

## **Agenda for Allostatic Load Workshop - February 4 - 5, 2019** **Hyatt Regency Hotel -- New Orleans, LA**

### BACKGROUND AND OBJECTIVES

This workshop is a first follow-up to a Human Health Observing System workshop held in Washington, DC on November 14 – 16, 2018. Critical concerns in the design of any surveillance system are the issues of what to measure, with what frequency, with what instrumentation, and with what underlying rationale?

Among the ideas and concepts discussed in the prior workshop was the notion of allostatic load (AL). A definition of allostatic load -- one among several similar definitions put forth since its introduction in 1993 -- is as follows: 'Allostatic Load is the price the body pays for being forced to adapt to adverse psychosocial or physical situations. It represents either the presence of too much stress or the inefficient operation of the stress hormone response system, which must be turned on and then turned off again after the stressful situation is over.' There are at least four forms of allostatic load to consider, more than one of which may occur in the same individual over time, depending upon the specific kind and duration of the challenge presented. These are: (i) repeated challenges/hits with normal responses; (ii) repeated challenges/hits with a lack of adaptation to them; (iii) prolonged response to a challenge; and (iv) inadequate response. A considerable literature, published over the past 25 years, deals with strategies for operationalizing the notion of AL. Nevertheless, there are important missing links that need to be developed if AL is to play a fundamental role in the human health observing systems of the future.

*The overall objective of the AL workshop is to clearly delineate the missing links and discuss strategies for advancing conceptual understanding of AL and its operationalizations.*

Assessments of AL should ