the pleasure of presenting The Frans Boas Distinguished Achievement Award to Albert Theodore Steegmann, Jr., Professor Emeritus, State University of New York at Buffalo, in recognition of his exemplary contributions to human biology in science, scholarship, and professional service.

We encourage you to participate in the HBA Annual Business Meeting, which will follow on the heels of the final podium session. It will be held on the same hotel level (Ballroom) as the podium sessions but around the corner in the Galleria South on Thursday from 5:00 to 6:30 p.m. Thursday evening’s student reception (Galleria North, Thursday from 7:00 to 9:30 p.m.) is open to all students registered for the HBA Annual Meeting. A buffet and open bar will facilitate round table discussions with invited senior scholars on topics selected by the Student Organizing Committee.

The HBA meeting overlaps with that of several sister organizations including the American Association of Physical Anthropologists (AAPA, April 11–14, Wednesday evening through Saturday). The
AAPA/HBA Jointly Sponsored Symposium, “Not by Bread Alone: Non-caloric Determinants of Life History Strategies” has been organized by Virginia J. Vitzthum and Pablo Nepomnaschy and is scheduled for Friday morning beginning at 8:00 a.m. in Galleria South, Ballroom Level. The AAPA program offers several other sessions of interest to human biologists. Please see http://physanth.org/ for the entire AAPA program.

On behalf of the 2012 HBA Program Committee, welcome to the meetings and enjoy your time in Portland!

L. Christie Rockwell
HBA Program Committee Chair
37TH ANNUAL MEETING
HUMAN BIOLOGY ASSOCIATION
PROGRAM SUMMARY
Portland, Oregon

TUESDAY, APRIL 10, 2012

5:00 p.m.–8:00 p.m.  REGISTRATION
Plaza Foyer, Plaza Level

6:00 p.m.–10:00 p.m.  EXECUTIVE COMMITTEE MEETING
Directors Suite, Third Floor

WEDNESDAY, APRIL 11, 2012

7:30 a.m.–9:00 a.m.  AJHB EDITORIAL BOARD MEETING AND BREAKFAST
Forum Suite, Third Floor

8:00 a.m.–5:00 p.m.  REGISTRATION
Plaza Foyer, Plaza Level

8:00 a.m.–12:00 p.m.  POSTER SESSION
Co-Chairs: L. Christie Rockwell and Virginia J. Vitzthum
Broadway I/II/III/IV, Plaza Level

12:00 p.m.–1:00 p.m.  LUNCH BREAK

1:00 p.m.–1:15 p.m.  OPENING WELCOME
William Leonard, President of the Human Biology Association
Grand Ballroom II, Ballroom Level

1:15 p.m.–4:45 p.m.  PLENARY SESSION
A Half-Century of High Altitude Studies in Anthropology
Grand Ballroom II, Ballroom Level

5:00 p.m.–6:00 p.m.  PEARL MEMORIAL LECTURE
Fifty years of research on high-altitude adaptation in anthropology: instrumentation advances, research designs and selected discoveries.
Cynthia Beall
Grand Ballroom II, Ballroom Level

6:00 p.m.–9:00 p.m.  HBA DINNER RECEPTION AND CASH BAR
Alexander’s, 23rd Floor

THURSDAY, APRIL 12, 2012

8:00 a.m.–11:30 a.m.  REGISTRATION
Grand Ballroom Foyer, Ballroom Level

8:30 a.m.–10:00 a.m.  PODIUM SESSION A
Life History, Health and Disease through the Life Cycle
Chair: Amanda Thompson
Parlors, Ballroom Level
10:00 a.m.–10:15 a.m.  COFFEE BREAK

10:30 a.m.–11:45 a.m.  PODIUM SESSION B
Mediators and Moderators of Growth and Development
Chair: Betsy Abrams
Parlors, Ballroom Level

12:00 p.m.–1:30 p.m.  HBA ANNUAL AWARDS LUNCHEON
Alexander’s, 23rd Floor

1:45 p.m.–3:15 p.m.  PODIUM SESSION C
Applied Human Biology - Risk, Stress and Adjustment
Chair: L. Christie Rockwell
Parlors, Ballroom Level

3:15 p.m.–3:30 p.m.  COFFEE BREAK

3:30 p.m.–4:45 p.m.  PODIUM SESSION D
Populations in Transition
Chair: Heather Norton
Parlors, Ballroom Level

5:00 p.m.–6:30 p.m.  HBA ANNUAL BUSINESS MEETING
Galleria South, Ballroom Level

7:00 p.m.–9:30 p.m.  HBA STUDENT RECEPTION
Galleria North, Ballroom Level

FRIDAY, APRIL 13, 2012

8:00 a.m.–12:00 p.m.  JOINT AAPA/HBA SYMPOSIUM
Not by Bread Alone: Non-caloric Determinants of Life History Strategies
Organizers: Virginia J. Vitzthum and Pablo Nepomnaschy
Galleria South, Ballroom Level
WEDNESDAY MORNING, APRIL 11, 2012

8:00 a.m.–12:00 p.m.  **Poster Presentations**
Co-Chairs: L. Christie Rockwell and Virginia J. Vitzthum  
*Broadway I/II/III/IV, Plaza Level*

8:00 a.m.–8:30 a.m.  Poster setup
8:30 a.m.–10:00 a.m.  Authors of odd-numbered posters present for discussion
9:45 a.m.–10:15 a.m.  Coffee Break
10:00 a.m.–11:30 a.m.  Authors of even-numbered posters present for discussion
4:00 p.m.–4:30 p.m.  Poster Take-down

**POSTER GROUP: ADAPTATION**

1. Human Sociality, Longevity and DHEAS.  
   B Campbell and L Barone
2. What is the appropriate metric for head size at birth, or did ‘Lucy’ need a midwife?  
   EJ Bowers
   ML Power
   RL Bender, HS Williams, DL Dufour
5. What selective forces produced eco-geographic patterns in human mid-facial morphology?  
   RL Hall, JR Halliwill, M Bridgmon
6. Increase in grip strength to cross sectional area ratios among modernized populations in Vanuatu.  
   G Lee, CW Chan, A Pomer, C Sun, KM Olszowy, H Silverman, KN Dancause, C Weitz,  
   JK Lum, RM Garruto

**POSTER GROUP: APPLIED HUMAN BIOLOGY**

   GL Kemner, CL Patil, ET Abrams
8. Testosterone supplementation is associated with altered immunity in complex ways in healthy older men.  
   MP Muehlenbein, S Bhasin
   GH Ice, AFA Sadrudin, SR Williams
    CM Farley, LM Schell, PJ Parsons
    E Singh and VJ Vitzthum
    KK Burnitz, LM Schell, MV Gallo
13. Testosterone links polychlorinated biphenyls to higher waist-hip ratios: preliminary results from a sample of Native American male adolescents.  
KR Nelder, LM Schell, MV Gallo

14. Heightened diurnal endocrine levels in healthy women with a family history of hypertension.  
GD James

15. Obesity, behavior and the built environment: Impacts of Western fast food on childhood overweight and obesity in China.  
KM Houck, AL Thompson

C Padez, C Gama, A Mourão, I Nogueira, H Rosado

17. A cross-national study assessing the impact of obesity on health and well-being using SAGE data.  
AFA Sadruddin, GH Ice, SR Williams

18. Confusion about gluten-averse conditions on websites.  
CL Maki, JC Stevenson, MJ Mosher, KA Rankin-Sunter

MJ Mosher and MH Crawford

POSTER GROUP: DEMOGRAPHY AND DISEASE

EK O’Neill, F Fang, TB Gage

EL Miller and JH Mielle

J Dimka, SE Mamelund, L Sattenspiel

23. Modeling the effects of kinship patterns on disease spread among neophytes in 18th century Mission San Diego de Alcala.  
CM Orbann

D Tompkins

POSTER GROUP: GENETICS

25. X-chromosomal genetic diversity and linkage disequilibrium patterns in Native Americans and worldwide populations.  
CEG Amorim, S Wang, A Ruiz-Linares, MC Bortolini, SL Bonatto, FM Salzano

26. Genome-wide Complex Trait Analysis (GCTA) as a method to quantify missing heritability in Parkinson's disease.  
MF Keller, MA Nalls, A Singleton

27. HLA-class II genes in Mexican Amerindian Mayas: Relatedness with Guatemalan Mayans and other populations.  
A Arnaiz-Villena, G Vargas-Alarcón, N Perez-Hernandez, C Areces, M Fernandez-Honrado, F Garcia-Sanchez, M Enriquez de Salamanca, S Abd-El-Fatah-Khalil, D Rey

POSTER GROUP: GROWTH AND DEVELOPMENT

AG Young

29. The “Community Effect” in growth regulation.  
M Hermanussen, C Aßmann, K Staub

W Johnson, AC Choh, LE Soloway, SA Czerwinski, B Towne, EW Demerath
31. The relationship between height and later body composition in the Bolivian Amazon.
S Tanner, WR Leonard, TW McDade, V Reyes-Garcia, T Huanca and Bolivian TAPS Study Team

32. Ariaal mothers’ nutritional status and infant sex predict infant height and weight.
EM Miller

33. Variation in 2D:4D ratios during childhood are dependent on sex.
DL Osborne, J Wagner, S Elliott

LG Mattern, AS Wiley

35. Height increments in 9- to 18 year-old boys and girls living in Merida, Yucatan, Mexico, with normal or stunted stature: effects of age at stunting, ethnicity and social status.
B Bogin, SD Banik, F Dickinson

SS Urlacher, MA Liebert, TJ Cepon, JJ Snodgrass, LS Sugiyama

37. The Indigenous Siberian Health and Adaptation Project: Evidence for a recent change in basal metabolic rate among the Yakut (Sakha) of Siberia.
JJ Snodgrass, WR Leonard, LA Tarskaia, TM Klimova, VI Fedorova, ME Baltakhinova, VG Krivoshapkin

38. The Indigenous Siberian Health and Adaptation Project: Seasonality in thyroid function and metabolic health among the Yakut (Sakha) of Eastern Siberia.
SB Levy, WR Leonard, LA Tarskaia, TM Klimova, VI Fedorova, ME Baltakhinova, VG Krivoshapkin, JJ Snodgrass

EC Squires, EA Streeter, WR Leonard, LA Tarskaia, TM Klimova, VI Fedorova, ME Baltakhinova, VG Krivoshapkin, JJ Snodgrass

40. Anthropometric and metabolic correlates of C-reactive protein in adult Toba men and women.
CR Valeggia, E Lagranja, A Navarro

41. Impact of meal timing and frequency on nutrient utilization and metabolism: Adaptive implications. SL Johnston

42. The Indigenous Siberian Health and Adaptation Project: Adiponectin, body composition, and cardiovascular health among the Yakut (Sakha) of Siberia.
EA Streeter, EC Squires, WR Leonard, LA Tarskaia, TM Klimova, VI Fedorova, ME Baltakhinova, VG Krivoshapkin, and JJ Snodgrass

43. The relationship between adverse childhood environment and adult inflammation and immune dysregulation: The Cebu Longitudinal Health and Nutrition Survey (CLHNS).
MK Hoke, CW Kuzawa, TW McDade

44. Acute changes in male salivary testosterone in response to intense physical activity among Tsimane forager horticulturalists.
BC Trumble, DK Cummings, KA O’Connor, DJ Holman, MD Gurven, HS Kaplan

45. Validation of a new multiplex assay against individual immunoassays for the quantification of reproductive, stress and energetic metabolism biomarkers in urine specimens.
KG Salvante, E Brindle, KA O’Connor, DS McConnell, PA Nepomnaschy

46. A comparison between first morning urinary cortisol levels and circadian salivary cortisol profiles.
PL Sarkar, KG Salvante, PA Nepomnaschy
47. Lower vitamin D status among migrant Bangladeshi women in the UK.  
EI McClure, G Cooper, K Begum, S Muttukrishna, LL Sievert, R Gunu,  
T Sharmeen, O Chowdhury, GR Bentley

48. The Testosterone Awaking Drop: Rapid post-waking decline in testosterone in males and  
females.  
CW Kuzawa, LT Gettler, ZM Thayer, TW McDade

POSTER GROUP: POPULATIONS IN TRANSITION

49. Modernization and differential physical activity among the islands of Vanuatu.  
H Silverman, C SuN, A Pomer, CW Chan, KN Dancause, G Lee, KM Olszowycz,  
C Weitz, RM Garruto, JK Lum

50. When Apple meets Kava: Impact of technology on traditional lifestyles in Vanuatu.  
C Sun, H Silverman, A Pomer, CW Chan, KM Olszowycz, KN Dancause, G Lee,  
C Weitz, RM Garruto, JK Lum

51. The Shuar Health and Life History Project: The relationship between market integration and  
diurnal salivary cortisol rhythms of children in an indigenous lowland Ecuadorian population.  
MA Liebert, JJ Snodgrass, TJ Cepon, SS Urlacher, FC Madimenos, LS Sugiyama

52. The Shuar Health and Life History Project: The effects of market integration on intestinal  
helminth levels among the Shuar of Amazonian Ecuador.  
TJ Cepon, MA Liebert, SS Urlacher, JJ Snodgrass, FC Madimenos, LS Sugiyama

KM Olszowycz, A Pomer, KN Dancause, C Sun, H Silverman, CW Chan, G Lee, C Weitz,  
JK Lum, RM Garruto

Pike IL, B Straight

55. The Shuar Life History and Health Project: Somatic symptoms in the Shuar of the  
Ecuadorian Amazon, ‘idioms of distress’, immune dysregulation, or both?  
Tallman PS, Liebert MA, Madimenos FC, Cepon TJ, Sugiyama LS, Snodgrass JJ,  
McDade TW

POSTER GROUP: REPRODUCTION

56. Variation in menopausal symptoms by varying time windows: comparison of 2-week and 4-week  
symptom frequencies based on daily diaries of Japanese women.  
MK Melby

57. Hot flashes and midlife symptoms in relation to levels of salivary cortisol.  
LM Gerber, LL Sievert, and JE Schwartz

58. The banana effect: Are past and/or present lifestyles associated with ovarian hormone  
differences in women from the two Germanys?  
C Deimel, VJ Vitzthum, FS Schaebs, T Deschner

59. Ovarian steroid variation in cycles deemed ovulatory by mid-cycle LH.  
EJ Rowe, A Van Horn, T Eisenstein, and LC Rockwell

60. Evaluating developmental plasticity in ovarian reserve: Infancy and childhood  
growth and anti-Müllerian hormone (AMH) in young adult Filipino women.  
JM Bragg, MN Banerjee, TW McDade, CW Kuzawa

61. Project REPA (Reproduction & Ecology in Provincia Aroma): The predictability of  
women's progesterone concentrations from cycle to cycle.  
AL Harris and VJ Vitzthum

seasonally in Bolivian agropastoralists?  
RM Bedwell, J Thornburg, VJ Vitzthum

63. Does residency status impact the gestation period and birth outcomes in Samoan women?  
M Howells, R Bender, D Dufour, J’Ah Ching, B Mua’sau
Until 50 years ago, high-altitude terrestrial research was conducted largely within the realm of environmental physiology where interests were focused on physiological mechanisms and mountain exploration. Scientists from the U.S., Europe, and Peru had developed sophisticated physiological models of adaptation and acclimatization to the hypoxia of high altitude, but very little research had been conducted on permanent residents, particularly natives of high altitude in the two major regions of the world—the Andes and the Himalayas. In 1962, Paul T. Baker initiated a project at the Pennsylvania State University to explore the responses of indigenous Peruvians to the major stresses at altitude: hypoxia and cold. Approaches to this early research were anthropological in perspective and centered on population-level studies with an evolutionary approach. Studies were conducted by applying a combination of physiological experimental methods, simulated field experiments, and extended anthropological field observations. Early hypotheses at this time were that heredity played a major role in the adaptive complexes in native high-altitude residents. These early hypotheses were later modified to incorporate or replace the genetic hypotheses with developmental adaptation models. A half century of research within anthropology and research in other fields has presented a vastly more complex and integrated picture of high-altitude adaptation in native residents. Recent studies incorporate physiology and oxygen transport, population and molecular genetics, reproduction, growth, and development. The history and current status of high-altitude research and its anthropological applications will be treated in this plenary symposium.
4:45 p.m. BREAK

5:00 p.m. PEARL MEMORIAL LECTURE
Fifty years of research on high-altitude adaptation in anthropology: Instrumentation advances, research designs and selected discoveries.
CM Beall
Grand Ballroom, Ballroom Level

THURSDAY, APRIL 12, 2012

8:30 a.m.–10:00 a.m. PODIUM SESSION A: LIFE HISTORY, HEALTH AND DISEASE THROUGH THE LIFE CYCLE
Chair: Amanda Thompson
Parlors, Ballroom, Level

8:30 a.m. Competing for attention: Do paternal grandmothers impact weaning times?
A Núñez-de la Mora

8:45 a.m. Change in age at menarche in Vanuatu.
A Pomer, CW Chan, KN Dancause, G Lee, KM Olszowy, H Silverman, C Sun, C Weitz, RM Garruto, JK Lum

9:00 a.m. Is there a prolactin paradox in human males? Prolactin, fatherhood, and reproductive behavior in a large sample of Filipino men.
LT Gettler, TW McDade, AB Feranil, CW Kuzawa

9:15 a.m. Diurnal cortisol rhythms in Tsimane’ Amazonian foragers: New insights into ecological programming of the HPA axis.
CH Nyberg

9:30 a.m. Household food consumption of Ribeirinhos, eastern Amazon, Brazil.
GT Ritchie-Ewing, BA Piperata

9:45 a.m. Advice vs. influence: an examination of the factors shaping nutritional status in Belfast, Northern Ireland.
JL Williams

10:00 a.m. COFFEE BREAK

10:30 a.m.–11:45 a.m. PODIUM SESSION B: MEDIATORS AND MODERATORS OF GROWTH AND DEVELOPMENT
Chair: Betsy Abrams
Parlors, Ballroom Level

10:30 a.m. Crawling, not age, predicts greater sIgA content of milk in Filipino women.
EA Quinn, ML Power

10:45 a.m. The timing of adrenarche among Bangladeshi and British youth.
LC Houghton, GD Cooper, M Booth, R Troisi, HA Katki, RG Ziegler, RN Hoover, OA Chowdhury, GR Bentley

11:00 a.m. Stressing out: Stress and adolescent nutritional health in Mississippi.
KP Garza, M Shepherd, ET Abrams, WR Leonard

11:15 a.m. Puberty, body size, and body proportions: Is there role for adaptation?
MH McIntyre

11:30 a.m. Changing patterns of child growth and disease ecology in Maya Agriculturalists.
A Veile, K Kramer
12:00 p.m.–1:30 p.m.  **HUMAN BIOLOGY ASSOCIATION ANNUAL AWARDS LUNCHEON**  
*Alexander’s, 23rd Floor*

1:45 p.m.–3:15 p.m.  **PODIUM SESSION C: APPLIED HUMAN BIOLOGY—RISK, STRESS AND ADJUSTMENT**  
Chair: L. Christie Rockwell  
*Parlors, Ballroom Level*

1:45 p.m.  
Refugee and nonrefugee pregnancy health risks and birth outcomes at an urban U.S. medical clinic: Impact of a refugee health care mentoring program.  
RB Cadzow, J Chang

2:00 p.m.  
The meaning of a lock: Cortisol from hair and psychosocial stress among incarcerated mothers in Oregon.  
HH McClure, JW Shortt, JM Eddy, SHM Van Uum, E Russell, G Koren, JJ Snodgrass

2:15 p.m.  
Global variation in the interaction of socioeconomic status and health in older women: results from SAGE.  
SR Williams, JG Studebaker, KA Moore, AFA Sadruddin, GH Ice

2:30 p.m.  
Reduced breastfeeding duration associated with body image concerns in overweight women.  
LE Hauff, EW Demerath

2:45 p.m.  
An evaluation of alternate anthropometric indices to screen for health risk in Canadian Inuit.  
T Galloway, GM Egeland, K Young

3:00 p.m.  
AFK weekend project: A correlative study on electronic media usage and genetic polymorphisms in Binghamton University.  
AJ Gonzalez, SM Schmitt, C Sun, R Spathis, CW Chan, K Sankaranarayanan, JK Lum

3:15 p.m.  
**COFFEE BREAK**

3:30 p.m.–4:45 p.m.  **PODIUM SESSION D: POPULATIONS IN TRANSITION**  
Chair: Heather Norton  
*Parlors, Ballroom Level*

3:30 p.m.  
Toward a human biology of war.  
PF Clarkin

3:45 p.m.  
The Shuar Health and Life History Project: Measures of market integration and their effects on health among Indigenous Shuar of Ecuadorian Amazonia.  
LS Sugiyama, FC Madimenos, MA Liebert, AD Blackwell, Tara Cepon, JJ Snodgrass

4:00 p.m.  
Contribution of Kava (*Piper methysticum*) consumption to sex biased rates of obesity in Vanuatu.  
JK Lum, C Sun, H Silverman, A Pomer, CW Chan, K Olszowy, KN Dancause, G Lee, C Weitz, RM Garruto

4:15 p.m.  
Vector-borne disease and the genetic epidemiology of the circumpolar region.  
KC Hoover and CR Dicke

4:30 p.m.  
INSIG2 variants rs9308762 and rs7566605 modify the association of dietary patterns with serum triglycerides in Samoans.  
ST McGarvey, A Baylin, C Quested, J Tuitele, DE Weeks, R Deka

5:00 p.m.–6:30 p.m.  **HBA ANNUAL BUSINESS MEETING**  
*Galleria South, Ballroom Level*
The role of energetics as a modulator of life history trajectories (e.g., the timing of developmental milestones and reproductive events, and the amount of effort invested in each reproductive venture) has garnered much attention from biological anthropologists. However, both life history theory and a growing body of empirical evidence suggest that factors not directly related to energy availability (e.g., mortality schedules, social dynamics, genotypes) can also play central roles in shaping life history strategies (LHS) in humans and other primates. In this symposium speakers will examine both ultimate and proximate determinants of LHS and the mechanisms by which they contribute to variation in LHS. Talks will explore how genotypic variation, immune challenges, temporal changes in the cross-talk between the HPA and HPG axes, and the social milieu affect ontogenetic trajectories and impact life history trade-offs, thereby creating variation in life history trajectories and reproductive strategies. The symposium is intended to stimulate more research that contributes to developing a comprehensive understanding of the interplay of the various determinants of LHS in humans and other primates.

CHAIR: Pablo Nepomnaschy

8:00 a.m. Is there an ecology of maternal investment in primates?
B Low, A Nepomnaschy, P Nepomnaschy

8:15 a.m. Immune and reproductive functions in female life history: How do we go about it?
A Nuñez de la Mora

8:30 a.m. A Vandenbergh effect in a wild primate? Male-induced maturation in geladas.
J Beehner

8:45 a.m. Milk consumption and age at menarche in NHANES: A role for IGF-I?
A Wiley

9:00 a.m. Developmental stress, reproductive development and adult body size: A life history theory perspective.
D Coall

9:15 a.m. Correlates of early reproduction in the Dogon of Mali.
B Strassmann

9:30 a.m. Is genetic variation a source of populational differences in ovarian hormone concentrations?
VJ Vitzthum

9:45 a.m. BREAK

CHAIR: Virginia J. Vitzthum

10:00 a.m. Potential influences of infant sleeping arrangement (social or solitary) in the developmental trajectories and life history strategy of adults.
J J Mckenna

10:15 a.m. Life history strategies, parasites, and the use of tobacco and cannabis in an Aka forager population.
C Roulette and EH Hagen

10:30 a.m. Today is the tomorrow we worried about yesterday: Changes in stress axis function across women’s reproductive transitions.
P Nepomnaschy
10:45 a.m.  From the womb to the tomb: The role of transfers in shaping the evolved human life history.  
M Gurven

11:00 a.m.  Environmental risk and facultative adjustment of life history strategy in the Philippines.  
JM Bragg, TW McDade, CW Kuzawa

11:15 a.m.  Environmental risk and facultative adjustment of life history strategy in the United States.  
TW McDade, JM Bragg, CW Kuzawa, L Chyu, EK Adam

11:30 a.m.  The timing of the onset and duration of perimenopause in baboons and humans.  
KA O’Connor, N Neretti, A Bronikowski, DJ Holman, M Tatar

11:45 a.m.  Hormonal aspects of aging: Some comparative evidence.  
K Hawkes

Please consult the AAPA program for abstracts from the Joint AAPA/HBA session.
ABSTRACTS

Abstracts are listed alphabetically by first author’s last name. Each is preceded by the session [P: Poster (Wednesday 8:00 a.m.–12:00 p.m. Broadway I/II/III/IV, Plaza Level), Pearl Memorial Lecture (Wednesday 5:00–6:00 p.m., Grand Ballroom II, Ballroom Level), Plenary Session (Wednesday 1:00–4:45 p.m., Grand Ballroom II, Ballroom Level), PODIUM A (Thursday 8:30–10:00 a.m., Parlorls, Ballroom Level), PODIUM B (Thursday 10:15–11:45 a.m., Parlorls, Ballroom Level), PODIUM C (Thursday 1:45–3:15 p.m., Parlorls, Ballroom Level), PODIUM D (Thursday 3:30–4:45 p.m., Parlorls, Ballroom Level)] and the slot within that session (starting time for podium; board number for poster). Please consult the AAPA program for abstracts from the Joint AAPA/HBA session.

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X-chromosomal genetic diversity and linkage disequilibrium patterns in Native Americans and worldwide populations. CEG Amorim,1 S Wang,2 A Ruiz-Linares,2 MC Bortolini,1 SL Bonatto,3 FM Salzano3. 1Laboratório de Evolução Humana e Molecular, Departamento de Genética, Instituto de Biociências, Universidade Federal do Rio Grande do Sul, Brazil; 2The Galton Laboratory, Department of Biology, University College London, United Kingdom; 3Laboratório de Biologia Genômica e Molecular, Faculdade de Biociências, Pontifícia Universidade Católica do Rio Grande do Sul, Brazil.

We report X-chromosomal linkage disequilibrium (LD) patterns in Amerindian and admixed Latin American populations (n = 256) using STRs widespread along the X-chromosome and other populations worldwide. The Amerindian populations presented lower genetic diversity and a higher proportion of loci in LD than the Latin American ones. Two haplotype blocks (haploblocks) were identified in the X-chromosome, both restricted to the Amerindians. The region corresponding to one of these haploblocks was investigated in other populations from public databases revealing that it also presents LD, showing a haploblock of ~15 kb shared among all the studied populations. This haploblock was further characterized in a Native American sample and compared with individuals from other ethnic backgrounds, revealing some private haplotypes and population structure between the continents. The observed LD and genetic diversity patterns are associated to the evolutionary history of these populations, evidencing the dynamics of the peopling of the globe and the action of bottlenecks. In accordance to previous work done with other populations, human isolates, such as Amerindian tribes, seem to be an optimal choice for the implementation of association studies due to the wide extent of LD which can be found in their gene pool. Moreover our analyses present a possibility of reconstructing X-chromosomal genealogies in an analogous way to those based on haploid genomes, with the advantage of providing information about both male and female evolutionary histories.

Support: CNPq, FAPERGS/PRONEX, Brazil.

P: 27

HLA-class II genes in Mexican Amerindian Mayas: Relatedness with Guatemalan Mayans and other populations. A Arnaiz-Villena,1 G Vargas-Alarcon,2 N Perez-Hernandez,2 C Areces,1 M Fernandez-Horando,2 F Garcia-Sanchez,1 M Enriquez de Salamanca,1 S Abd-El-Fatah-Khalil,1 D Rey1. 1Immunology, The Madrid Regional Blood Center, Medical School, University Complutense, Madrid, Spain; 2Instituto Nacional de Cardiología Ignacio Chávez, Mexico City, Mexico.

We analyzed the HLA class II allele frequencies in 50 healthy unrelated Mayan individuals. The relationship with other worldwide populations was studied by using HLA data from 71 different populations. The most frequent alleles were HLA-DRB1*04, HLA-DRB1*01, HLA-DQB1*0302, and HLA-DQB1*0501. When comparisons with other Mexican Amerindian groups were made, some differences were observed. Mayans showed an increased frequency of HLA-DRB1*01 when compared to Nahuas, Mayos, Teenek, and Mazatecans (P < 0.05), whereas the HLA-DRB1*04 was increased in Mayans when compared with Nahuas (P < 0.05). The analysis of HLA-DQB1 alleles showed an increased frequency of DQB1*0302 in Mayans when compared with Nahuas and Mazatecans (P < 0.05), whereas the frequency of HLA-DQB1*0301 was decreased in Mayans when compared with Nahuas, Mayos, Teenek, and Mazatecans (P < 0.05). Decreased frequency of HLA-DQB1*0501 in Mayans when compared with Nahuas was found. Neighbour Joining dendrogram shows that Mexican Mayans are genetically close to some of the most ancient groups living in Mexico and some South American Amerindians. However, Guatemalan Mayans do not cluster together with Mexican Mayas showing that languages do not correlate with genes, particularly in Amerindians. The data corroborate the restricted polymorphism of HLA-DRB1 and DQB1 alleles and the high frequency of HLA-DRB1*04 and HLA-DQB1*0302 in Mayans from Mexico.

PEARL MEMORIAL LECTURE, WEDNESDAY, 5:00 p.m.

Fifty years of research on high-altitude adaptation in anthropology: Instrumentation advances, research designs and selected discoveries. CM Beall, Department of Anthropology, Case Western Reserve University.

Paul Baker and students from The Pennsylvania State University initiated anthropological research on high-altitude adaptation in 1962 with studies of Quechua highlanders in Peru. Baker recounted the theoretical advan-
tages of such research: (1) "genetic and physiological adaptation to an environmental stress is more likely to occur when men do not have cultural tools which can prevent them from being biologically stressed," and (2) "the more the environmental stress affects such fundamentals as work ability or reproduction and growth, the greater the probability that genetic and physiological adaptations will be evoked." (Man in the Andes. 1976. Dowden Hutchinson & Ross, Inc., Stroudsburg, PA, p. 2). This presentation gives an overview of the research designs and salient discoveries. Early research used a single population-multiple stress model of Andean highlanders' adaptations to cold, nutritional, and hypoxic stresses. Later research expanded to a multiple population—Single stress model comparing Andean and Tibetan highlanders while concentrating on hypoxia. Fieldwork in developing countries posed challenges for feasibility and community acceptability of biological measurements. Noninvasive, portable pulse oximeters, and echosonography for measuring the oxygen saturation of hemoglobin and blood flow, respectively, were crucial enabling technologies. Key discoveries include evidence for adaptation during pre-adolescence and pregnancy, fetal origins of adult phenotypes, Andean–Tibetan differences in adaptation, the role of nitric oxide, the importance of circulatory phenotypes, genetic bases of some traits, and natural selection. The past 50 years produced an extraordinary record of hypothesis-generation and testing and new understanding about high-altitude human biology, evolution, and adaptation.

P: 62

Project REPA (Reproduction & Ecology in Provincia Aroma): Does investment in lactation vary seasonally in Bolivian agropastoralists? RM Bedwell, J Thornburg, VJ Vitzthum, The Kinsey Institute for Research in Sex, Gender, and Reproduction; Department of Anthropology, University of Michigan; Department of Exercise Science, Syracuse University; Department of Anthropology, University of Colorado-Boulder.

Breastfeeding one's youngest child is a costly investment which life history theory predicts must involve trade-offs in the allocation of resources (e.g., time, nutrients) to other investments (e.g., personal somatic maintenance, mating effort). Optimal life history strategies in specific local conditions don't always favor lactation over other demands, which may help to explain the variable repertoire of human infant feeding behaviors and the responsiveness of this repertoire to biological, ecological, and social factors. For example, seasonal changes in activity patterns, known to impact several components of human reproductive functioning, have been found to affect infant feeding strategies in some populations but not in others. We have previously demonstrated that anovulation rates and the risk for early pregnancy loss are both higher during the planting and harvesting seasons in agropastoral communities in the Bolivian altiplano (AJHB 21:548–558), suggesting that nursing behavior may also be modified by this agricultural cycle. To test the hypothesis that seasonally varying investment in subsistence activities modifies investment in lactation, nearly 200 breastfeeding mothers from ~30 rural communities were taught to keep track of the frequency of nursing their infants. Breastfeeding behavior was recorded on repeated 2-day periods over the course of several months (median observation periods per mother–infant pair = 4). These prospective data, representing nearly 1,000 two-day observation periods throughout a single year, allow us to evaluate the trade-offs between investments in food production and lactation, and how these strategies influence a mother's ability to supply sufficient nutrients to her youngest offspring.

Supported by US National Science Foundation Grant SBR 9506107.

P: 4


Lactation is a metabolically expensive state. Lactating women may potentially meet this energetic burden by increasing energy intake, decreasing energy expenditure, mobilizing body fat stores, or increasing mechanical efficiency. Previously, Spurr et al. (1998) reported significantly higher mechanical efficiency (measured as delta efficiency) in 92 lactating Colombian women compared with 290 nonpregnant nonlactating (NPNL) counterparts in a cross-sectional design. Here, we present preliminary results from a longitudinal study of 56 well-nourished women (26 subjects, 30 NPNL controls) from Boulder, CO. Each subject was measured for VO2 at six workloads (between 0 and 75 W) on a cycle ergometer during two separate laboratory visits. Subjects were measured at peak- and postlactation; controls were measured at 6-month intervals. We used multiple regression models with visit-by-workload interaction terms to determine whether the relationship between workload and VO2 changed between visits; a significant interaction term was interpreted as a change in efficiency. None of the subjects showed a change in efficiency between peak- and postlactation, and there was no change in efficiency when all subjects were aggregated into one model. We did find a between-visit change in efficiency in one NPNL control. Contrary to previous work, we found no evidence of an increase in mechanical efficiency associated with lactation. Using interaction terms to assess differences in the relationship between work output and energy expenditure (e.g. VO2) provides a unit-less indication of changes in mechanical efficiency, and may offer additional insights compared with other unit-based measures such as delta efficiency.

This research was supported by the Wenner-Gren Foundation for Anthropological Research and the Council on Research and Creative Work at the University of Colorado, Boulder.

PLENARY: WED., 3:45 p.m.

Natural selection at high altitude: Andean and Tibetan patterns of adaptation to an extreme environment. AW Bigham, T Brutsaert, C Julian, LG Moore, EJ Parra, MD Shriver, and M Wilson. Department of Anthropology, University of Michigan; Department of Exercise Science, Syracuse University; Department of Anthropology, University of Colorado-Boulder.
and Altitude Research Center, University of Colorado, Denver; Departments of Public Health Sciences, Anthropology and Obstetrics-Gynecology, Graduate School of Arts and Sciences, Wake Forest University, Winston-Salem; Department of Anthropology, University of Toronto, Mississauga; Department of Anthropology, Pennsylvania State University.

High-altitude hypoxia, or the decrease in oxygen levels caused by lowered barometric pressure, challenges the ability of humans to live and reproduce. Two high-altitude regions where humans have lived for millennia are the Andean Altiplano and the Tibetan Plateau. Populations living in these regions exhibit unique circulatory, respiratory, and hematological adaptations to life at high altitude. We performed a genome scan to identify selection nominated candidate genes or gene regions for high-altitude adaptation. We scanned across each chromosome to discern genomic regions with previously unknown function with respect to altitude phenotypes, and examined groups of genes functioning in oxygen metabolism and sensing, such as the hypoxia inducible transcription factor (HIF) pathway, for evidence of directional selection. Applying four population genetic statistics commonly used for detecting signatures of natural selection, we identified selection-nominated candidate genes and gene regions in these two populations (Andeans and Tibetans) separately. The Tibetan and Andean patterns of genetic adaptation are largely distinct from one another, with both populations showing evidence of positive natural selection in different genes or gene regions. Interestingly, one gene previously known to be important in cellular oxygen sensing, EGLN1, shows evidence of positive selection in both Tibetans and Andeans. However, the pattern of variation for this gene differs between the two populations. Overall, the results provide key insights into the patterns of genetic adaptation to high altitude in Andean and Tibetan populations.

Support: NIH HLBI-079647; NIH TW001188; NIH HG-002154; NSF DDIG-0622337; NSF Graduate Research Fellowship; NSF BNS-8919645; Wenner-Gren Foundation.

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Height increments in 9- to 18-year-old boys and girls living in Merida, Yucatan, Mexico with normal or stunted status. B Bogin,1 SD Banik,2 P Dickinson2. 1Centre for Global Health and Human Development, School of Sport, Exercise and Health Sciences, Loughborough University, United Kingdom; 2Department of Human Ecology, Cinvestav-Merida, Mexico.

Existing studies report high rates of stunting (height-for-age z-scores < −2SD) in children of Yucatan, Mexico. Between 2008 and 2010 in Merida, Yucatan the height of 475 boys and 500 girls, aged 9 to 18 years, were measured twice with a gap of 1 calendar year. Overall, rates of stunting for boys equaled 11.16% and for girls 12.6%. Some participants were stunted at both measurement times while others were stunted only at time 1 or time 2. Boys stunted at time 1 or at both times have later ages at peak height velocity (PHV) and a more intense PHV than boys not stunted. Boys stunted only at time 2 have a later age at PHV but less intense PHV than all other boys. Girls stunted at time 1 have an earlier PHV than all other girls, but the intensity of PHV is similar in both stunted and nonstunted girls. Boys and girls were characterized by social status according to school attended, zone of residence, mothers’ education, fathers’ occupation, and a crowding index of the family. They were also characterized into three ethnic groups: (1) both parents Maya, (2) one parent Maya, (3) both parents non-Maya. Those of higher social status and of non-Maya ethnicity are, on average, tallest. Those with both parents Maya are of the lowest social status and are shortest. Growth increments around the time of PHV are more influenced by stunting than by ethnicity, however, those participants with one or both Maya parents are most likely to be stunted.

P: 2

What is the appropriate metric for head size at birth, or did “Lucy” need a midwife? EJ Bowers. Department of Anthropology, Ball State University.

Modern obstetrics uses biparietal diameter based on CAT scans to judge the likelihood of cephalopelvic disproportion and the need for surgical intervention. Cephalopelvic disproportion was a major selective factor acting on humans until the introduction of general anesthesia (and it remains such where this is not routinely available). It is a common assertion in introductory texts that Australopithecines had sufficiently small head sizes at birth that the birthing difficulties seen in modern humans would not have been in effect. Australopithecines, however, had short pelvis like Homo, not the intermediate pelvis seen in Ardi- pithecus, nor the long pelves of quadrupeds. Gilbert, in Developmental Biology (2010) points out that the relevant parameter for birthing is head circumference, not volume. Au. afarensis (Lucy) had a broader bi-iliac diameter for height than do modern humans, but it is the internal pelvic diameter that is relevant to birthing. New born chimpanzees certainly have heads of smaller volume than newborn humans. The average head circumference at birth for humans is 35 cm (Smith Growth and its Disorders 1977), while that for chimpanzees is 30 cm (Schultz 1940). The aim of this study is to examine the question of head circumference in Australopithecines, in order to consider whether birthing assistance might have been of value, and in the process emphasize that head circumference, not volume, is the parameter relevant to successfully birthing a hominid.

P: 60

Evaluating developmental plasticity in ovarian reserve: Infancy and childhood growth and anti-Müllerian hormone (AMH) in young adult Filipino women. JM Bragg,1 MN Banerjee,2 TW McDade,1 CW Kuzawa1. 1Department of Anthropology, Northwestern University; 2University of Colorado School of Medicine, Denver.

Theory and empirical evidence suggest that variation in life history traits among women, including maturational timing and reproductive effort, may be influenced by environmentally-driven adaptive plasticity. However, there is limited consensus concerning the contributors to variation in the duration of the female reproductive lifespan, which
varies across and within populations. Anti-Müllerian hormone (AMH) is correlated with the number of ovarian follicles remaining, and thus represents a useful tool for monitoring developmental changes in and underlying influences on ovarian reserve. Here, we test the hypothesis that poor energetic conditions and slower growth during early life predict reduced ovarian reserve in early adulthood. We examined associations between in utero, infancy, and childhood growth outcomes and serum AMH measured in 253 young adult women (mean age 21.5 yr) enrolled in the Cebu Longitudinal Health and Nutrition Survey. Contrary to our hypothesis, we find that birthweight ($P > 0.7$) and infancy, childhood (2.5–8.5 yr), juvenile (8.5–11.5 yr), and adolescent (11.5–15.5 yr) weight velocities are not associated with AMH in a multiple regression analysis (all $P > 0.3$). Menarcheal age and parity, however, each have inverse dose-response relationships with AMH (both $P < 0.05$), suggesting that reproductive factors are likely associated with ovarian reserve independent of growth trajectory. To the extent that the female reproductive lifespan is determined by ovarian reserve in early adulthood, these results suggest that this important life history trait is likely not shaped by early life energetic conditions. Theoretical implications of a lack of energetically-driven plasticity in reproductive lifespan will be discussed.

JMB is supported by an NSF Graduate Research Fellowship.

PLENARY: WED., 4:15 p.m.

Origins of high arterial hemoglobin-oxygen saturation (SaO2) during exercise in Andean high-altitude natives. TD Brutsaert, A Bigham, and M Kiyamu. 1Department of Exercise Science, Syracuse University; 2Department of Anthropology, University of Michigan; 3Department of Anthropology, The University at Albany, SUNY.

Human populations in the Andes (Quechua and Aymara) have resided at high altitude (HA) for millennia and show relatively high arterial hemoglobin-oxygen saturation (SaO2), at rest and particularly during exercise. Previous studies link higher SaO2 to functionally important outcomes including higher birth-weight, lower infant mortality, and enhanced work performance. In this talk we review the evidence for and against a developmental basis for high Andean SaO2, largely based on two independent studies that were conducted by this research group nearly 15 years apart using different versions of the classic “migrant” study design. In addition, we present preliminary evidence that natural selection has operated, directly or indirectly, to increase the exercise SaO2 in Peruvian Quechua. These genetic data were derived from a recent and targeted whole-genome analysis of a sample of $n = 142$ Peruvian Quechua who were earlier measured for both exercise and control of breathing phenotypes at altitude. Briefly, we identified several genomic regions in Andeans that showed evidence (i.e., signatures) of natural selection using a dense panel of single nucleotide polymorphism (SNP) genetic markers (905,747 SNPs). The analysis provided compelling evidence of natural selection in several hypoxia inducible factor (HIF) pathway genes, where HIF is the central transcriptional regulator that controls hundreds of downstream genes involved in the maintenance of cellular oxygen homeostasis. Several of the SNP markers so identified are associated with exercise SaO2 in the Quechua sample, including markers near the nitric oxide synthase (NOS2A) gene, and the protein kinase, AMP-activated, alpha 1 catalytic subunit (PRKAA1) gene.

Studies referred to in this abstract were funded by SBR-9523454, BCS-0129377, BCS-0622337, BCS-082442.

P: 12

Toxicant exposure and the association with adolescent height growth in the Akwesasne Mohawk. KK Burnitz, 1LM Schell, 1,2,3 MV Gallo. 1Department of Anthropology; 2Department of Epidemiology and Biostatistics; 3Center for the Elimination of Minority Health Disparities, SUNY-Albany, NY.

Epidemiological and toxicological research suggests that exposure to toxicants such as lead (Pb), polybrominated biphenyls (PCBs), and dichlorodiphenylchloroethylen (DDE) alters endocrine function and may impact growth during adolescence. However, this work has not employed sophisticated analytical techniques from auxology, specifically growth curve modeling. The Akwesasne Mohawk were exposed pre- and perinatally to background levels of lead, DDE, and to a substantial number of PCBs from industrial pollution of the St. Lawrence River. Previous work determined that toxicant levels can impact the timing of menarche, but it is unknown how said toxicants affect adolescent height. Data drawn from a cross-sectional study of Mohawk adolescents ($n = 271$) between 10-16.99 years of age were utilized to determine how low exposure levels of serum lead, PCBs, and DDE affect adolescent height. Using the LMS method, height reference centiles and charts were generated for visual and statistical analyses. Population specific height-for-age z-scores were then derived from reference values and calculated separately for males ($n = 131$) and females ($n = 140$). Multivariate models stratified by sex included serum triglycerides, cigarette use, total caloric intake, and whether the participant had been breast fed. Lead was negatively related to height-for-age z-score in females. None of the toxicants were related to male height-for-age z-score. This investigation suggests that female adolescent growth in height is sensitive to low levels of lead. Effects of DDE or PCB’s were not evident. Small sample size limits our power to say conclusively that there is no relationship.

Acknowledgement: The authors thank the Akwesasne Mohawk community for their cooperation and participation in this research. Supported by grants NIEHS-ES04913-10; ES510904-06; and NCMHD—1P20MD003373-01. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Center on Minority Health and Heath Disparities, or the National Institutes of Health.

PODium C: THURS., 1:45 p.m.

Refugee and non-refugee pregnancy health risks and birth outcomes at an urban U.S. medical clinic: Impact of a refugee health care mentoring program. RB Cadzow, 1J Chang. 1Department of Family Medicine; 2School of Medicine and Biomedical Sciences, State University of New York at Buffalo.
Research suggests that refugees experience numerous health risks before resettlement and that migration to a more economically developed country increases susceptibility to chronic diseases through exposure to different living conditions, adoption of new behaviors, and acculturation stress. Some studies show that pregnancy/birth outcomes may also be affected (gestational diabetes, preeclampsia, inadequate prenatal care, short birth interval, and emergency c-sections). To address some of these health risks in their refugee patients, providers at an urban medical clinic partnered with a nonprofit group to implement the Priscilla Project (PP)—a program that provides language-appropriate prenatal counseling and pairs refugee women with local women who assist with accessing health care and resources. Using medical record data and pre/post PP structured interviews of participants, this study explored health risks and pregnancy outcomes among refugee (mostly Somali, Sudanese, and Burmese) and non-refugee women in this clinic and the impact of PP on these outcomes. Data on 242 pregnancies within a 5-year period were analyzed. Findings show that refugees and nonrefugees experienced different health risks during pregnancy. Nonrefugee women were more likely to smoke. Refugee women had higher incidences of parasitoses and female circumcision. Refugees participating in PP reported more sources of social support than nonrefugee patients. No significant differences in delivery methods or neonatal outcomes were observed either before or after the initiation of PP. However, pre/post-PP structured interviews show that confidence and knowledge of resources increased among PP refugees after participation, which may reduce future health risks.

This work was supported by the U.S. Department of Health and Human Services, Health Resources and Services Administration Pre-Doctoral Training in Primary Care Grant: 07/01/08-06/30/11, Award number: 1 D56HP10318-01-00.

P: 1

Human Sociality, Longevity, and DHEAS. B Campbell and L Barone. Department of Anthropology, University of Wisconsin-Milwaukee.

Humans are highly social and have long life spans, both traits that have been related to our large brains. The fact that a brain to body size ratio is associated with increased group size across primates, but not other mammalian orders, suggest that it is not just the quantity of social interactions that are different among primates, including humans, but their quality. At the same time, larger group sizes lead to increased possibly of conflict over limited resources, suggesting that some other factor must lower the cost of social interaction in humans and other primates that live in large groups. While defining the quality of a relationship is problematic, we suggest that quality can be conceptualized in terms of the relative physiological cost versus benefit of maintaining interactions with another group members. Here, we suggest that adrenal production of DHEAS, an anti-gluocorticoid, is one factor that helps to reduce the physiological costs of social stress in humans. More specifically, the release of DHEAS along with cortisol in response to stressful interactions may help to mitigate the impact of cortisol at the cellular level, particularly on mitochondrial function and the production of oxygen free radicals. Reduction of oxygen free radical damage would presumably result in a longer life span thus linking increased sociality and longevity in humans. Recent epidemiological studies linking DHEAS and the cortisol: DHEAS ratio with mortality in the aging provide support for a role of DHEAS in human longevity.

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The Shuar Health and Life History Project: The effects of market integration on intestinal helminth levels among the Shuar of Amazonian Ecuador. TJ Cepon,1,2 MA Liefert,1,2 SS Urlacher,2 JJ Snodgrass,1,2 FC Madimenos,1,2 LS Sugiymama1,2. 1Department of Anthropology; 2Institute of Cognitive and Decision Sciences, University of Oregon, Eugene, OR; 3Department of Human Evolutionary Biology, Harvard University, Cambridge, MA.

Market integration, defined as the suite of social and cultural changes that occur with rapid economic development, has been shown to alter levels of intestinal parasite exposure due to associated changes in diet, sanitation, and behavior. Some side effects of economic development such as increased consumption of processed food and altered sanitation practices result in decreased exposure to and virulence of certain pathogens, while other factors such as increased population density, poor water purification, and animal domestication can lead to higher pathogen exposure. This study examines the prevalence of parasitic intestinal helminths among the Shuar of Amazonian Ecuador in order to report preliminary data on the general infection rates and types of intestinal helminths infecting the Shuar, and to explore the effects of individual and household measures of market integration on parasite load. Anthropometric, health, and lifestyle data were collected from 63 Shuar participants (1–78 years old; 37 females, 26 males) living in a Shuar community in the Morona-Santiago province of Ecuador. Kato-Katz thick smears were made from fresh stool samples in order to report a standardized count of eggs per gram of feces for four types of intestinal helminths: tapeworm, roundworm, whipworm, and pinworm. 41% of individuals (43.8% of females; 38.5% of males) were infected with at least one type of intestinal helminths, the most prevalent being roundworm and whipworm. These data are analyzed in conjunction with household interview data to understand how market integration is affecting parasite burden among the Shuar.

Support: Ryoichi Sasakawa Young Leaders Fellowship Fund; Institute of Cognitive and Decision Sciences, University of Oregon; Department of Anthropology, University of Oregon; NSF Graduate Research Fellowship 2011109300.

POD IUM D: THURS., 3:30 p.m.

Toward a human biology of war. PF Clarkin. Department of Anthropology, University of Massachusetts, Boston, MA.

Over a decade ago, Leatherman and Goodman (1998) proposed that biological anthropologists and human biologists increase research efforts toward better understanding
what they termed the "biology of poverty." Similarly, we
now may be poised toward studying the human biology of
war. Historical records demonstrate that war consistently
creates an array of physiologically taxing stressors that
extend beyond competing military forces into nearby civil-
ian populations. Exposure to such stressors (infection, mal-
nutrition, psychological stress, etc.) may vary in duration,
but they result in predictable, though variable, biological
outcomes contingent on local circumstances. This article
reviews some of the epidemiological and biology literature
related to the various ways that war-related experiences
become embedded within human bodies. Additionally, it
suggests future potential areas of research, and delineates
possible approaches and pitfalls. Epidemiologists and hu-
manitarian organizations have led the way in studying
health outcomes in refugees and other groups affected by
war. However, human biologists and biological anthropolo-
gists—with their intellectual traditions rooted in evolution,
variation, and plasticity—may add substantively to the
understanding of such patterns that extend beyond physical
trauma and mortality into more subtle aspects of biology.
Furthermore, such a research agenda seems relevant in
applying human biology toward understanding "real life"
problems. Rather than viewing examples such as the Dutch
Hunger Winter or the Biafra famine as "natural experi-
ments" and opportunities for testing given hypotheses, it
seems necessary to maintain a complex perspective which
views war as an interaction of human agency and shifting
ecological conditions that impact health.

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The banana effect: Are past and/or present lifestyles
associated with ovarian hormone differences in women
from the two Germanys? C Deimel,1,2 VJ Vitzthum,1,2 FS
Schaeb,3 T Deschner3. 1Anthropology Department, Indi-
auna University, Bloomington, USA; 2Kinsey Institute for
Research in Sex, Gender, and Reproduction, Indiana
University, Bloomington, USA; 3Max Planck Institute for
Evolutionary Anthropology, Leipzig, Germany.

When the Berlin Wall fell in 1989, West Germans wel-
comed East Germans with bananas, a rare and high-priced
food in the former East. This fruit symbolized the well-
documented and long-term differences in economies and
lifestyles of the two Germanys. For example, West Ger-
mans are significantly taller than East Germans, which
suggests significant differences between the regions in
energy intakes and/or expenditures during childhood.
Based on data from Bolivian women, in whom body size is
positively correlated with progesterone levels, it may be
that the height and lifestyle differences between the two
pre-unification Germanys are paralleled by differences in
ovarian steroid levels. On the other hand, since reunifica-
tion, innumerable changes in the former East have made
these differences less apparent, particularly between them and
groups to the south, that allow comparison of factors that may have contributed to
observed epidemic outcomes. The Alaska sample consists of
130 communities separated into five geographical regions
related to both childhood and adult living conditions.

P: 22

A comparison of mortality in Alaska and Labrador during
the 1918-1919 influenza pandemic. J Dimka,1 SE Mame-
lund,2 L Sattenspiel1. 1Department of Anthropology,
University of Missouri Columbia; 2Division for Infectious
Disease Control, Dept Vaccines, Norwegian Institute of
Public Health.

Multiple communities in Alaska and Labrador experi-
enced severe mortality during the 1918–1919 influenza pan-
demic, some at rates up to 80–90%. A syndemic approach
that takes into account interacting factors such as multiple
health conditions, environment, socioeconomic status, and
government policies is a useful way to investigate how some
communities could be affected so seriously while others in
the same regions were relatively untouched. Despite cul-
tural continuity in Inuit populations spanning the Arctic
between the two regions, many differences are apparent,
particularly between them and groups to the south, that
allow comparison of factors that may have contributed to
observed epidemic outcomes. The Alaska sample consists of
130 communities separated into five geographical regions
within subregions. Environmental, geographic, political,
socioeconomic, biological, and cultural factors are suggested
in order to highlight explanatory variables that should be
considered in further analyses.

Support: Government of Canada-Canada Studies Fac-
ulty Research Grant Program, MU Research Council, UM
Research Board.

P: 10

Relationship between trace elements in placenta and
birth outcomes in mother–infant pairs of low
socioeconomic status, from the Albany Pregnancy Infancy
Concern over exposure to toxicants and effects on the human physiology continues. Day to day activities can lead to chronic exposure and accumulation of many trace elements, many of which are not essential and may be harmful, even at levels previously thought to be safe. Other trace elements are essential in small amounts for proper cellular function but may also be toxic at far higher levels. Using data from APILS, the Albany Pregnancy Infancy Lead Study, a study of mother–infant pairs of low socioeconomic status living in Albany County, NY conducted from 1992 to 1998, the placental tissues were analyzed to determine the influence of elemental concentrations on birth outcomes, specifically weight and length. This study examined 39 trace metals, consisting of 160 specimens of each placenta body, membrane, and umbilical cord, and tested their relationship to birth weight and length using bivariate correlation analysis. Several trace elements were significantly associated with increased weight while others with decreased weight. These initial findings indicate that background exposure to trace elements are related to birth outcome but the issue of what is a tolerable level of each metal, amount of protection provided by the placenta, if it contains higher levels as a means of barrier for the fetus, needs to be clarified. Further analysis will involve multivariate methods to examine these relationships more precisely.

PLENARY: WED., 1:15 p.m.

Developmental and evolutionary components of human adaptation to high altitude environments. AR Frislancho, Department of Anthropology, University of Michigan.

A major goal of high altitude research has been to determine the role of genetic and developmental factors that account for individual and population differences functional adaptation. Within this framework nearly 40 years ago we proposed the concept of developmental adaptation to explain the origin of individual and population differences in functional traits. Specifically, we postulated that environmental influences and responses during the period growth and developmental can shape adult biological outcomes. Experimental and population based research suggest that a large proportion of the functional traits that contribute to successful cardiovascular adaptation of the high-altitude native and distinguish them from low altitude natives is related to adaptations and responses during growth and development made to the high altitude environment. This presentation will review: (a) similarities and differences in the developmental pattern of growth of high altitude populations, (b) role of development in the attainment of functional adaptation of Andean high altitude populations, and (c) the ecological and geographic origins that contribute to the different developmental expression of Andean and Tibetan high-altitude populations.

PODIUM B: THURS., 11:00 a.m.

Stressing out: Stress and adolescent nutritional health in Mississippi. KP Garza,1 M Shepherd,2 ET Abrams,1 WR Leonard2.1Department of Anthropology, University of Illinois at Chicago, Chicago, IL; 2Endocrinology Associates, Tupelo, MS; 3Department of Anthropology, Northwestern University, Evanston, IL.

Childhood obesity is a major problem in the U.S. While much research has focused on the contributions of diet and activity to childhood obesity, less attention has been given to stress. Increases in stress induce hormonal changes that affect adiposity, insulin resistance, and blood pressure. However, the experience of stress is subjective, and thus to properly assess its health effects, the relevant sources of anxiety and pressure for a given group must be identified. In this study, we identified major stressors in the lives of adolescents living in the area of Tupelo, Mississippi, and examined their influence on changes in the body mass index (BMI). A sample of 13 adolescents (four males; nine females) with Metabolic Syndrome or Type 2 Diabetes was recruited through an endocrinologist’s office. The subjective experience of stress was captured via interviews and surveys; data on heights (cm) and weights (kg)
at time of diagnosis and at the two most recent office visits were obtained from medical records. In this sample, conflict at home over healthcare management was the most prominent stressor, and it was associated with increases in BMI from baseline diagnosis (P < 0.06). In contrast, standard scales did not capture the key stressors for teens in this sample, and were not correlated with changes in BMI. These findings indicate that future studies must account for teen-specific measures of stress to better understand the effects of stress on health.

Supported by funding from the Department of Anthropology & the Undergraduate Research Committee, Northwestern University.

P: 57

Hot flashes and midlife symptoms in relation to levels of salivary cortisol. LM Gerber,1 LL Sievert,2 and JE Schwartz3,4; 1Department of Public Health, Weill Cornell Medical College; 2Department of Anthropology, University of Massachusetts Amherst; 3Center for Behavioral Cardiovascular Health, Columbia University, and 4Department of Psychiatry, Stony Brook University.

Some laboratory studies have shown an increase in plasma cortisol levels with hot flashes. Increases in urinary cortisol levels have been associated with more severe hot flashes. This study examines the relationship between salivary cortisol levels and hot flashes at midlife. Salivary cortisol levels were also examined in relation to total number of symptoms at midlife. Participants included 145 women aged 19 to 65 with salivary cortisol measures at waking, 30 minutes after waking, 1 hour before bedtime, and at bedtime. The cortisol awakening response (CAR) and cortisol daily decline (CDD) were also examined. Women reported the presence or absence of 23 symptoms, including hot flashes, during the past 2 weeks. Symptoms were summed, and those in the top quartile of total number of symptoms were compared with all others in relation to cortisol levels. Medians and distributions of cortisol levels were compared by hot flash report and menopause status. Median salivary cortisol levels were higher at waking (10.19) and 30 minutes after waking (12.80) compared with 1 hour before bedtime (2.40) and bedtime (1.90). Salivary cortisol levels were not significantly associated with hot flashes or with menopause status. Salivary cortisol levels did not differ between women in the highest quartile of symptom totals and those in the rest of the sample. A limitation of the study is that cortisol levels were sampled over a 24-hour period while hot flashes reported over 2 weeks. Symptomatic women—defined by hot flash report or symptom total—were not found to have higher cortisol levels.

Supported by NIH (P01HL47540 and R24HL76857).

PODIUM A: THURS., 9:00 a.m.

Is there a prolactin paradox in human males? Prolactin, fatherhood, and reproductive behavior in a large sample of Filipino men. LT Gettler,1 TW McCade,1 AB Feranil1,2 CW Kuzawa1,2, 1Department of Anthropology, Northwestern University, Evanston, IL; 2Office of Population Studies Foundation, University of San Carlos, Cebu City, Philippines.

Little is known about the hormonal architecture that underlies human paternal care. In some species, prolactin rises when males care for dependent offspring, but it is unknown if this occurs in human fathers. Here we draw on a large sample of men (n = 295; age 21.5 – 0.3 at baseline) residing in Metro Cebu, Philippines, to evaluate relationships between prolactin and components of male reproductive strategy. Prolactin was assayed from dried blood spots collected in 2005. At baseline (2005), fathers had higher prolactin than single non-fathers (P < 0.05), and fathers of infants had higher prolactin compared with fathers of older children (P < 0.05). Among single non-fathers at baseline, prolactin did not predict who had transitioned to new fatherhood by follow-up (2009) 4.5 years later (P > 0.2). These findings suggest that among men who were fathers at baseline prolactin may have shifted during or after their transition to parenthood, with effects greatest among fathers of infants. Contrary to expectations, fathers’ prolactin at baseline predicted lower paternal care at follow-up (P = 0.051), which became nonsignificant (P > 0.1) after adjustment for socioeconomic status and psychosocial stress. Additionally, non-fathers with higher prolactin reported more lifetime sexual partners (P < 0.05). Our results demonstrate that in this cultural setting fathers have higher prolactin than nonfathers, which is consistent with expectations from cross-species comparisons. However, we also uncovered novel relationships between prolactin and male reproductive behavior that hint at distinct roles of the hormone in males compared with females.

This work was supported by: Wenner Gren Foundation (Gr. 7356; Gr. 8186), National Science Foundation (BCS-0542182; BCS-0962212), Cells to Society (C2S), Northwestern University: Student Research Grant, The Interdisciplinary Obesity Center (RR20649), and The Center for Environmental Health and Susceptibility (ES10126; project 7-2004-E). LTG was supported by a National Science Foundation Graduate Research Fellowship during write-up.

PODIUM C: THURS., 3:00 p.m.

AFK weekend project: A correlative study on electronic media usage and genetic polymorphisms in Binghamton University. AJ Gonzalez,1,2 SM Schmitt,1,3 C Sun,1 R Spathis1,2,4 CW Chan1,2,4 K Sankaranarayanan,3,5 JK Lum1,4,5 1Laboratory of Evolutionary Anthropology and Health; 2Laboratory of Biomedical and Neurosciences; 3Integrated Neuroscience Department; 4Department of Anthropology; 5Department of Biological Sciences, Binghamton University, State University of New York, Binghamton, NY.

In the rapidly expanding electronic age, humans are being increasingly exposed to various forms of media and devices such as computers and cell phones. Our reliance upon this technology is already extending to the point where it may be difficult to live without it. This is particularly uncomfortable for some. To test this possibility, participants were asked to abstain from internet use for 1 day and self-report on their normal electronic media usage and life histories in addition to providing a DNA sample. Participants were made up of 73 individuals, both male and female, and were recruited from Binghamton Univer-
sity’s staff and student populations. The participants’ answers to the questionnaires were compared with their genetic polymorphisms for several loci, many of which have previously been shown to correlate with human behavioral variation, such as susceptibility to depression. Genes such as DRD2, DRD4, and Serotonin 5HTTLPR have already been tested. Thus far it has been shown that there is a significant correlation between DRD4 fragment length polymorphisms and their preference for either internet based communication or face to face interaction with a non-specific individual. Participants with no alleles more than four repeats preferred electronic communication \((P < 0.05)\). We suspect that individuals who are more genetically prone to anxiety and depression would prefer less personal forms of communication with peers and that certain genotypes would correlate with their amount of internet usage. Further study is in progress for more loci and will give additional insight into how individuals use these new technologies.

Funding: Undergraduate Award for Research and Creative Work, by Harpur College and the Binghamton Foundation, Binghamton University.

P: 5

What selective forces produced eco-geographic patterns in human mid-facial morphology? RL Hall, 1 JR Halliwill, 2 M Bridgmon 2. 1Department of Anthropology, Oregon State University, Corvallis; 2Department of Human Physiology, University of Oregon, Eugene.

Biological anthropologists have long described geographic patterns of mid-facial morphology in crania and living people. Relatively tall, narrow nasal structures characterize people in cold, dry habitats, while short, broad noses characterize tropical populations. Explanations for this pattern consider the anatomy and function of the nasal airway in conserving heat and moisture in cold, arid regions, and dissipating heat in tropical climates, but have not been established experimentally. Here we report on a pilot study examining the temperature of expired air of 12 young adult male subjects in two temperature and humidity regimes at the University of Oregon’s climate chamber: a typical lab temperature of 20°C and relative humidity 65% (specific humidity ~11.2 g/kg) and a cold, dry room of ~12°C and relative humidity of 62% (specific humidity ~1.2 g/kg). In separate trials allowing nose-only and mouth-only breathing, expired temperatures were consistently lower during nose-only breathing. Differences between inspired and expired temperatures in each type of breathing were correlated with mid-facial measurements and produced differing results. Nasal height and the distance from nasion to the plane connecting left and right tragion were stronger during nose-only breathing in the cold regime. In the lab temperature trial, inspired—expired temperature differences correlated positively with nasal breadth in mouth-breathing and negatively in nose-breathing. Establishing heat conservation as the selective mechanism for midfacial variation will require a larger and more diverse sample. This article presents theory, methods, and results and compares human breathing adaptations to those of other animal species.

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Project REPA (Reproduction & Ecology in Provincia Aroma): The predictability of women’s progesterone concentrations from cycle to cycle. AL Harris 1 and VJ Vitzthum 1, 2. 1Department of Anthropology; 2The Kinsey Institute for Research in Sex, Gender, and Reproduction, Indiana University, Bloomington, IN.

Studies of women’s reproductive hormones often assume that, in the absence of some observed energetic or other stressor, intradividual ovarian steroid concentrations vary little from one cycle to the next (or are less variable than between-woman differences in hormone concentrations). Whether these assumptions are, in fact, warranted is critically important for both clinical and anthropological research. Most studies of premenopausal women’s ovarian functioning have relied on a single day’s sample from an entire cycle or, at best, sampled multiple days over the course of only one cycle, regimes which may not yield an accurate measure of a woman’s typical age-specific hormone concentrations. A handful of investigators have examined within-woman intercycle variability, but none has done so in a large sample of women from a nonindustrialized natural fertility population. Cycle patterns in these women may differ from those in women from contemporary industrial/postindustrial populations for several reasons (e.g., natural-fertility women have fewer sequential cycles; women in nonindustrialized populations have relatively more similar lifestyles than those in more modernized settings). To address this current gap in knowledge and to inform future research designs, we tested the hypothesis that age-specific intercycle variation in progesterone concentrations is relatively low in a sample of rural Bolivian women who had participated in Project REPA. Vaginal bleeding patterns and every-other-day saliva samples (subsequently assayed for progesterone) were collected from nearly 200 women for up to eight sequential cycles. In addition, unlike previous studies, we distinguish anovulatory cycles and evaluate the impact of their inclusion in analytical samples.

Supported by US National Science Foundation Grants SBR 9506107 and 9507320.

POD IUM C: THURS., 2:30 p.m.

Reduced breastfeeding duration associated with body image concerns in overweight women LE Hauff 1 and EW Demerath 2. 1Division of Nutritional Sciences, Cornell University, Ithaca, NY; 2Division of Epidemiology, School of Public Health, University of Minnesota, Minneapolis, MN.

Women with high prepregnancy body mass index (BMI) have shorter breastfeeding duration compared with women of normal BMI, yet the explanation(s) for this relationship is not fully understood. As obesity increases globally, it is important to identify explanations so that overweight women and their infants can realize the full benefits of breastfeeding. Here, we demonstrate that breastfeeding duration differs by prepregnant maternal overweight status, and explore whether body image con-
The "Community Effect" in growth regulation. M Hermesnussen,1 C Alßmann,2 K Staub3. 1Christian-Albrechts University, Altenhof, Germany; 2Bamberg, Germany; 3Zurich, Switzerland.

Human growth is envisaged as a target seeking process regulated by genes, nutrition, health, and an individual's social and economic environment. The increase in height during the last 150 years, conventionally explained by the steady improvement of living conditions, however, points toward an "additional target." At the population level, height tends to converge into narrow clusters. The average 19th century European conscript just reached the modern 5th percentile of adult height. Almost nobody reached the modern 90th percentile. Vice versa, modern men—even those who were raised under unfortunate social and physical circumstances—almost never stay below average mid-19th century height. Using Bayesian estimation, we find evidence for an association between the growth rate of an individual and average height of the population. The model indicates that the community sets a target for final height. Adolescents growing up in short-stature communities will grow less and remain shorter than adolescents from tall-stature communities. Social interactions appear to strongly target height. Recent evidence on modern Swiss conscript height at the district level further questions the concept of a fixed target in growth. Average male adult height differs by up to 6 cm among the various mountainous regions. But neither nutrition, nor genetics nor socioeconomic characteristics appear to adequately explain the differences in height at the district level. The regulator of height appears to be the mere physical distance between adolescents: living closely together in districts within the same valleys results in similar average height, living in districts separated by mountains allows differences in average height of up to 6 cm.

Global climate change is having a dramatic effect on species' distribution boundaries. As a result, there is an increased effort to understand disturbance dynamics and how this impacts human population health, either by endangering key food species or affecting the density and distribution of animal hosts. The people and places of the north are affected by climate change at rates and magnitudes much faster and more immediate than elsewhere in the world. As a result, diseases of largely tropical origin are spreading rapidly into areas with naïve populations, ill-equipped to respond medically, culturally, and possibly genetically. The focus of this article is to present an assessment of circumpolar genetic epidemiology relative to highly prevalent vector-borne diseases. Lymphatic filariasis, onchocerciasis, malaria, and West Nile Virus have vectors already present in the Arctic, rendering rapid disease dispersal highly likely. We include here a brief review of these diseases, associated genetic resistances or
increased susceptibilities, and allelic variation in putative circumpolar populations. We also present our case study on West Nile Virus and CCR5 variation, which confers resistance to those carrying the 32 basepair deletion.

**P: 15**

Obesity, behavior and the built environment: Impacts of Western fast food on childhood overweight and obesity in China. KM Houck, AL Thompson. Carolina Population Center, University of North Carolina, Chapel Hill, NC.

Although dietary intake and physical activity are traditionally accepted as the proximal determinates of overweight and obesity, recent evidence indicates that targeting individual-level behaviors has little effect on the prevalence of obesity in the developed world. Evidence from the US indicates that the density of fast food restaurants at the neighborhood-level significantly interacts with fast food consumption and physical activity in increasing obesity, highlighting the potential importance of the built environment. To better understand the relationship between the built environment and obesity in populations undergoing rapid urbanization in the developing world, this study uses data from 889 children and adolescents aged 6 to 18 years in the 2006 wave of the China Health and Nutrition Survey, a longitudinal study of 4,400 households from seven provinces in Eastern China, to investigate whether fast food consumption mediates the effect of fast food availability on increasing individual-level risk of childhood overweight and obesity. In communities with Western fast food restaurants, 45.7% of kids recently consumed fast food; yet in communities without fast food availability 19.4% of kids consumed fast food suggesting that availability alone does not predict fast food consumption. When examining the effects on childhood overweight and obesity with multilevel logistic models, overall measures of urbanicity and availability of fast food are strong predictors. However, fast food consumption mediates this relationship. These results indicate that individual behaviors interact with broader social and environmental factors to predict obesity risk in China.

Population Research Training (the T32 Training grant from NIH): 5 T32 HD007168 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD).

**PODIUM B: THURS., 10:45 a.m.**

The timing of adrenarche among Bangladeshi and British youth. LC Houghton, GD Cooper, M Booth, R Troisi, HA Katki, RG Ziegler, RN Hoover, OA Chowdhury, GR Bentley, Department of Anthropology, Durham University, UK; Division of Cancer Epidemiology and Genetics, National Cancer Institute, USA; Sylhet MAG Osmani Medical College, Bangladesh.

Adrenarche, or puberty of the adrenal gland, is a life stage unique to humans and some Great Apes, but its role in the developmental process remains unclear. Earlier data from Bangladeshi migrant women in the UK suggest that migrating before adrenarche influences adult reproductive steroid levels. Therefore, we propose that adrenarche may be a critical window for setting adult reproductive function. The Adrenarche among Bangladeshi and British Youth (ABBY) Project is designed to explore if the developmental environment affects sex steroid levels and the age at which girls reach adrenarche. Healthy girls (n = 488) between the ages of 5 and 16 years born and/or growing up either in London, UK or Sylhet, Bangladesh were recruited into the study. These areas were chosen as sister field sites because of the different developmental environments and history of migration between the two countries. Participants were assigned to one of four groups: British (n = 90), British-Bangladeshi first generation (n = 44), British-Bangladeshi second generation (n = 162), or Bangladeshi (n = 192). Girls from all field sites answered structured questionnaires including the Pubertal Development Scale, and provided anthropometrics and biomarkers including urine and saliva samples. Here we test the hypothesis that Bangladeshi girls growing up in Sylhet, an environment with higher disease exposures, will exhibit lower DHEA-S concentrations and reach adrenarche later than both Bangladeshi migrant and white British girls growing up in the UK. We present our results from comparing salivary DHEA-S across groups and generate future hypotheses in relation to the evolutionary origins of adrenarche.

**P: 63**

Does residency status impact the gestation period and birth outcomes in Samoan women? M Howells, R Bender, D Dufour, J Ah Ching, B Muu‘sau. Department of Anthropology, University of Colorado, Boulder; LBJ Tropical Medical Center, American Samoa; Department of Health American Samoa.

This study examines the impact of residency status on gestation length and birth outcomes in Samoan women living on the island of Tutuila, American Samoa. Residents pay reduced medical fees, have stronger support networks and generally enjoy better wages with greater job security. We reviewed the medical charts of 303 Samoan women (201 residents, 102 nonresidents) who gave birth in American Samoa between December 2010 and April 2011 for residency status, sociodemographic variables, number of prenatal care (PNC) visits, gestation length, and birth outcomes (weight and length). Two sample t-tests showed no significant differences between residents and nonresidents in PNC (P = 0.074), gestation length (P = 0.109), neonate weight (P = 0.197), or neonate length (P = 0.324). We used multiple linear regression models to assess the effect of PNC on gestation length, neonate weight, and neonate length, as well as the effect of gestation length on neonate weight and length. Interaction terms were included to determine whether the relationships between these variables were different between residents and nonresidents. The interaction terms indicated a greater positive effect of prenatal care on gestation length among nonresident women as compared to resident women (multiple regression, P < 0.01); however, gestation length had a smaller positive impact on neonate weight in nonresidents (multiple regression, P < 0.05). The multiple linear regression models did not show a significant effect of PNC on either neonate weight or length. These results
suggest that nonresidents may require more PNC to achieve the same gestation length and neonate weight as residents.

This study was funded by NSF DDIG 1028966, and a Dissertation Fieldwork Grant from the Wenner Gren Foundation.

P: 9

Cross-National comparison of impact of caregiving on health and well-being using SAGE data. GH Ice,1 AFA Sadruddin,1 SR Williams2. 1Department of Social Medicine, Ohio University, Athens, OH; 2Department of Anthropology, Purdue University, West Lafayette, IN.

Studies of grandparent caregivers in the U.S. have documented that caregiving has multiple effects on human biology and health. The HIV/AIDS epidemic has resulted in an increase in orphans in developing countries and thus an increase in caregiving. In many places in the world, grandparents play a larger role in the care of grandchildren, even in the absence of deceased parents. Therefore, we might expect variation in the impact across populations. This article examines the impact of caregiving in four countries from the WHO SAGE database, India (N = 6,372, age = 61.9 ± 9.4), Mexico (n = 1,844, age = 69.0 ± 9.4), Ghana (N = 4,186, age = 64.2 ± 10.7) and South Africa (N = 3,639, age = 62.7 ± 9.7). Data were collected from a probability samples within each country including extensive interviews and several health biomarkers. Overall, there was little impact on the health of elders across countries. Caregiving had relatively little impact on health across the different countries. Caregiving had little impact on body habitus, although Ghanian CG were larger than non (P < 0.05) and Indian and Mexican caregivers had lower WHR (P < 0.05). In all countries, if there was a difference in cardiovascular health, it was generally better among caregivers. On the other hand, function and affect were generally worse among caregivers when there was a difference. In all countries, among those who reported that caregiving had produced significant burden had higher stress and lower function and quality of life. This suggests that caregiving is not a universal stressor on human biology but rather the impact depends on the country and level of burden.

P: 14

Heightened diurnal endocrine levels in healthy women with a family history of hypertension. GD James. Decker School of Nursing and Department of Anthropology, Binghamton University, State University of New York, Binghamton, NY.

Previous studies suggest that otherwise healthy individuals who have a family history of hypertension (FH+) have an accentuated reactive rise in catecholamines and cortisol to laboratory stressors compared with those with no family history (FH–); however, few if any studies have evaluated whether the diurnal variation of these hormones in FH+ subjects is also greater. The purpose of this study was to compare the variation in diurnal urinary catecholamines (epinephrine and norepinephrine) and cortisol excretion as well as ambulatory blood pressures (BP) between women with (FH+) (N = 62, age = 35.2 – 9.1) and without (FH–) (N = 72, age = 33.8 – 10.0) a family history of hypertension. The women all worked in clerical, technical, or professional positions at a major medical center in NYC. Urinary hormone excretion rates and ambulatory BP were measured across three contrasting daily microenvironments: work (11 AM–3 PM), home (approximately 6 PM–10 PM) and during sleep (approximately 10 PM–6 AM). History group comparisons by microenvironment were made using MANCOVA models. The results of the analyses show that daily epinephrine excretion among FH+ women was 36% higher than FH– women (P < 0.008) over the entire day, and that the diurnal variation of cortisol excretion was also greater among FH+ women (P < 0.045). FH+ women also had statistically significantly higher systolic BP (4 mm Hg higher; P < 0.01) and diastolic BP (2 mm Hg higher, P < 0.03) compared with FH– women over the whole day. These findings suggest that there may be genetically-linked mechanisms which elevate tonic epinephrine levels and diurnal cortisol variability that contribute to the development of hypertension.

Supported by NIH grant HL47540.

P: 30

Eighty year trends in infant weight and length growth: The Fels Longitudinal Study. W Johnson,1 AC Choh,2 LE Soloway,3 SA Czerwiniski,2 B Towne,2,4 EW Demerath1. 1Division of Epidemiology and Community Health, University of Minnesota, Minneapolis, MN; 2Department of Community Health, Wright State University, Dayton, OH; 3New York State Cancer Registry, Albany, NY; 4Department of Pediatrics, Wright State University, Dayton, OH.

Few published studies exist on secular trends in infant growth, and those available have assessed trends over short periods in the second half of the 20th century, and didn't account for the possibility that a trend in increasing size may be explained by a trend in the maturational clock as greater size is often a function of developmental pace. Here, we investigate secular trends in weight and length growth from birth to 3 years in infants born 1930–2008, and assess whether these trends were mediated by concurrent trends in pace of infant skeletal maturation and maternal BMI. Longitudinal weight and length data from 620 (302 girls) infants were analyzed using mixed effects modeling to produce growth curves and predicted anthropometry for infants born 1930–1949, 1950–1969, 1970–1989, and 1990–2008. Significant associations of cohort with growth were observed, with the most pronounced differences occurring in the first year of life. Infants born after 1970 were ~450 g heavier and ~1.4 cm longer at birth, but demonstrated slower growth to 1 year, than infants born before 1970. Growth trajectories converged after 1 year of age, and there was no evidence that relative skeletal age, maternal BMI, or maternal age together mediated associations between cohort and growth. Recent birth cohorts may be characterized not only by greater birth size, but also by subsequent catch-down growth. Pediatricians should be aware that trends over
time in human growth do not increase monotonically, and that growth velocity in the first year may actually have declined compared to preceding generations.

Financial disclosure: This study was supported by grants from the National Institutes of Health: R01 HD012252 and R01 HD053685.

P: 41

Impact of meal timing and frequency on nutrient utilization and metabolism: Adaptive implications. SL Johnston. Department of Anthropology & Sociology, West Chester University, West Chester, PA.

Humans, like mammals in general, are metabolically programmed, through evolutionarily-derived internal clocks entrained to circadian cycles, to eat soon after waking and periodically during the waking hours. Research suggests that eating fewer than three meals a day, perhaps depending on timing in relation to circadian and ultradian cycles, may exact costs in domains with applicability to survival and reproduction, especially over the long term, including energy and nutrient intake, nutrient utilization, energy expenditure, physical and cognitive performance, and health. It appears that meal timing, food deprivation, and caloric restriction also affect circadian cycles. Other work, primarily with rodents and monkeys, indicates that intermittent fasting improves glucose utilization, reduces oxidative damage, and increases stress resistance. The question of whether there is a particular meal frequency or pattern, or a range of patterns, to which humans are biologically adapted has yet to be definitively answered. Many humans skip meals by choice or necessity. Some people have a decidedly nonmammalian pattern including lack of appetite and even food-associated nausea in the morning hours that prevent eating at that time. A clinical condition termed the night-eating syndrome involves morning anorexia, evening hyperphagia, and nighttime awakenings with frequent snacking episodes; people with this eating pattern are prone to obesity. This article explores the impact of timing and pattern of eating on nutrient utilization and metabolism by examining these and other lines of evidence from human and analog studies in order to further develop an understanding of the evolutionary dimensions of human meal patterns.

P: 26

Genome-wide Complex Trait Analysis (GCTA) as a method to quantify missing heritability in Parkinson's disease. MF Keller,1,2 MA Nalls,2 A Singleton1. 1Department of Anthropology, Temple University, Philadelphia, PA; 2Laboratory of Neurogenetics, National Institute of Health-National Institute on Aging, Bethesda, MD.

Genome-wide association studies have been successful at identifying SNPs highly associated with common traits, however, a great deal of the heritable variation associated with common traits remains unaccounted for within the genome. Genome-wide Complex Trait Analysis (GCTA) is a statistical method developed by Peter Visscher used to estimate phenotypic variance of complex traits explained by genome-wide SNPs, including those not associated with the trait in a Genome Wide Association Study (GWAS). We applied this method to eight cohorts containing 6,057 case and 17,471 control individuals of European ancestry, in order to examine the missing heritability present in Parkinson's disease, a neurodegenerative disorder affecting between 1% and 2% of individuals over the age of 65. We meta-analyzed our initial results to produce more robust and generalizable heritability estimates for PD types. Our results identify 36% ($P = 6.47E-06$) of phenotypic variance associated with all types of PD, 51% ($P = 3.91E-04$) phenotypic variance associated with early onset PD, and 39% ($P = 2.55E-05$) phenotypic variance associated with late onset PD. This is a substantial increase from the genetic variance identified by GWAS alone (between 1% and 3%). Our results suggest that while GWAS is a useful tool in identifying some of the most common variants associated with complex disease, a large portion of the heritability associated with disease traits remains unattributed.

P: 7

Behavioral adaptations to minimize postpartum hemorrhage. GL Kemner,1 CL Patil,2 ET Abrams3. ¹Honors College and ²Anthropology Department, University of Illinois at Chicago, Chicago, IL.

Postpartum hemorrhage (PPH) is the leading cause of maternal mortality worldwide, accounting for up to 35% of maternal deaths. PPH-related death rates are likely to have been as high or higher in the past. After a parturient woman has lost a lot of blood, the main treatment is blood transfusion, an option that is largely available only in resource-rich countries. However, during delivery, excess postpartum bleeding, which is often associated with a retained placenta, can be managed by a simple method promoted by the World Health Organization, the active management of the third phase of labor. This method incorporates three components: controlled cord traction, in which an attendant gently but firmly grasps the umbilical cord to help guide the placenta out; uterine massage, which stimulates muscular contraction; and injections of drugs like Pitocin (synthetic oxytocin), which induce uterine contractions. In this article, we marshal evidence from published accounts and interviews with traditional birth attendants (TBAs) in rural Tanzania to argue that many interventions by TBAs achieve the effects of active management. Furthermore, we argue that the ubiquity, diversity, and effectiveness of these interventions suggest an ancient origin of these behavioral interventions in the management of PPH.

P: 48

The Testosterone Awaking Drop: Rapid postwaking decline in testosterone in males and females. CW Kuzawa, LT Gettler, ZM Thayer, TW McDade. Dept of Anthropology, Northwestern University, Evanston, IL.

Immediately upon waking, cortisol rapidly rises to peak levels before beginning a gradual decline across the day.
Little is known about whether testosterone (T), which follows a similar circadian pattern, might also experience a rapid change upon waking. Here we report T measured in saliva obtained at waking, 30 minutes after awakening, and before bed. Data come from 120 male and 19 female participants in the Cebu Longitudinal Health and Nutrition Survey, in Cebu City, Philippines. Between waking and bedtime, T declines 78 and 29 pg/ml in males and females, respectively. We find that 62% (male) and 65% (female) of these across-day declines are already achieved within 30 minutes of waking. We hypothesized that the magnitude of the waking T drop would relate inversely to the magnitude of concurrent postwaking rise in cortisol measured in the same samples. Contrary to predictions, males and females with higher cortisol awakening responses also had modestly but nonsignificantly smaller declines in T after waking. In conclusion, we find that testosterone levels decline rapidly soon after waking in both males and females. Although this response is in the opposite direction to the marked postwaking rise in cortisol, individuals with higher cortisol rises also had less severe declines in T. Additional research is needed to identify the determinants of the magnitude of the "testosterone awakening drop" and any functional and behavioral implications of this rapid endocrine shift.

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Increase in grip strength to cross-sectional area ratios among modernized populations in Vanuatu. G Lee,1 CW Chan,2,3 A Pomer,1,2 C Sun,1,2 KM Olszowy,1,3 H Silverman,1,2 KN Dancause,5 C Weitz,6 JK Lum,1,2,4 RM Garruto,1,3,4 1Department of Anthropology; 2Laboratory of Evolutionary Anthropology and Health; 3Laboratory of Biomedical and Neurosciences; 4Department of Biological Sciences, Binghamton University, State University of New York, Binghamton, NY; 5Psychosocial Research Division, Douglas Hospital Research Center, McGill University, Montreal, Canada; 6Department of Anthropology, Temple University, Philadelphia, PA.

Within the last three decades, Vanuatu has seen drastic changes due to the rapid rate of modernization. In order to observe the changes of health as a result of modernization, data were obtained across four islands of Vanuatu during the summer of 2011. The data indicate that the increase in modernization increases the overall ratios of grip strength to cross-sectional areas of populations for men 19 years of age and older. According to preliminary data analysis, the highest maximum grip average to cross-sectional lean area ratio is 0.79 in Efate, which is the most developed island and home of the urban capital, Port Vila. In addition, Nguna, a close island to Efate, has a maximum grip average to cross-sectional lean area ratio of 0.76. The data here reveals that the men on both islands are relatively the same in strength when comparing greatest gain per cm² on average. In contrast, Ambae and Anentum, two islands far from Efate and comparatively less developed, have maximum grip average to cross-sectional lean area ratios of 0.55 and 0.52, respectively. This does not mean that all men in modernizing areas are stronger and bigger, but rather portrays the potential increase of strength of the population of those who have access to more resources. Whether modernization is an attributing factor in increasing the relationship between grip strength and lean area is a question that will be ascertained with further analysis of the data.


The Indigenous Siberian Health and Adaptation Project: Seasonality in thyroid function and metabolic health among the Yakut (Sakha) of Eastern Siberia. SB Levy,1 WR Leonard,1 LA Tarskaia,2,3 TM Klimova,4 VI Fedorova,5 ME Baltakhinova,6 VG Krivoshapkin,4 JJ Snodgrass,5,6 1Department of Anthropology, Northwestern University, Evanston, IL; 2Institute for Molecular Genetics, Russian Academy of Sciences, Moscow, Russia; 3Department of Anthropology, University of Kansas, Lawrence, KS; 4FSRI Institute of Health, Republic of Sakha/Yakutia, Yakutsk, Russia; 5Department of Anthropology and 6Institute of Cognitive and Decision Sciences, University of Oregon, Eugene, OR.

Human circumpolar populations face extreme seasonal variation in both temperature and day length. Previous work has shown that exposure to long and severe winter conditions results in a constellation of physiological and metabolic changes known as “Polar T3 syndrome.” However, most of this research has focused on the responses of nonindigenous, short-term residents to circumpolar environments, with little information on populations that are native to these regions. Thus, the purpose of this study is to examine seasonal changes in thyroid function and metabolic health among an indigenous population of northeastern Siberia, the Yakut (Sakha). Data on body weight and composition, and serum measures of thyroid hormones, lipids, and glucose were collected on a sample of 57 men and 83 women from the village of Berdyges-takh during July/August of 2009 and January of 2011. Both Yakut men and women showed significant declines in free thyroxine (T4) and triiodothyronine (T3) from summer to winter, whereas thyroid-stimulating hormone (TSH) levels were significantly increased in men, but not women. In addition, Yakut men and women experienced significant increases in body weight, BMI, and waist circumference during the winter, but not significant increases in percent fatness. Serum lipid (triglycerides and HDL) and glucose levels also significantly increased in both sexes during the winter. These results are consistent with previous studies of Polar T3 syndrome, and suggest that seasonal changes in thyroid hormone levels are promoting mobilization of energy sources (lipids and glucose) and increased metabolic turnover during severe winter conditions.

Support: NSF ARC-0802390; Northwestern University; University of Oregon; FSRI Institute of Health.
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The Shuar Health and Life History Project: The relationship between market integration and diurnal salivary cortisol rhythms of children in an indigenous lowland Ecuadorian population. MA Liebert,1,2 JJ Snodgrass,1,2 TJ Cepon,1,2 SS Urlacher,3 FC Madimenos,1,4 LS Sugiyama1,2,4. 1Department of Anthropology; 2Institute of Cognitive and Decision Sciences, University of Oregon, Eugene, OR; 3Department of Human Evolutionary Biology, Harvard University, Cambridge, MA; 4Center for Evolutionary Psychology, University of California, Santa Barbara, CA.

Research suggests that increasing market integration (MI) influences adult psychosocial stress by presenting new sources of socioeconomic status that align with Western perspectives but diverge from indigenous systems. This altered perspective can increase the discrepancy between aspirations and the means to attain them, thereby contributing to chronic psychosocial stress, dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis, and negative health outcomes. However, little is known about children's psychosocial stress response to MI, and limited studies have measured the diurnal cortisol rhythms of children in non-Western populations. The Indigenous Shuar of Ecuadorian Amazonia are experiencing rapid social and cultural changes due to increasing MI, which provides an opportunity to examine the effects of MI on children's psychosocial stress. This preliminary study examines the relationships between children's diurnal salivary cortisol rhythms, individual health, and factors associated with cultural and economic change in a community sample of 42 Shuar children (23 females, 19 males; aged 3–16 years) and 15 coresident adults. Saliva samples were collected three times per day (waking, 30 minutes postwaking, late afternoon/evening) for three consecutive days to examine diurnal cortisol rhythms and the cortisol awakening response (CAR). Standard anthropometric dimensions (height, weight, skinfold thickness) were collected, and measures of MI were obtained using economic, lifestyle, and household food frequency interviews, which were reduced by principal components analysis. Multiple regressions were used to test the association between children's diurnal cortisol rhythms, health markers, and MI factors. This study identifies important relationships between cultural change, individual health, and psychosocial stress among children.

Support: Institute of Cognitive and Decision Sciences, University of Oregon; NSF Graduate Research Fellowship 2011109300; Anthropology Department, University of Oregon; Ryoichi Sasakawa Young Leaders Fellowship Fund.

PLENARY: WED., 1:00 p.m.

Introduction to the Plenary Session. MA Little,1 RB Thomas,2 and RM Garruto1. 1Department of Anthropology, Binghamton University, State University of New York; 2Department of Anthropology, University of Massachusetts, Amherst.

Terrestrial high elevations are areas around the globe where tens of millions of people reside and derive their livelihood from a traditional lifestyle of agriculture and pastoralism. These people survive and have continued to flourish for thousands of years despite the pervading presence of reduced barometric pressure and consequent low oxygen tension. Reduced availability of atmospheric oxygen has a profound influence on the body in a variety of ways and is particularly stressful because culture and technology are ineffective at lessening the impact of these hypoxic conditions. Residents of high altitude must reproduce, grow, engage in food acquisition, and carry out physical work in order to survive and persist. High altitude has served as an ideal model for exploration of human adaptation to the environment using a diverse and comprehensive methodological framework.

A half century ago, Paul Baker initiated a pilot study to investigate responses of highland Quechua-speaking Native Americans resident in the southern Andes of Peru. Today, we recognize the broad theoretical and methodological contributions of the Peruvian project and its participants in advancing diverse areas of human biological research. The project's primary objective was to explore patterns of response of Andean residents to high-altitude hypoxia and cold. The research was built on work of Peruvian and other physiologists, but was clearly anthropological in its approach. This introduction will trace briefly the history of the Peruvian project initiated and led by Paul Baker and its subsequent branching network of studies and influences within anthropology and human biology.

PODIUM D: THURS., 4:00 p.m.

Contribution of Kava (Piper methysticum) consumption to sex biased rates of obesity in Vanuatu. JK Lum1,3,4 C Sun1,3 H Silverman1,3 A Pomer1,2,3 CW Chan1,2,3 K Olszowy2,3 KN Dancause,5 G Lee3,6 C Weitz6 RM Garruto3,4,7 1Laboratory of Evolutionary Anthropology and Health; 2Laboratory of Biomedical and Neurosciences; 3Department of Anthropology; 4Department of Biological Sciences, Binghamton University, State University of New York, Binghamton, NY; 5Psychosocial Research Division, Douglas Hospital Research Center, McGill University, Montreal, Canada; 6Department of Anthropology, Temple University, Philadelphia, PA.

The Republic of Vanuatu consists of over 80 islands inhabited by speakers of more than 100 traditional languages. The archipelago is rapidly modernizing, but the speed and extent of cultural change varies substantially among islands. In 2011 we assessed diet and activity patterns and collected anthropometric measures of over 1,900 people from five islands spanning the range of development from subsistence horticulture to urban wage labor. We observed higher rates of overweight and obesity with the speed and extent of cultural change varies substantially among islands. In 2011 we assessed diet and activity patterns and collected anthropometric measures of over 1,900 people from five islands spanning the range of development from subsistence horticulture to urban wage labor. We observed higher rates of overweight and obesity with increased modernization, primarily among females. One factor that may contribute to the sex biased differences in body mass observed is the consumption of kava (Piper methysticum). Kava is a postsynaptic neuroinhibitor consumed regularly by most males of Vanuatu, but only rarely by females. In addition to imparting a relaxed feeling of well being, kava also suppresses appetite and can induce vomiting. Because of these characteristics, kava
is currently marketed globally as a weight loss supplement. One troubling aspect of cultural change with as yet unknown health consequences is the current replacement of the traditional intoxicant kava with the global drug marijuana. Our survey revealed that young males on Anetiyum, Nguna, and Efate, those most impacted by tourism, have begun to consume marijuana in addition to or instead of kava. Although the use of marijuana is still rare in Vanuatu, its use is ubiquitous throughout the Pacific. Since marijuana increases appetite, if it replaces kava as the drug of choice in Vanuatu, the obesity gap between males and females may be short lived.


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Confusion about gluten-averse conditions on websites. CL Maki,1 JC Stevenson,1 MJ Mosher,1 KA Rankin-Sunter2. 1Anthropology Department, Western Washington University; 2Bellingham Gluten Intolerance Group, Bellingham, WA.

Adverse foods reactions are increasing in prevalence worldwide; common triggers are the seed storage proteins of wheat, rye, and barley (glutens). Celiac disease (CD) is an autoimmune condition, and is suspected if gastrointestinal complaints and nutrient malabsorption are present. Wheat allergy and gluten sensitivity represent two additional gluten-averse conditions with distinct pathologies. Unfortunately, these medical conditions are misunderstood. Immune reactions can involve rapid antibody recognition of the offending substance and include (1) IgE-mediated responses with the potential for anaphylaxis (e.g. “true” wheat allergy), (2) non-IgE mediated reactions (e.g. CD), and (3) mixes of IgE and non-IgE antibodies (e.g. eosinophilic gastroenteritis). A fourth type of delayed-onset, immune response likely underlies ‘gluten sensitivity’. ‘Gluten intolerance’ refers to nonimmune adverse reactions to wheat, and no clinical condition has yet been identified. Here we conduct a survey of websites that indicate this confusion is widespread, evident in nomenclatural usage, symptom lists favoring “classical” indicators and diagnosis (intestinal biopsy is last word) and less commonly, description of Europeans as most affected group, when condition is much more widespread. Websites (N = 26) were of four types: encyclopedic health (EH) (35%) (e.g., PubMed, Medicine.net), site from centers associated with universities (CU) (23%), educational sites on behalf of affected individuals (ES) (35%) and gastroenterology association sites (7%). Many web sites used “gluten intolerant” for all gluten disorders and most web sites provide, at best, incomplete descriptions of nonceliac gluten disorders. ES and CU sites were most informative about the phenotypic complexity of this systemic response to gluten.

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Lower vitamin D status among migrant Bangladeshi women in the UK. EI McClure,1 G Cooper,1 K Begum,2 S Muttukrishna,3 LL Sievert,3 R Gunu,4 T Sharmeen,5 O Chowdhury,6 GR Bentley1. 1Dept of Anthropology, Durham University (UK); 2Dept of Anthropology, University College London; 3Dept of Obstetrics and Gynaecology, University College Cork (Ireland); 4Dept of Anthropology, University of Massachusetts, Amherst; 5Institute of Women’s Health, University College London; 6Sylhet Osmani Medical College (Bangladesh).

Vitamin D (VitD) affects calcium homeostasis, bone mineralization, neuromuscular and cardiovascular function, cell growth and differentiation, and diabetes risk. VitD deficiency is associated with rickets, certain cancers, rheumatoid arthritis, chronic pain, obesity, hyperparathyroidism among other conditions. Dark skinned migrants moving to higher latitudes are at risk for lower VitD which can be exacerbated by cultural traditions such as concealing clothing, or substantial time spent indoors; common practices among traditional Muslims. This study reports on levels of serum Vitamin D3 levels measured by electrochemiluminescence (ECLI)A among: (1) Bangladeshi women living in Sylhet, Bangladesh (n = 41); (2) migrant Bangladeshis in London (n = 55), and a comparative group of white UK women (n = 49). Data were col-
lected as part of a wider study on reproductive ageing. Levels of serum vitamin D3 (ng/ml) were significantly lower (F = 33.843, P < 0.001) among Bangladeshi migrants (12.63 ± 0.70) compared with either Bangladeshi still living in Sylhet (20.35 ± 0.85) or white British women (22.66 ± 1.20). There was no significant correlation with length of residency of UK migrants (r = 0.01, P > 0.05), nor between VitD levels and reports of aches and pains. Across all groups, however, there was a significant negative correlation between VitD and waist circumference (r = −0.167, P < 0.05), waist-to-hip ratio (r = −0.181, P = 0.031), and triceps skin fold (r = −0.243, P = 0.031); migrants scored more highly on these markers of adiposity. Despite significantly lower VitD in Bangladeshi migrants, we could find no relationship with health indicators other than markers of adiposity related to risk for metabolic disorders.

Supported by NSF #0548393, Wolfson Research Institute.

PODIUM C: THURS., 2:00 p.m.

The meaning of a lock: Cortisol from hair and psychosocial stress among incarcerated mothers in Oregon. HH McClure,1,2 JW Shortt,1 JM Eddy,1,3 SHM Van Uum,1,4 E Russell,5 G Koren,5,6 JJ Snodgrass1,2,5. 1Oregon Social Learning Center, Eugene, OR, USA; 2Department of Anthropology, University of Oregon, Eugene, OR, USA; 3Partners for our Children, School of Social Work, University of Washington, Seattle, WA, USA; 4Institute of Cognitive and Decision Sciences, University of Oregon, Eugene, OR, USA; 5Department of Medicine, University of Western Ontario, London, Ontario, Canada; 6Department of Physiology and Pharmacology, University of Western Ontario, London, Ontario, Canada.

Research suggests that cortisol can be recovered from hair and provide a record of chronic psychosocial stress. The present study draws on data from Project HOME, an Oregon-based emotion-focused intervention pilot study to support effective parenting practices with 47 incarcerated mothers. This study assesses the feasibility of measuring cortisol in hair among incarcerated participants, and examines relations between psychosocial stress, parenting, group condition (intervention or control), and chronic cortisol secretion. The study includes 28 mothers (16 intervention, 12 control) who have provided hair samples at baseline (time 1 [T1]) and after the intervention concluded 3 to 6 months later (time 2 [T2]). Cortisol was measured in the 2 cm of hair closest to the scalp, reflective of cortisol exposure during last 2 months. Average cortisol levels at T1 were 224.1 ng/g (SD = 115.1) and at T2 were 232.7 ng/g (SD = 101.1). Using multiple regression analysis, higher cortisol levels (at T1 only) were significantly associated with increased parenting dissatisfaction, decreased parenting efficacy, increased time since last telephone contact with their child, and with non-Latina ethnicity (r2 = 0.29; P < .01). Repeated-measures ANOVA found no significant change in hair cortisol in the intervention group (238.9 ng/g and 243.6 ng/g at T1 and T2, respectively), with a nonsignificant increase (191.1 ng/g and 223.8 ng/g at T1 and T2, respectively; P < 0.15) in the control group, after controlling for significant covariates above. This study identifies factors that may contribute to increased systemic cortisol exposure, which potentially may have negative impacts on health.

Supported by the National Institutes of Health (grant MH079811).

PODIUM D: THURS., 4:30 p.m.

INSIG2 variants rs9308762 and rs7566605 modify the association of dietary patterns with serum triglycerides in Samoans. ST McGarvey,1 A Baylin,2 C Quested,2 J Tuite-le,4 DE Weeks,5 R Deka6. 1Brown University; 2University of Michigan; 3Ministry of Health, Government of Samoa; 4Department of Health, American Samoa; 5University of Pittsburgh; 6University of Cincinnati.

INSIG2 genetic variants have been associated with cardiometabolic traits in some but not all populations. It is possible that differences in environmental factors across populations may mask some genetic associations. We hypothesized that the association between dietary patterns and components of the metabolic syndrome could be modified by INSIG2 variants. We studied 753 adults from Samoa and American Samoa from a longitudinal study of adiposity and cardiovascular disease risk. Principal component analysis on food items from a validated food frequency questionnaire was used to identify neo-traditional and modern dietary patterns. We explored gene-dietary pattern interactions with the INSIG2 variants rs9308762 and rs7566605. Results for American Samoans were mostly non-significant. In Samoa, the neotraditional dietary pattern was associated with lower triglycerides, BMI, waist circumference, systolic and diastolic blood pressure, and fasting glucose (all P-for-trend < 0.05). The modern pattern was significantly associated with higher triglycerides, BMI, waist circumference, and lower HDL cholesterol (all P-for-trend < 0.05). Significant interactions for triglyc- erides were found between the modern pattern and the rs9308762 polymorphism (P for interaction = 0.01) and between the rs7566605 and the neotraditional pattern (P for interaction = 0.005). Those from Samoa consuming the modern pattern have higher triglycerides if they are homozygous for the rs9308762 C allele, while if consuming the neotraditional pattern they have lower triglycerides if they are noncarriers of the rs7566605 C allele. The modern dietary pattern in Samoa is associated with a poorer metabolic profile compared to the neotraditional pattern. Associations of the dietary patterns with triglycerides were modified by INSIG2 variants.

Supported by NIH Grants AG09375, HL52611, and HL093093.

PODIUM B: THURS., 11:15 a.m.

Puberty, body size, and body proportions: Is there role for adaptation? MH McIntyre. Department of Anthropology, University of Central Florida.

Historical health improvements in developed countries, and ongoing changes in developing countries, have resulted in taller stature and earlier puberty. Meta-analytic evidence
and evidence from the 3,174 participants of the US National Health and Nutrition Examination Study (NHANES) III are presented to show that, in industrialized countries, earlier puberty is associated with shorter rather than taller stature, by about 4 mm per menarcheal year in women (95% CI: 1.5–6.3) in NHANES III, all of which is explained by shorter legs and distal legs (2.8 mm, 95% CI: 1.8–3.7). Given the key role of age and size at maturity in popular life models, could these patterns reflect an evolved norm of reaction, or are other explanations more plausible? If the general pattern of secular trends and gross socioeconomic inequality (negative association between stature and maturation) results from rising parental investment, the reverse pattern observed in industrialized societies might result from either increasing prediction of size dependence of production (sometimes symbolized as A) or declining adult mortality. Alternative, nonadaptive explanations are also considered. It is proposed that the correct explanation depends on whether the distal legs play a special role in human foraging not shared by other parts of the body.

**P: 56**

Variation in menopausal symptoms by varying time windows: Comparison of 2-week and 4-week symptom frequencies based on daily diaries of Japanese women. MK Melby. Department of Anthropology, University of Delaware.

Most studies of menopausal symptoms ask participants to report symptoms experienced in the preceding 2 weeks or in the preceding month. A shorter recall period may be more accurate, but may not capture the experience of perimenopausal women whose symptoms fluctuate with their hormones following approximately monthly cycles. A 1-month reference period may be more likely to capture the erratic nature of symptoms such as hot flushes and more correctly identify the individuals who are symptomatic. To enable comparisons between past studies and to identify an optimal time window for future research, we need data that show how these time frames are related (e.g., are 4-week symptom rates similar to or double 2-week rates?) and to assess how they may vary with factors such as menopausal status. Using daily symptom diaries collected prospectively for 6-months, this article compares frequencies of symptoms experienced by Japanese perimenopausal women in overlapping 2-week and 4-week time frames as well as an initial 2-week recall period, and assesses the extent of correspondence between different time windows and the relationship with menopausal status. This analysis focuses on vasomotor symptoms such as hot flushes and chilliness that are commonly associated with menopause in Japan, and shoulder stiffness—the most common climacteric complaint among Japanese women. Optimal time windows may depend on the symptom of interest and its prevalence and patterning in the population, and may vary throughout the menopausal transition.


**P: 21**

Measles and smallpox mortality in households and parishes in 19th century Åland, Finland. EL Miller and JH Mielke. 1Dept Anthropology, University of Missouri, Columbia; 2Dept Anthropology, University of Kansas.

The islands of Åland, Finland contribute a wealth of historical data that can be used to address questions about the spread of childhood infectious diseases, especially measles and smallpox, during the 19th century, and the influence of social factors on their spread. Andrew Cliff, Peter Haggett, and colleagues noted in 1981 that remote islands tend to have periodic epidemics accompanied by long interepidemic periods without regular cyclical patterns. This trend is observed in the time-series analysis of the Åland measles data. It is consistent with the small population of Åland, and supports the conclusion that epidemics were introduced from outside the island population. The inclusion of smallpox in this time-series analysis indicated a frequent overlap of measles and smallpox mortality during the last half of the 18th century. However, no discernable patterns of overlap are found in the 19th century, perhaps due to shifted smallpox periodicity caused by the introduction of vaccination. In addition to results of the analysis of time series data within and across parishes, which illuminate disease patterns at the aggregate level, preliminary analyses of household level patterns of mortality and morbidity will be presented. This level is especially interesting for the Åland islands where significant social and political changes resulted in smaller households over the course of the 19th century.

**P: 32**

Ariaal mothers’ nutritional status and infant sex predict infant height and weight. EM Miller. Department of Anthropology, Northwestern University, Evanston, IL.

Maternal condition is an important determinant of offspring growth, potentially contributing to sex differences in infant outcomes as predicted by the Trivers-Willard hypothesis. Three predictions can be derived from this hypothesis: (1) girls in a low resource population are predicted to have better growth outcomes than boys, (2) infant growth outcomes will be associated with maternal nutritional status, and (3) there will be an interaction between maternal condition and infant outcomes within the population. The Ariaal are a group of settled pastoralists with marginal nutritional indices residing in Marsabit District Kenya, making them an idea population to study the association between maternal condition and infant outcome. Two hundred and thirty-nine Ariaal mothers and infants participated in anthropometric measurement. Boys have significantly lower height-for-age z-scores (HAZ) and weight-for-age z-scores (WAZ) than girls ($P < 0.05$). In addition, mothers’ BMI is significantly positively associated with both infant HAZ and WAZ ($P < 0.05$). However, there is no significant interaction between maternal BMI and infant sex in this population ($P > 0.05$), although mothers of boys do have significantly lower BMIs than mothers of girls ($P < 0.05$). This study
demonstrates a sex difference between boys and girls that is consistent with Trivers-Willard predictions for a low resource population; that is, girls have better height and weight outcomes than boys. Infant height and weight also tracks maternal nutritional status. Finally, there is no interaction between maternal BMI and infant sex, demonstrating that there is no within-population evidence of Trivers-Willard dynamics.

Support: NSF Grant Number BCS-0750779; Leakey Foundation General Research Grant.

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Adequate nutrition has long been accepted as the primary method for maintaining health and preventing disease. Therefore it is counterintuitive to embrace the caloric restriction (CR) hypothesis now suggested as a healthy choice by which to extend individual’s life span. Reducing caloric intake increases the risk of inadequate nutrient intake. Previous analyses from the 1980 University of Kansas study on biological aging in the central Kansas Mennonite communities have documented a substantial age-related decrease of total caloric intake in both males and females and a life span 10 years longer than their Kansas neighbors. Here we examine nutrient density (ND) gathered during the revisit in 2003 for further illumination of the CR-longevity hypothesis. One hundred fifty-eight individuals (76 Males, 84 females) maintained dietary diaries for 3 nonconsecutive days during 1 week. Nutrient profiles from these diaries were obtained through Nutribase software and nutrient density calculated as total nutrient intake divided by total caloric intake (TCI). Age remained negatively correlated with total caloric intake in both males and females (P < 0.001). However, significant nutrient correlation (P = < 0.05) was found to be an inverse relationship for protein, Vitamin A, iron, copper, magnesium, and zinc in females. Males exhibited a significant decrease in ND of zinc and thiamine (P = < 0.001), but a positive correlation with Vitamin E. Our findings suggest that Mennonites are selecting nutrient dense foods, not empty calories, to accompany their calorie reduction. These healthy choices are more evident in females than males.

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Testosterone supplementation is associated with altered immunity in complex ways in healthy older men. MP Muehlenbein,1 S Bhasin2. 1Department of Anthropology, Indiana University, Bloomington, Indiana, USA; 2Section of Endocrinology, Diabetes, Nutrition and Weight Management, Department of Medicine, Boston University School of Medicine, Boston, Massachusetts, USA.

Testosterone has been considered the quintessential physiological moderator between the immune and endocrine systems, and its immunomodulatory actions appear to be primarily suppressive. Yet there is tremendous variation in results of field studies that attempt to identify relationships between testosterone and immunity. We chose to evaluate alterations in the immunophenotype in response to testosterone supplementation in 60 healthy men aged 59 to 75 years. Each was randomly assigned to receive one of five different doses of testosterone enanthate (up to 600 mg/kg body weight) via intramuscular injection every month for 10 months. A monthly complete blood cell count with leukocyte differential (although arguably not an ideal measure of immunity) revealed that monocyte and neutrophil percentages significantly increased over time in the highest dosage group, but returned to levels similar to the lowest dosage group by the 6th month of treatment. Opposite effects were found with eosinophil and lymphocyte percentages that decreased in the highest dosage group, but later increased to levels similar to the lowest dosage group by the 6th month of treatment. Although the causes and consequences of these time–dosage effects remain unclear, these results further support the idea that testosterone does not suppress all aspects of immunity equally. The immunomodulatory actions of testosterone likely depend on several host characteristics, including energy status and relative concentrations of other hormones. Further investigation of immune-endocrine relationships utilizing a variety of measures under a variety of conditions is important for understanding differences in disease severity as well as the basic nature of phenotypic plasticity.

This study was funded by the National Institute of Aging (1RO1AG14989-01) and Indiana University.

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Testosterone links polychlorinated biphenyls to higher waist-hip ratios: Preliminary results from a sample of Native American male adolescents. KR Nelder,1 LM Schell,1,2,3 MV Gallo3. 1Department of Anthropology; 2Department of Epidemiology and Biostatistics; 3Center for the Elimination of Minority Health Disparities, University at Albany, Albany, NY.

PCB (polychlorinated biphenyl) exposure has been linked by other researchers to overweight/obesity, metabolic syndrome and type II diabetes. The mechanism underlying this relationship has not been elucidated. Previously we showed that in males some PCB congeners are negatively associated with T (testosterone). Thus, T may be in the causal pathway between PCBs and central obesity. This study tests this hypothesis by determining the relationships between PCBS thought to be obesogenic, serum T and WHR (waist-hip ratio) among 127 Akwesasne Mohawk adolescent males between 10 and 16.9 years of age, with documented exposure to PCBS. The Akwesasne Mohawk Nation is a sovereign nation of approximately 13,000 persons that borders both the U.S. and Canada. In a multiple regression analyses enzyme inducing PCBS were associated with T (std. [beta] = −0.142, P = 0.038), and T was negatively associated with WHR (std. [beta] = −0.174, P = < 0.001). These results indicate that in males, as PCB level increases, T decreases and as T
decreases WHR increases, suggesting a mechanism for relationships between POP exposure and diabetes and metabolic syndrome.

This research was supported by supported by grants from the National Institute of Environmental Health Sciences (NIEHS-ES04913; ES10904), and the National Institute on Minority Health and Health Disparities, National Institutes of Health (P20MD003373).

PODIUM A: THURS., 8:30 a.m.

Competing for attention: Do paternal grandmothers impact weaning times? A Núñez-de la Mora. Medical Anthropology Research Group, Durham University, UK.

Bangladeshi women living in London show high breastfeeding initiation rates (81%), similar to those registered in their country of origin. Average breastfeeding length, however, changes significantly among consecutive migrant generations: Infants born in the UK to first generation Bangladeshi women living in London are breastfed on average, 8.3 months shorter than their peers in Bangladesh. Among second-generation mothers, average is further reduced by 3.1 months. Factors affecting breastfeeding duration are varied and complex, but social support has been shown to be of significant relevance. In particular, the role of grandparents in initiating and maintaining breastfeeding has been highlighted in several studies. Less attention, however, has been paid to the evolutionary dimension of these relationships. Using qualitative evidence gathered during a series of focus group discussions with Bangladeshi women of different ages, migrant status, family structure, and breastfeeding experience living in London, I explore the differential effects of maternal versus paternal grandmothers on early infant feeding practices in this community. The findings are discussed within an evolutionary framework and the implications for women’s reproductive patterns, child’s health, and family dynamics are also explored.

PODIUM A: THURS. 9:15 a.m.

Diurnal cortisol rhythms in Tsimane’ Amazonian foragers: New insights into ecological programming of the HPA axis. CH Nyberg. Department of Anthropology, University of Massachusetts, Boston.

Although a growing body of research has documented the importance of the HPA axis in mediating the interface between the psychosocial world and individual health, there is a paucity of data from nonwestern populations, particularly from those with distinct nutritional and infectious disease ecologies. The specific objectives of this study are: (1) to document variation in diurnal cortisol rhythms among the Tsimane’, a remote population in the Bolivian Amazon, and (2) to compare diurnal rhythms from this study with other population based studies of cortisol conducted in industrialized nations. Salivary cortisol samples were collected twice daily, immediately upon waking and before bed, for 3 consecutive days from 303 participants (age 1.6–82 years, 1,564 samples) in conjunction with the Tsimane’ Amazonian Panel Study (TAPS). Although the within-population variation in cortisol profiles was consistent with the established correlates of time of day, age, and sex, the between-population comparisons revealed dramatically lower levels of HPA activity among the Tsimane’, providing a benchmark against which to reference cortisol levels from industrialized populations. These findings raise questions about whether early immune exposures prime the developing HPA axis, which may be down-regulated among the Tsimane’ in order to facilitate immune activation in a high pathogen ecology, and also suggest inquiry into the role of how metabolic load and energy balance contribute to HPA programming. A broader exploration of population differences in HPA trajectories across diverse environments has important implications for understanding the etiology of stress related disorders such as depression, obesity, and the metabolic syndrome.

This study was funded by the National Science Foundation (DDIG BCS-0622576), an American Association of University Women Dissertation Fellowship, a Northwestern University Graduate Research Grant, and a Northwestern University Fellowship and a Northwestern University FAN grant.

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Exploring the health transition in Vanuatu: Longitudinal data comparisons from 2007 to 2011. KM Olszowy,1,2 A Pomer,1,2,3 KN Dancause,4 C Sun,2,3 H Silverman,2,3 CW Chan,1,2,3 G Lee,2 C Weitz,5 JK Lum,2,3,6 RM Garruto1,2,6,7 Laboratory of Biomedical and Neurosciences; 7Department of Anthropology; 1Laboratory of Evolutionary Anthropology and Health, Binghamton University, State University of New York, Binghamton, NY; 2Psychosocial Research Division, Douglas Hospital Research Center, McGill University, Montreal, Canada; 3Department of Anthropology, Temple University, Philadelphia, PA; 4Department of Biological Sciences, Binghamton University, State University of New York, Binghamton, NY.

Vanuatu, similar to other South Pacific nations, is undergoing rapid modernization accompanied by changes in lifestyle, diet, and health. These changes in health include increased rates of chronic diseases, including obesity, type II diabetes, and hypertension. In 2007, our research team from Binghamton University collected anthropometric measurements, including body mass index (BMI), skinfolds, and circumferences, on Ni-Vanuatu men, women, and children from three islands in Vanuatu (Aneityum, Ambae, and Efate). The results of this survey demonstrated that rates of obesity were greatest on Efate, the most developed island in the survey. During the summer of 2011, our research team returned and collected the same anthropometric measurements on these same islands. We hypothesized that Aneityum, the island undergoing the most rapid economic change, will exhibit the greatest increase in rates of obesity. Preliminary cross-sectional analysis of adults in the village of Anelcahat on Aneityum reveals mixed results. Among women between 2007 and 2011, BMI decreased from 25.2 ± 4.5 to 25.1 ± 4.5 (P < 0.05), upper arm circumference
increased from 28.4 ± 3.7 to 28.8 ± 3.6 (P < 0.05), and waist to hip ratio increased from 0.85 ± 0.07 to 0.88 ± 0.6 (P < 0.05). Among men between 2007 and 2011, BMI decreased from 23.91 ± 2.7 to 22.9 ± 5.8 (P < 0.05), upper arm circumference increased from 28.9 ± 2.7 to 29.2 ± 2.3 (P < 0.05), and waist to hip ratio increased from 0.84 ± 0.05 to 0.86 ± 0.04 (P < 0.05). Differences in other anthropometric measurements were not significant. Further analysis will reveal if the statistically significant differences reported here are also biologically significant. Longitudinal analysis is currently underway and will be important in clarifying trends.

Funding was provided through the Wenner-Gren Foundation for Anthropological Research; Harper College Grants in Support of Research, Scholarship, and Creative Work.

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Historical trends in birth weight and mortality. EK O’Neill,1 F Fang,1 TB Gage1,2. 1Department of Anthropology, University at Albany; 2Department of Epidemiology and Biostatistics, University at Albany.

The Covariate Density Defined mixture of logistic regression (CDDmlr) method has been shown to account for unmeasured heterogeneity in infant mortality by identifying two latent subpopulations ("normal" and "compromised" fetal development) in contemporary birth cohorts. Here, the CDDmlr method is applied to historical data from the Hertfordshire Cohort Study for comparison with previous analyses. The Hertfordshire dataset contains 97,996 records of birth weight, infant sex, and childhood death from 1911 to 1940. The historical model presented here shows patterns similar to previous analyses. In the "normal" subpopulation, the male mean birth weight is 3,534 g (SD 483 g) and the female mean birth weight is 3,397 g (SD 452 g) while in the "compromised" subpopulation the male mean birth weight 3,429 g (SD 867 g) and the female mean birth weight is 3,331 g (SD 841 g). Mean birth weights and standard deviations in both the Hertfordshire and contemporary "normal" subpopulations are similar. However, in the Hertfordshire "compromised" subpopulation, the mean birth weight is closer in value to the "normal" subpopulation than is typically seen in the "compromised" subpopulation. Further, the proportion of "compromised" births is 19.4% (males) and 21.2% (females) in the Hertfordshire cohort—greater than the 6% to 10% typically seen in published samples from the 20th century. The death rate of individuals aged 0 to 5 is 47 deaths/1,000 births (males) and 35 deaths/1,000 births (females)—greater than that of recent populations. This article explores these historical trends in birth weight and mortality and the relationship between them.

Supported by NIH grant R01 HD037405 and R24 HD044943.

P: 23 WITHDRAWN

Modeling the effects of kinship patterns on disease spread among neophytes in 18th century Mission San Diego de Alcala. CM Orbann. Department of Anthropology, University of Missouri-Columbia.

Agent-based modeling is an increasingly popular tool for the investigation of disease in human populations. It is particularly useful in examining disease dynamics in small populations where the actions of single individuals or small fluctuations in behaviors can play significant roles in determining the outcome of an epidemic event. This article will describe the use of an agent-based computer simulation model to investigate the spread of acute, infectious disease among the Kumeyaay neophytes of Mission San Diego de Alcala, in present-day San Diego, CA. The model, built using the RePast toolkit for social sciences modeling, uses a population based on the historically known population at the mission. The mission baptismal, marriage, and death records serve as the primary data source on which the model population was structured, but ethnographic and historic data were critical during model development. Agent behaviors are sex- and age-structured and are consistent with on information found in both the ethnographic and historical record. The purpose of this project was twofold: (1) to discover to what extent precontact kinship structures persisted during the Spanish colonial period and (2) to understand what affect those kinship structures might have had on the spread of an acute, infectious disease within the neophyte population.

The use of an agent-based model to study disease in a Spanish colonial context is novel, but well-suited to the kinds of data available from this period. This model could be further applicable to contemporary small, kin-based populations worldwide.

This study was funded by NSF DDIG 1123918.

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Variation in 2D:4D ratios during childhood are dependent on sex. DL Osborne, J Wagner, S Elliott. Dept of Anthropology, University of Nebraska-Lincoln.

Variability in 2D:4D ratios are associated with health, behavior, and sexuality throughout adulthood. This sexually dimorphic trait is believed to be influenced by androgen levels in utero, but little is known about the mechanisms and pattern of growth in 2D:4D ratios. Our objectives were to evaluate 2D:4D ratios in terms of the pattern of growth and magnitude of differences during childhood. We performed a standard anthropometric assessment of subjects (n = 55) including stature, weight, digit length, ponderal index, abdominal and triceps skinfolds, MUAC, and waist circumference. Life history data were obtained from the parent(s) via questionnaire and included maternal age at menarche, subject birth weight and length, duration of breastfeeding, maternal and paternal stature, and household structure. Bivariate correlations were used to test for associations between 2D:4D ratio, anthropometric, and life history data. Differences in 2D:4D by sex were tested using the Mann-Whitney U (alpha = 0.05). Results indicate that in childhood the male 2D:4D ratio of the right, but not left hand is significantly lower than that of females. Further, available life history data suggest familial and environmental influence on 2D:4D ratio of
the left hand, but not right hand of females only. These results support previous findings suggesting of dimorphic 2D:4D ratio. A better understanding of mechanisms underlying variation in the 2D:4D ratio may help clarify the relationship it has with associated phenotypes and behaviors.

This study was supported by the Layman Award and UCARE funding through the University of Nebraska-Lincoln.

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Association of obesity with sedentary behaviors and play outdoor among children. C Padez,1,2 C Gama,2,3 A Mourão,4 I Nogueira2,5, H Rosado2,6 1Department of Life Sciences, University of Coimbra, Portugal; 2Research Centre for Anthropology and Health, University of Coimbra, Coimbra, Portugal; 3Faculty of Sciences, University of Lisbon, Lisbon; 4University of Tras-os-Montes e Alto Douro, Vila Real, Portugal; 5Department of Geography, University of Coimbra, Coimbra, Portugal; 6Instituto Investigação Científica Tropical, Lisbon, Portugal.

Sedentary behaviors such as television viewing is one of the major factors contributing to childhood obesity. This study aims to analyze the association between sedentary behaviors, passive play inside house, outdoor play and childhood obesity. A cross-sectional study was done in a sample of 11,554 children, aged 6.0 to 10.0 years. Weight and height were measured, and parents filled out a questionnaire about family and child characteristics: TV viewing, passive play, and outdoor play. Overweight and obesity, using cut-off points as defined by the IOT, were used. Data was analyzed using the chi-square test and the multivariate logistic regression analysis. We found 21.1% overweight and 9.0% of obese children. The prevalence of obesity decreased by time of TV viewing: < 2 h, 26.9%, 2 to 4 h, 30.2%, and +4 h 34.2%, P < 0.001; decreased by time spent with passive play inside house: < 2 h, 32.6%, 2 to 4 h, 30.3%, and +4 h 27.7 %, P < 0.001 and decreased by active play outdoor: < 1 h/day 37.4%, 2 to 4 h/day 30.1%, >3 h/day 26.4, P < 0.001. The odds ratio (OR) for childhood obesity increased by television viewing (< 2 h, 2.4 h: 1.18; > 4 h: 1.39), decreased by time spent in passive play inside house (reference < 2 h; 2–4 h: 0.72; > 4 h: 0.58). We conclude that TV viewing is positive associated with childhood obesity and either passive play inside house or active play outdoor are both effective ways to decrease childhood obesity.

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Health Experiences of Elder Pastoralists in a Context of Endemic Violence. IL Pike,1 B Straight1 1School of Anthropology, University of Arizona; 2Department of Anthropology, Western Michigan University.

Ageing is poorly understood in Sub-Saharan Africa and while elders are often revered as community leaders very little is understood about elder care and healthy aging. The expectation for pastoralist communities is elder mobility with frail elders moved to more sedentary encampments. In a backdrop of endemic warfare, mobility becomes more important. This study presents data on elders residing in a randomly selected sample of households from three pastoralist communities of northern Kenya. Nutritional status is generally low among herding communities and elders are no exception, with a high prevalence of mild-moderate anemia (approximately 26%). For the elders who live in the highly affected sites, nutritional status is lower on average than the elderly who live in less affected sites with some signs of significant erosion for the oldest men. Older women show evidence of lower arm circumference measures with age but BMI does not change significantly. Nutritional status is higher for wealthier men in three of the sites but wealth does not, on the surface, protect women. In a backdrop of endemic violence elders appear to be making important sacrifices that impact their health.

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PODIUM A: THURS., 8:45 a.m.

Change in age at menarche in Vanuatu. A Pomer,1,2,3 CW Chan,1,2,3 KN Dancause,5 G Lee,5 KM Olszowy,5,7 H Silverman,2,3 C Sun,2,3 C Weitz,6 RM Garruto,1,3,4 JK Lum1,2,3,4 1Laboratory of Biomedical and Neurosciences; 2Laboratory of Evolutionary Anthropology and Health; 3Department of Anthropology; 4Department of Biological Sciences, Binghamton University, State University of New York, Binghamton, NY; 5Psychosocial Research Division, Douglas Hospital Research Center, McGill University, Montreal, Canada; 6Department of Anthropology, Temple University, Philadelphia, PA.

The last century has seen a significant decrease in age at menarche for young women in modernized populations, from about age 15 years to a present average of 12.5 years in the United States. Lifestyle changes associated with modernization, particularly changes in nutrition, have been accepted as the cause for this observed change in age at menarche. Recent research in the Pacific island nation of Vanuatu indicates that a similar phenomenon is occurring among young Ni-Vanuatu women, but that this decrease in age at menarche may be occurring in fewer generations than has been seen in Western nations (one generation in Vanuatu, as opposed to three generations in Western Europe). In 2011, we surveyed age at menarche in females on five islands of Vanuatu, representing varying levels of economic development. Preliminary analysis of the collected data shows that women older than age 18 at the time of our survey experienced menarche around age 13, resulting in a younger average age than the older women in their communities. This decrease in age at menarche is particularly distinct on islands where the process of modernization has become a prevalent force in society, especially those islands in greatest proximity to the urbanized capital city of Port Vila.
Milk protein content and relative growth in early infancy in anthropoid primates. ML Power. Nutrition Laboratory and Conservation Ecology Center, Smithsonian Conservation Biology Institute, National Zoological Park, Washington, DC, USA.

Milk is every mammal’s first food. Accordingly, differences in growth rates between species at the earliest ages should be reflected in differences in milk composition. Sugar and fat largely provide energy; there are high-fat, low-sugar milks, and the reverse. Protein content of milk has been hypothesized to correlate more directly with lean mass growth. Thus, species with faster growth during the time of reliance on mother’s milk for nutrition should have higher protein concentration in the milk. Assessing this hypothesis has been complicated by how to express milk protein concentration in order to compare milks that differ in fat and sugar as well as protein. I propose that expressing milk protein content on a per energy basis provides a parameter that it is directly comparable among milks of almost any composition. On this basis, among anthropoid primates New World monkeys have the highest milk protein concentrations, ranging from 27 mg protein per kcal of milk (Cebus) to 40 mg protein per kcal of milk (Alouatta). Macaques and baboons have 21 to 24 mg protein per kcal of milk, and great apes have 17 to 20 mg protein per kcal of milk. Human milk has the lowest protein content, though published values overlap the great ape range (12–18 mg protein per kcal of milk). Thus, milk protein content predicts relative growth of very young infants is highest in New World monkeys, followed by Old World monkeys and then great apes; and further suggests that human early growth may be the slowest.

PODIUM B: THURS., 10:30 a.m.

Crawling, not age, predicts greater sIgA content of milk in Filipino women. EA Quinn,1 ML Power2. 1Department of Anthropology, Washington University in St. Louis; 2Nutrition Laboratory and Conservation Ecology Center, Smithsonian Conservation Biology Institute, National Zoological Park, Washington, DC, USA.

Secretory IgA (sIgA) is one of the primary immunological factors found in human milk. Breast milk sIgA augments infant immune function during the period of breast-feeding, and may have lasting effects on immunological development. Milk sIgA is responsive to changes in maternal exposure to pathogens, but it is not known if milk sIgA is also sensitive to environmental challenges experienced by the infant. Crawling represents an infant’s first independent interaction with the environment as crawling infants will have increased contact with potential pathogens compared with sedentary infants. We investigated this question in a sample of 100 lactating Filipino women and their infants. Infants ranged in age from 10 to 540 days and were drawn from 31 communities in metro Cebu. Milk samples were collected by hand expression during home interviews and analyzed for sIgA by ELA. Interviews and behavioral observations supplemented sample collection. Mothers with crawling infants produce milk with 26% more sIgA than mothers who infants are not crawling after adjustment for infant age (P < 0.024). Independently, infant age was not a predictor of milk sIgA. This specific association with infant motor development but not age is suggestive of feedback between infant environmental experience and maternal production of sIgA. Infants may be signaling increased pathogen exposure to mothers and up regulating sIgA synthesis by the mammary gland.

PODIUM A: THURS., 9:30 a.m.

Household food consumption of Ribeirinhos, eastern Amazon, Brazil. GT Ritchie-Ewing, BA Piperata. Department of Anthropology, The Ohio State University.

Recent research shows evidence of a “nutrition transition” or an increase in overweight/obesity rates with related chronic diseases partly due to more reliance on purchased, energy-dense, low-nutrient foods. In Brazil, a conditional cash-transfer program (Bolsa Familia) has provided household funds that increased market orientation among the Ribeirinhos. To determine how well the Ribeirinhos are meeting nutritional needs in the midst of this transition, we examined food consumption in 22 Ribeirinhos households using weighed-inventory dietary data collected in 2009. Based on previous research on Ribeirinhos, we hypothesized insufficient energy and fat intake, but sufficient protein and carbohydrate intake within each household. Comparing household and recommended intakes of energy and macronutrients revealed households consumed inadequate amounts of energy, carbohydrates, and fats (energy 76.5%, 92.3% carbohydrates, 73.4% fats) and more than adequate amounts of protein (161.6%). The amounts of energy and all macronutrients consumed varied widely between households. As expected, purchased foods constituted a large percentage of the energy and macronutrients consumed (energy 45.8%, protein 38.9%, carbohydrates 40.7%, fats 68.0%) indicating a heavy reliance on a market economy. Local and purchased manioc products comprised the highest percentage of energy and carbohydrates in household diet (43.1% energy, 63.1% carbohydrates). Most dietary protein came from local fish, local meats, and purchased meats (38.1% fish, 20.1% local meats, 15.9% purchased meats). More than half of fats were purchased (56.9%). Despite evidence of a nutrition transition in Brazil, our results demonstrate many nutritional needs even of energy and fats still are not adequate for the entire household.

Supported by Wenner-Gren 6861, NSF BCS 0201936, NIH R21-HD47943-05.

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Ovarian steroid variation in cycles deemed ovulatory by mid-cycle LH. EJ Rowe,1 A Van Horn,2 T Eisenstein,3 LC Rockwell2. 1Department of Biology, Southern Georgia
The commercial availability of ovulation test kits that detect urinary LH has the potential to simplify studies in which segregation of ovulatory from anovulatory cycles is necessary. We assessed mid-follicular through mid-luteal ovarian steroid profiles for cycles of healthy Philadelphia women (N = 29, aged 18–45 with no oral contraceptive use <3 months before enrollment). Subjects self-monitored three consecutive menstrual cycles, used a home ovulation test kit each month, and collected daily saliva samples during the third cycle. Steroids were measured by ELISA (DRG International). Estradiol and progesterone were assayed every-other-day beginning ~6 through 10 (positive LH test or menstural calendar history was used to determine ovulation = day 0) with consecutive sampling days ~2 through 2 for estradiol. Estradiol intra-assay CVs ranged from 0.2% to 6.5% and inter-assay CVs 6.8% to 13.3%; progesterone intra-assay CVs ranged 0.2% to 4.0% and inter-assay CVs 7.8% to 11.2%. Among LH positive cycles we also used both the Kassam and the mid-cycle E2 drop methods to assess ovulation. Concordance between LH and Kassam methods was 29%. Of the cycles deemed ovulatory by both the LH and the Kassam method all showed a mid-cycle E2 drop between −1 and 1. The majority of LH positive cycles, however, did not correspond with ovarian steroid profiles that would be classed as ovulatory by the Kassam method, and timing of the E2 drop varied from −4 to 6. Additional study of the relationships between urinary LH elevation detected by test strips and ovarian steroid levels is needed.

This research was supported by NSF DDIG 0824567 and a Wenner-Gren Foundation Doctoral Dissertation Fieldwork Grant.

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A cross-national study assessing the impact of obesity on health and well-being using SAGE data. AFA Sadruddin, 1, 2, 3, 4, 5, 6 PA Nepomnaschy 1, 2, 3, 4, 6, Rendering abdominal adiposity in India is better among obese individuals (P < 0.05). Despite this, the best rates of body function in India appear in the normal and underweight category (P < 0.05). Quality of life decreases in China among the undernourished and body functioning is generally equivalent across the BMI categories (P < 0.05). The relationship between quality of life and obesity is complex and influenced by cultural perspectives and these data demonstrate how culture can influence biological variation in body habitus and health.

Support: World Health Organization, Purdue University, Ohio University Heritage College of Osteopathic Medicine.
A comparison between first morning urinary cortisol levels and circadian salivary cortisol profiles. PL Sarkar,1 KG Salvante,1,2 PA Nepomnaschy1,2. 1Maternal and Child Health Laboratory-Faculty of Health Sciences; 2Human Evolutionary Studies Program, Simon Fraser University, Burnaby, BC.

Urine and saliva are frequently used for the longitudinal evaluation of the assessment of physiologic stress. Compared with alternatives like blood, these matrices are logistically easier to collect and less invasive. It is unclear, however, whether the information yielded by urinary and salivary cortisol is comparable. To evaluate their relationship we collected one first morning urine and four saliva specimens at different time points throughout the same day from 32 Guatemalan women over 3 consecutive days. We measured cortisol in both urine and saliva specimens using competitive enzyme immunoassays. Salivary cortisol profiles varied diurnally, peaking in the morning and decreasing throughout the day. Using mixed models we found that circadian salivary cortisol profiles varied among individuals (P < 0.05), and the decrease in salivary cortisol levels from the first collection time (T1) to each of the other three time points was significantly related to T1 levels (P < 0.05). First morning urinary cortisol levels were positively associated with salivary cortisol levels at T1 (P < 0.05), but not with changes in salivary cortisol concentrations throughout the day (P > 0.6). These results suggest that cortisol levels assessed in first morning urine and early morning saliva samples provide related information regarding physiologic levels of stress. The lack of an association between first morning urine cortisol and circadian salivary profiles may be explained by random daily events (e.g.: food consumption, physical activity, stressful events) affecting salivary cortisol levels. Our results should aid in decisions regarding matrix choice and sampling designs used to assess intra- and inter-individual variation in physiologic stress.

This study was funded by CIHR OG 106705, and a Simon Fraser University President’s Research Start-Up Grant.

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Gender differences in physical activity patterns, and the effects of time spent in school on total daily energy expenditure in Bolivian children. E Singh1 and VJ Vitzthum1,2. 1Anthropology Dept; 2Kinsey Institute for Research in Sex, Gender & Reproduction, Indiana University, Bloomington.

Increasing concern with the “obesity epidemic” has prompted research on children’s diets and activities. As populations become more modernized, children are likely to spend more time sitting in classrooms, which may lower their total energy expenditure relative to that of a more traditional lifestyle. This study (1) evaluates the potential effect on children’s total energy expenditure of time spent in school versus time in those activities typical of Bolivian agropastoral communities, and (2) evaluates potential gender differences in activity patterns in Bolivian schoolchildren. A total of 41 boys and 60 girls (11 to 14 years old) from El Alto, a periurban community in highland Bolivia, were interviewed on time spent on sports, chores, homework, and helping parents. Based on estimates of individual total daily energy expenditure (TDEE) using predictive equations for physical activity level and basal metabolic rate, we found that boys and girls did not differ significantly in physical activity levels but did differ significantly on time spent on specific activities, e.g. time spent on chores. Also, both genders had significantly lower energy expenditure than they would have had if time in school had been spent in the children’s chores typical of traditional agropastoralists. These results suggest that both boys and girls are at risk for obesity if “modernization” of children’s activity patterns are not also accompanied by compensatory changes in lifestyle, for example, reductions in energy intake (which are notoriously difficult to achieve) and/or the incorporation of sports or similar physical activities into the school curriculum.

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Modernization and differential physical activity among the islands of Vanuatu. H Silverman,1,2,3 A Pomer1,2,3 CW Chan,1,2,3 KN Dancasse,5 G Lee,3 KM Olaszowy1,3 C Weitz,6 RM Garruto,1,4 JK Lum2,3,4 1Laboratory of Biomedical and Neurosciences; 2Laboratory of Evolutionary Anthropology and Health; 3Department of Anthropology; 4Department of Biological Sciences, Binghamton University, State University of New York, Binghamton, NY; 5Psychosocial Research Division, Douglas Hospital Research Center, McGill University, Montreal, Canada; 6Department of Anthropology, Temple University, Philadelphia, PA.

We conducted a study in 2011 to ascertain which aspects of modernization lead to the onset of non-communicable diseases in the Republic of Vanuatu. Five islands that represent varying stages of modernization ranging from high (Efate) to low (Ambae) level of physical infrastructure were surveyed. Among these islands percent body fat correlated inversely with physical infrastructure. On Efate (n = 199), the island with the most infrastructure, the obesity rate was 56.4% in women and 17.9% in men. In contrast, Ambae (n = 119) characterized by subsistence horticulture, had an obesity rate of 10% in women and less than 1% in men. While obesity rates generally show an increase with increasing infrastructure, the greater susceptibility of females to chronic disease in these populations is as yet not understood. Further analysis will hopefully contribute to the understanding of this.


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The Indigenous Siberian Health and Adaptation Project: Evidence for a recent change in basal metabolic rate among the Yakut (Sakha) of Siberia. JJ Snodgrass,1,2 WR...
Studies of native circumpolar populations have documented basal metabolic rates (BMRs) that are systematically elevated relative to international norms; this metabolic elevation appears to be a physiological adaptation to cold stress. However, a number of key questions remain about metabolic adaptation, including how nutritional and lifestyle changes affect BMR, whether there is an age-related change in BMR, and the extent of seasonal variability in BMR. The present study investigated BMR among the indigenous Yakut (Sakha) of northeastern Siberia in order to: (1) compare data collected in 2 different years in a community undergoing rapid nutritional and lifestyle change; and (2) investigate whether there are age-related changes in BMR. In two cross-sectional studies of adult volunteers (conducted in 2003 and 2009), we collected anthropometric and metabolic data among 320 Yakut adults (>18 years old; 171 females, 149 males) from Berdyegistiakh (62°N, 127°E; pop. 4,900), Sakha Republic/Yakutia. Measured BMR was compared with predicted BMR based on lower latitude norms. Measured BMR of both males (1,677 ± 24 vs. 1,542 ± 12 kcal/day; P < 0.001) and females (1,370 ± 16 vs. 1,252 ± 7 kcal/day; P < 0.001) was substantially elevated (+9.4% and +8.5%, respectively) compared to fat-free mass predictions. No significant age-related differences in BMR were detected after adjustment for body composition and year of study. This study provides further evidence of metabolic elevation but is highly suggestive of a substantial recent decline in metabolic rate in this population. If confirmed, this has important implications for population-level energy requirements.

Support: NSF ARC-0802390; Leakey Foundation; Sigma Xi; Wenner-Gren Foundation (6884); Northwestern University; University of Oregon; FSRI Institute of Health.

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The Indigenous Siberian Health and Adaptation Project: Adiponectin, body composition, and cardiovascular health among the Yakut (Sakha) of Siberia. EA Streeter, EC Squires, WR Leonard, LA Tarskaia, TM Klimova, VI Fedorova, ME Baltakhinova, VG Krivoshapkin, JJ Snodgrass, Department of Anthropology, University of Oregon, Eugene, OR; Department of Anthropology, Northwestern University, Evanston, IL; Institute for Molecular Genetics, Russian Academy of Sciences, Moscow, Russia; Department of Anthropology, University of Kansas, Lawrence, KS; FSRI Institute of Health, Republic of Sakha/Yakutia, Yakutsk, Russia; Institute of Cognitive and Decision Sciences, University of Oregon, Eugene, OR.

Adiponectin is a hormone secreted by adipocytes that is involved in a number of metabolic processes. Recent work suggests that decreased production of adiponectin is an important risk factor linking obesity with other cardiovascular risk factors. However, few population-based studies have been conducted on this emerging biomarker, and virtually all existing data come from Western clinical settings. This study, part of a long-term research project focused on the indigenous Yakut (Sakha) of northeastern Siberia, examines potential sex differences in adiponectin and investigates relationships with body composition and blood pressure. The data were collected in 2009 from 255 healthy Yakut adults (>18 years old; 137 females, 118 males) and used to test two hypotheses: (1) adiponectin
levels will be higher in females compared to males; and (2) adiponectin will be inversely related to body composition and blood pressure measures. Results indicate a significant sex difference, with greater concentrations in females (15.1 ± 9.7 μg/ml) compared with males (11.6 ± 10.6 μg/ml) (P < 0.01). As expected, adiponectin was negatively correlated with several anthropometric parameters, including body mass index (BMI), waist circumference (WC), and percent body fat (all measures P < 0.01) among males, and BMI (P < 0.05), WC (P < 0.01), and percent body fat (P < 0.01) among females. These findings are consistent with previous work among Western populations. However, adiponectin among the Yakut was not significantly correlated with blood pressure in either sex, which raises questions about its utility as a cardiovascular risk marker in this population.

Support: NSF ARC-0802390; Northwestern University; University of Oregon; FSRI Institute of Health.

PODIUM D: THURS., 3:45 p.m.

The Shuar Health and Life History Project: Measures of market integration and their effects on health among Indigenous Shuar of Ecuadorian Amazonia. LS Sugiyama,1,2,3 FC Madimenos,1 MA Liebert,1 AD Blackwell,1 TJ Cepon,1 JJ Snodgrass1,2,3 1Department of Anthropology, University of California Santa Barbara; 2Institute of Cognitive and Decision Sciences, University of Oregon; 3Center for Evolutionary Psychology, University of California Santa Barbara.

The transition from subsistence to market economy produces living conditions very different from those to which our biology evolved. This process of market integration (MI) has numerous health effects, although the mechanisms involved remain incompletely understood; in part, this stems from the need to adequately measure complex, locally valid dimensions of MI. This article presents MI measures that we have used among indigenous Shuar of Ecuadorian Amazonia. We present food frequency questionnaire (FFQ), traditional style of life (T-SOL) and market style of life (M-SOL) inventory data, as well as information on hemoglobin (Hb), immunoglobulin E (IgE), and C-reactive protein (CRP) for 540 Shuar (1–90 years old; 318 females, 222 males) from nine communities representing different levels of MI. Principal components analysis identified six key factors: (1) market foods (e.g., soda); (2) plant greens, fruits, vegetables, and eggs; (3) traditional game and chicken; (4) market fish and beef; (5) market carbohydrates; and (6) traditional carbohydrates (e.g., yucca). FFQ and SOL scores were associated with various health measures in predicted ways. For example, FFQ and SOL variables explained significant additional variance in Hb levels, beyond age and sex effects. Hb was positively correlated with market foods factors and SOL scores, but negatively correlated with traditional SOL scores, showing expected relationships between dietary and economic measures. MI measures also show significant relationships with cardiovascular and metabolic health measures, IgE, and CRP. This demonstrates the utility of our dietary, economic and style of life measures for characterizing aspects of MI associated with important health-related outcomes.

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When Apple meets Kava: Impact of technology on traditional lifestyles in Vanuatu. C Sun,1,3 H Silverman,1,3 A Pomer,1,2,3 CW Chan,1,2,3 KM Olszowy,2,3 KN Dancause,5 G Lee,5 C Weitz,6 RM Garruto,2,3,4 JK Lum1,2,4 1Laboratory of Evolutionary Anthropology and Health; 2Laboratory of Biomedical and Neurosciences; 3Department of Anthropology; 4Department of Biological Sciences, Binghamton University; 5State University of New York, Binghamton, NY; 6Psychosocial Research Division, Douglas Hospital Research Center, McGill University, Montreal, Canada.

The use of electronic media including computer, television, and video-game constitutes an important part of modern sedentary lifestyle, contributing to chronic health problems such as obesity. Here, we present data collected in 2011 from five islands of the Republic of Vanuatu, where the pace and progress of technology adoption varies greatly among islands. We conducted a survey to assess sedentary behaviors, especially electronic media use, and analyzed their relationships with physical activities and chronic health problems. Preliminary results show that, in the periurban area on Efate where electronic media use is relatively common, the prevalence of adult obesity (20.6%) is much higher than in less economically developed areas where power grids are not readily available, such as Ambae (3.0%) and Futuna (4.0%). In Vanuatu, and potentially other societies undergoing recent technology changes, a higher level of electronic media interrupting and replacing traditional physical activities leads to a sedentary lifestyle. We also suspect that information technology has started to change the way Ni-Vanuatu communicate, from a traditional face-to-face system which includes non-verbal expressions to a voice- or text-based style. This transition may also lead to effects on local social life, information flow and language use (e.g. regional languages versus Internet-friendly languages). The data from this study were collected as part of a broader research project on modernization and health transition in Vanuatu.


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The Shuar Life History and Health Project: Somatic symptoms in the Shuar of the Ecuadorian Amazon, “idioms of distress,” immune dysregulation, or both? PS Tallman,1 MA Liebert,2 FC Madimenos,2 TJ Cepon,2 Binghamton, NY; 5Psychosocial Research Division, Douglas Hospital Research Center, McGill University, Montreal, Canada; 6Department of Anthropology, Temple University, Philadelphia, PA.
Research within anthropology has hypothesized that somatic symptoms, or reports of physical symptoms that suggest physical illness or injury but lack a medical explanation, are actually “idioms” through which distress is communicated. While there is evidence for associations between reports of psychosocial stress and somatic symptoms, no investigations to date have examined whether somatic symptoms are associated with physiological measures of chronic stress. In the present study, we examined whether somatic symptom reports were associated with Epstein Barr virus (EBV) antibodies, a biomarker of chronic stress, in a sample of 102 Shuar men and women in lowland Ecuador. Exploratory analyses found that more than 75% of individuals within this sample reported some form of pain and that close to 80% of the sample had EBV antibody concentrations over 70 AU/ml (mean 135.45 AU/ml). We documented positive associations ($P < 0.05$) between EBV antibody concentrations and reports of body pain, joint pain, a summary pain variable, and dichotomous somatic symptom report. Further, we found a trend ($P < 0.15$) for associations between EBV and reports of weakness, organ pain (kidney, liver, uterine, or ovary pain), and vision problems. No significant associations were found between EBV and any type of gastrointestinal symptom, headaches, tingling in the extremities, heart palpitations, or reproductive problems. High reports of pain and other somatic symptoms, high average EBV antibody concentrations, and significant associations between somatic symptoms and EBV concentrations suggest that a significant proportion of this sample of individuals is suffering with physical symptoms that may be related to stress-induced immune dysregulation.

Support: NSF (GRFP Travel Award and NSF BCS-1027687); NIH 5D1P1OD000516-04 (via Center for Evolutionary Psychology, USCB); University of Oregon; L.S.B. Leakey Foundation; Wenner-Gren Foundation (7970).

Factors Effecting Tuberculosis Mortality: Lessons from a known skeletal collection. D Tompkins. University of Massachusetts, Amherst

Tuberculosis continues to be a major cause of morbidity and mortality in many parts of the world despite near eradication earlier in this century. As the world becomes increasingly globalization and drug resistant forms of the disease emerge, these trends will almost certainly continue to increase. Factors effecting tuberculosis mortality are as varied as the persons who contract the disease and include social as well as biological causes. This poster discusses some of the factors present in an early 20th century skeletal collection from St. Louis, Mo, with tuberculosis listed as a cause of death. The Robert J. Terry Anatomical Collection has been an invaluable resource for skeletal biologists for nearly a century and offers a glimpse of what other aspects of the individuals’ lives may have led to succumbing to tuberculosis. In a preliminary study of 62 of the 256 tubercular deaths, 40% of the individuals displayed at least one scorable linear enamel hypoplasia indicative of early metabolic stress. Gendered differences in distribution are also present (54% of the male sample, 17% of the female sample). Early heavy muscle markings indicative of repetitive labor was present at higher rates in whites. Through an examination of the skeletal markings of disease and social differences present in a known collection of individuals, the aspects of tuberculosis mortality and morbidity may be extrapolated to living populations and utilized by public health officials working to alleviate the negative effects of this insidious disease.

Stunting, or linear growth retardation, has been documented in nearly ¼ of children in rural South American indigenous populations. It is well recognized that malnutrition and infectious disease are associated with childhood stunting and, more recently, research has begun to consider the relationships between height, stunting, and body composition later in life. Here we present data from the Tsimane’ Amazonian Panel Study that examines the relationship between child height and both body mass index (BMI) and other measures of body composition after a period of 5 years. Standard anthropometric measures including height, weight, and skinfold thickness were collected in 13 research communities in the Beni region of Bolivia. A total of 447 Tsimane’ 5 to 16 years old who participated in 2002 also participated in the final year of data collection presented here, 2007. Preliminary results indicate that both height and height for age z-score (HAZ) in 2002 were strongly correlated with height in 2007. The majority of children who were stunted (HAZ < −2) in 2002 remained stunted in 2007. Height for age z-score in 2002 was positively associated with both BMI and skinfold measurements of the child in 2007. After controlling for sex and age, the relationship between early stunting and later body composition remains strong for girls and older children between the ages of 10 and 16 years. These findings provide insight into the consequences of childhood growth restriction in a rural, low-income setting.

Support: NSF (GRFP Travel Award and NSF BCS-1027687); NIH 5D1P1OD000516-04 (via Center for Evolutionary Psychology, USCB); University of Oregon; L.S.B. Leakey Foundation; Wenner-Gren Foundation (7970).
Studies report acute increases in testosterone in response to heavy physical activity among young men in industrial populations. These acute increases in testosterone enhance muscular glucose uptake, allowing rapid performance enhancement. Changes in testosterone during intense physical activity have not been adequately examined in older males, or in nonindustrial populations, which tend to exhibit reduced levels of testosterone compared with males in industrial populations due to energetic and pathogenic down-regulation of the hypothalamic-pituitary-gonadal axis. The Tsimane are forager-horticulturalists living in the Bolivian Amazon who experience high energy expenditure, as well as high levels of parasites and pathogens, and display significantly lower baseline levels of salivary testosterone than age-matched U.S. males. This study examines acute changes in salivary testosterone among 63 Tsimane men ranging in age from 16 to 80 (mean age 38.7 years) during 1 hour of intense physical activity. Linear mixed effects models controlling for BMI and time of specimen collection determined that there was a significant increase in salivary testosterone \( P < 0.000 \), equivalent to a 54.9% rise in testosterone after one hour of tree chopping. Age had no effect on the change in testosterone. These results suggest that acute increases in testosterone do occur during intense physical labor in a nonindustrial population with significantly lower baseline testosterone levels, and that the change in testosterone was not affected by age in this population.

Funded in part by NIH/NIA Grant# R01AG024119-01, NIH/NICHD Grant# 5T32HD007543-07.

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The Shuar Health and Life History Project: Knemometric assessment of short-term childhood growth in an indigenous Amazonian population. SS Urlacher,1 MA Liebert,2 TJ Cepón,3,4 JJ Snodgrass,3,4 LS Sugiyama,2,5,6 1Department of Human Evolutionary Biology, Harvard University, Cambridge, MA; 2Department of Anthropology, University of Oregon, Eugene, OR; 3Department of Anthropology; 4Institute of Cognitive and Decision Sciences, University of Oregon, Eugene, OR; 4Center for Evolutionary Psychology, University of California, Santa Barbara, CA.

Substantial evidence demonstrates that childhood linear growth is an episodic phenomenon characterized by significant variation in short-term (e.g. daily or weekly) growth velocity. Acknowledging that this variation likely represents nonrandom patterns in association with energetic trade-offs and health, the ability to accurately measure short-term growth is essential to understanding the biological processes underlying childhood development. Knemometry (the accurate measurement of the lower leg) is one of few techniques capable of detecting short-term childhood growth. Most knemometers are large, expensive and difficult to use, limiting previous knemometric studies to Western populations in laboratory settings. Here we present data on the use of a simplified, battery-powered, and portable knemometer to measure short-term lower leg length growth among the indigenous Shuar of Ecuadorian Amazonia. Living in a highly pathogenic and nutrient-poor environment, the Shuar are expected to show greater variation in short-term growth than Western populations. Knemometry and standard anthropometric measures (height, weight and skin folds) were collected from 93 Shuar children aged 3 to 14 years (57 females and 36 males). Preliminary knemometric replicate measurements \( n = 476 \) were analyzed to calculate a technical error and instrument precision of 0.27 mm. Individual short-term lower leg length growth was derived from weekly measurements obtained over 4 consecutive weeks. Intra- and interindividual variation in weekly lower leg length growth is discussed in conjunction with linear analyses examining the relationship between growth and weight/skin folds controlling for age and sex.

Support: NSF GRFP 2011109300; Ryoichi Sasakawa Young Leaders Fellowship Fund; Harvard University Department of Human Evolutionary Biology; University of Oregon Institute for Cognitive and Decisions Sciences; University of Oregon Department of Anthropology.

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Anthropometric and metabolic correlates of C-reactive protein in adult Toba men and women. CR Valeggia,1,2 E Lagranja,2,3 A Navarro1. 1Department of Anthropology, University of Pennsylvania, PA, USA; 2Chaco Area Reproductive Ecology Program, University of Pennsylvania, PA, USA; 3Escuela de Nutrición, Universidad Nacional de Córdoba, Argentina.

The interactions between metabolic and immune pathways in different ecological situations have been largely understudied. These interactions reflect clear life history trade-offs at different points during the life course. The purpose of this study was to explore the association between a marker of inflammation (C-reactive protein levels) and measures of body mass and adiposity, blood pressure, and metabolic markers. Our sample consisted of 280 Toba men and women 20 years old and older. We collected data on weight, height, %fat, waist circumference, blood pressure and reproductive status. Using finger-pricking and a portable device we collected fasting blood samples and measured blood glucose, HDL-cholesterol and triglycerides on site. Dried blood spots were collected and shipped to the laboratory where they were analyzed for hs-CRP. The median CRP value was 1.99 mg/l, and high CRP values are as prevalent among the Toba as among US adults (33–35%). Toba women have significantly higher CRP levels than men (4.1 vs. 2.8 mg/l, \( t = -3.1, P = 0.02 \)) and age was a significant predictor in both sexes \( r = 0.2, P < 0.001 \). All of the anthropometric measures were highly and positively correlated with CRP levels. Among these, abdominal fat seems to be the best predictor. However, none of the metabolic cardiovascular disease risk markers was correlated with CRP levels. High pathogen exposure and high abdominal obesity are characteristic of indigenous populations experiencing a rapid process of acculturation. More
research is needed to understand the possible adaptive dynamics of metabolic and immune trade-offs.

This study was funded by the NIA P30 Demography of Aging (AG 012836-15) Pilot Award.

PODIUM B: THURS., 11:30 a.m.


In the last 20 years, many traditional subsistence societies throughout Latin America have seen rapid nutritional, demographic, and epidemiologic change. Here we present changing patterns in child growth over time, drawing from an 18-year study of Maya subsistence agriculturalists in Yucatan, Mexico. Since the onset of the study, health care infrastructure has improved substantially and declines in infant mortality have occurred. Also observed is a recent emergence of reproductive and social stratification. We find evidence of changing patterns in child growth from 1992 to the present. We attempt to evaluate the suite of forces that may be driving this phenomenon, with particular attention to the role of local disease ecology. Recent village clinic data are used to examine the relationships between growth, parasitism, and infectious disease morbidity in 107 children from 0 to 5 years of age. Trade-offs between growth and immune function have been observed across multiple taxa and in a variety of human populations. These trade-offs are most pronounced under circumstances of resource scarcity and environmental pathogenicity. We therefore expect that rapid changes in the social and epidemiologic environment may alter the nature of such energetic trade-offs in early childhood, with important implications for child health outcomes.

This study was funded by the National Science Foundation (0964031) and National Institutes of Health (AG 19044-01 and AG11761).

PLENARY: WED., 2:15 p.m.

Fifty fertile years: Anthropologists’ studies of reproduction in high altitude natives. VJ Vitzthum, Anthropology Department & Kinsey Institute for Research in Sex, Gender and Reproduction, Indiana University, Bloomington, and H Spielvogel, Instituto Boliviano de Biología de Altura, Universidad Mayor de San Andrés, La Paz, Bolivia.

Early European colonists of the Andean highlands had difficulties reproducing. A 16th century missionary wrote, “...the Indians are healthiest and where they multiply the most prolifically is in these same cold air-tempers, which is quite the reverse of what happens to the children of the Spaniards, most of whom when born in such regions do not survive.” To bioanthropologists, these observations suggest that humans at high altitudes are subjected to strong natural selection from hypoxia, cold and limited food sources and, furthermore, that human populations can and have adapted, and continue to adapt, to these conditions.

Informed by several approaches and theoretical frameworks (genetics, physiology, energetics, biocultural models, demography, life history theory), anthropologists during the past 50 years have investigated to what extent and precisely how high altitude environments impact human reproductive functioning and fertility. Analyses of the proximate determinants of fertility (Vitzthum and Wiley, 2003) suggest that behaviors (breast/infant feeding practices in the Andes, and marriage practices and religious celibacy in the Himalaya) are major determinants of fertility in high altitude populations. Data from Project REPA (Reproduction and Ecology in Provincia Aroma), a longitudinal study in rural Bolivia, support predictions from life history theory that fecundity is not impaired in this indigenous altiplano population, and that the risk for early pregnancy loss varies seasonally with the agricultural cycle (contra to the assumption that EPLs are due almost entirely to genetically flawed concept). We present these and other findings that reveal the complex and dynamic adaptations of human reproductive functioning in high altitude environments.

Project REPA has been supported by the U.S. National Science Foundation, Instituto Boliviano de Biología de Altura (La Paz), the University of California (Riverside), Binghamton University (SUNY), and the Office of the Vice Provost for Research, Indiana University (Bloomington).

PLENARY: WED., 1:45 p.m.

Migrant studies at high altitude. CA Weitz. Department of Anthropology, Temple University, Philadelphia.

Physiological studies of migrants to high altitude have been taking place for much longer than studies of indigenous high altitude populations. But most of the early studies that were conducted in the late 19th and early 20th centuries focused on the responses of short-term sojourners to high altitude. In the 1960s Geoffrey A. Harrison proposed a strategy for high altitude research that included comparisons between permanent migrants at high altitude and indigenous populations. This approach, pioneered in the Rockies and as part of the Nuñoa project in the Andes, suggested that migrants who spend part or all of their childhood at high altitude might develop some of the physiological responses that characterize indigenous groups. Carefully controlled studies that occurred subsequently in the Andes have “flushed-out” the nature of developmental acclimatization by identifying the magnitude of change in physiological characteristics associated with the age at which individuals migrated to, and the number of years subsequently spent at, high altitude. Migrant studies in Tibet have shown that low altitude Asian populations also exhibit patterns of developmental acclimatization. However, evidence of common developmental patterns between high altitude Tibetans and some lowland Han point to the possibility of genetic overlaps between high and low-altitude Asian populations. While migrant-indigenous comparisons have moved into the genomic era through the use of techniques like admixture mapping, there is still reason to support continue research on the emergence of adult phenotypes—particularly in the context of selective migration and on the interaction between hypoxia and poor nutrition.
PODIUM A: THURS., 9:45 a.m.

Advice versus influence: An examination of the factors shaping adolescent nutritional status in Belfast, Northern Ireland. JL Williams. Department of Anthropology, University of Kentucky, Lexington, KY.

Human biologists have positioned young people as “participants in structuring their own lives” (Lee and Brewis, 2009: 435) who play a central role in shaping nutritional status outcomes, yet little is known about the sociocultural influences shaping the diet and exercise of young people. In low-income neighborhoods of Belfast, Northern Ireland, there have been numerous government and community level efforts to improve the diets and exercise patterns of young people and curb the spread of obesity. For young people, nutrition messages are received amidst multiple influences, and the purpose of this research is to examine the sociocultural factors influencing diet and exercise patterns in a community where healthy eating messages are pervasive. This poster will then examine the relationship between nutritional status outcomes and the strength of influence that family, peers, school, church, community organizations, and media have on adolescent decision making. The strength of sociocultural factors is correlated with nutritional status outcomes in a representative sample of secondary school students to highlight the role that competing factors play in adolescent decision making. This relationship is mediated with diet and activity data collected through self-administered questionnaires, to correlate diet and exercise patterns with nutritional status. Since most of the children in this study fell into the “normal” (50%), “overweight” (27%), or “obese” (15%) categories, based on WHO cutoffs, sociocultural influences on each group will provide insight into the forces shaping diet and exercise patterns and nutritional status outcomes and the points at which healthy eating messages are potentially effective.

This study was funded by an NSF doctoral dissertation improvement grant.

PODIUM C: THURS., 2:15 p.m.

Global variation in the interaction of socioeconomic status and health in older women: Results from SAGE, SR Williams, LG Moore, 1 CG Julian, 1 AW Bigham, 2 MD Shriver, 3 E Vargas, 4 LG Moore 5. 1Altitude Research Center, Department of Emergency Medicine, School of Medicine, University of Colorado Denver, Aurora, CO; 2Department of Genome Sciences, University of Washington; 3Department of Anthropology, Pennsylvania State University; 4Instituto Boliviano de Biologia de Altura, Universidad Mayor de San Andrés, La Paz, Bolivia; 5Graduate School of Arts and Sciences, Wake Forest University.

Being born female plays a significant role in determining health outcomes throughout life. Irrespective of geographic area or culture, women have unique health issues and are particularly susceptible to the negative impacts of poverty on health. Research on women’s health has traditionally focused on younger women and topics that are associated with younger women’s reproduction. Less is known about gender variation in health at older ages. The goal of this paper is to examine the general health of women in six countries (Ghana, South Africa, China, India, Russia, and U.S.) and to explore the differential impact of socioeconomic status on key health variables using data from the Study on Global Aging and Adult Health (SAGE) and the National Social Life, Health and Aging Project (NSHAP). Most health indicators vary significantly across countries, including rates of overweight and obesity, hypertension, self-reported health, and physical function. Further, the impact of SES on health also varies significantly across cultures. For example, in India 32% of women over 55 were overweight and 26% were overweight but among those in the lower half of SES, 42% of women were underweight and 18% overweight. In China only 5% of older women were overweight increasing to 7% in the bottom SES with overweight women accounting for 41% of the general sample but only 26% of women in the bottom SES. These data suggest that SES and gender interactions differ across cultural contexts.

Support: NIH/NIA R01AG030481, World Health Organization, Purdue University.

PLENARY: WED., 3:15 p.m.

High altitude, natural selection, and pregnancy. MJ Wilson, 1 CG Julian, 1 AW Bigham, 2 MD Shriver, 3 E Vargas, 4 LG Moore 5. 1Altitude Research Center, Department of Emergency Medicine, School of Medicine, University of Colorado Denver, Aurora, CO; 2Department of Genome Sciences, University of Washington; 3Department of Anthropology, Pennsylvania State University; 4Instituto Boliviano de Biologia de Altura, Universidad Mayor de San Andrés, La Paz, Bolivia; 5Graduate School of Arts and Sciences, Wake Forest University.

High altitude provides an ideal natural laboratory for studying modern human adaptation. Many phenotypes characteristic of people living at high altitude have been described, yet the adaptive value or consequences of some of these phenotypes are debated. For instance, populations of multigenerational residence at high altitude show a decrease in fetal growth, but the decrease is less than that seen in relative newcomers to high altitude. There is debate as to whether decreased birth weight at high altitude has been selected for or against (the “small-but-healthy” hypothesis). Here we explore the genetic evidence for birth weight selection at high altitude. By using multiple tests for signatures of natural selection, we identified five hypoxia-related gene regions that showed allelic frequencies distinctive to the Andean population, of which three were associated with pregnancy phenotypes at high altitude. Alleles more frequently found in Andeans were positively associated with birth weight and additional factors likely to contribute to Andean protection from hypoxia-associated fetal growth restriction, suggesting that selection has been operating at high altitude to raise, not lower, birth weight in long-resident populations. Our approach here provides an informative look at human adaptation to high altitude by analyzing the association of pregnancy phenotypes that have direct relevance for reproductive success and hence adaptive fitness at high altitude. By applying recently developed methods in finding genetic signatures of natural selection, we can further explore the adaptive phenotype for high altitude. These current studies suggest that “small” is not healthy at altitude.
Household livelihoods, maternal synchrony, and long-term child growth among Datoga in northern Tanzania. AG Young. Department of Anthropology, University of Florida, Gainesville, FL.

This article uses panel data collected among 20 mother-infant dyads in northern Tanzania between 2004 and 2011 to examine the impact of household livelihood strategies on immediate and long-term growth of young children though their effects on mother-infant interaction. The analysis relies on data from 175 hours of direct observation mother-infant interaction for 20 mother-infant dyads, 6 months of consecutive monthly anthropometric and health assessments for each child (2004–2006), as well as health and growth measures for each child after 3 and 5 years (between 2009 and 2011). Data from 2004 to 2006 indicate that household livelihood strategies affect feeding patterns and amount of time women spend with children, however, the types of interactions that women and children have during their time together also have an impact on child growth. In particular, sensitivity of maternal response, maternal synchrony, and proportion of time the dyad spend in close proximity were associated with better short-term growth scores. Additional data from 2009 to 2011 support this finding, with dyads that showed high maternal synchrony in 2004 to 2006 also showing better growth after 3 and 5 years. Discussions about maternal workloads and caretaking practices often focus on larger scale feeding practices and time spent together-rather than the qualities of the time dyads spend together. This is understandable given the challenges of collecting detailed behavioral data, however, we may be losing important connections for understanding the subtle ways that larger aspects of lived experience are filtered and translated into human biological variation.

Funding provided by: NSF-DDIG (0451049), Fulbright Hays DDRA, UF Humanities Scholarship Enhancement Fund, and a USAID LCC-CRSP grant.
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Pomer A P: 6, P: 49, P: 50, P: 53, PODIUM A: Thurs., 8:45, PODIUM D: Thurs., 4:00 p.m.
Power ML *P: 3, PODIUM B: Thurs., 10:30 a.m.
Quested C PODIUM D: Thurs., 4:30 p.m.
Quinn EA *PODIUM B: Thurs., 10:30 a.m.
Rankin-Sunter KA P: 18
Rey D P: 27
Reyes-Garcia V P: 31
Ritchie-Ewing GT *PODIUM A: Thurs., 9:30 a.m.
RL Hall *P: 5
Rockwell LC P: 59
Rosado H P: 16
Rowe EJ* P: 59
Ruiz-Linares A P: 25
Russell E PODIUM C: Thurs., 2:00 p.m.
Sadruddin AFA P: 9, *P: 17, PODIUM A: Thurs., 9:45 a.m.
Salvante KG *P: 45, P: 46
Salzano FM P: 25
Sankaranarayanan K PODIUM C: Thurs., 3:00 p.m.
Sarkar PL *P: 46
Sattenspiel L P: 22
Schaefers FS P: 58
Schell LM P: 10, P: 12, P: 13
Schmitt SM PODIUM C: Thurs., 3:00 p.m.
Schwartz JE P: 57
Sharman T P: 47
Shepherd M PODIUM B: Thurs., 11:00 a.m.
Shortt JW PODIUM C: Thurs., 2:00 p.m.
Sievert LL P: 47, P: 57
Singh E *P: 11
Soloway LE P: 30
Spathis R PODIUM C: Thurs., 3:00 p.m.
Squires EC *P: 39, P: 42
Staub K P: 29
Stevenson JC P: 18
Straight B P: 54
Streefer EA P: 39, *P: 42
Studebaker JG PODIUM A: Thurs., 9:45 a.m.
Sun C P: 6, P: 49, *P: 50, P: 53, PODIUM A: Thurs., 8:45, PODIUM C: Thurs., 3:00 p.m., PODIUM D: Thurs., 4:00 p.m.
Tallman PS *P: 55
Tanner S *P: 31
Tarskaia LA P: 37, P: 38, P: 39, P: 42
Thayer ZM P: 48
Thomas RB PLENARY: Wed., 1:00 P.M.
Thompson AL P: 15
Thornburg J P: 62
Tompkins D *P: 24
Towne B P: 30
Troisi R PODIUM B: Thurs., 10:45 a.m.
Trumble BC *P: 44
Tuitele J PODIUM D: Thurs., 4:30 p.m.
Urlacher SS *P: 36, P: 51, P: 52
Valeggia CR *P: 40
Van Horn A P: 59
Van Uum SHM PODIUM C: Thurs., 2:00 p.m.
Vargas E PLENARY: Wed., 3:15

Vargas-Alarcón G P: 27
Veile A *PODIUM B: Thurs., 11:30 a.m.
Wagner J P: 33
Wang S P: 25
Weeks DE PODIUM D: Thurs., 4:30 p.m.
Weitz C P: 6, P: 49, P: 50, P: 53, PODIUM A: Thurs., 8:45, PODIUM D: Thurs., 4:00 p.m.
Weitz CA *PLENARY: Wed., 1:45 P.M.
Wiley AS P: 34
Williams HS P: 4
Williams JL *PODIUM A: Thurs., 9:15 a.m.
Williams SR P: 9, P: 17, *PODIUM C: Thurs., 2:15 p.m.
Wilson M PLENARY: Wed., 3:45 p.m.
Young AG *P: 28
Young K PODIUM C: Thurs., 2:45 p.m.
Ziegler RG PODIUM B: Thurs., 10:45 a.m.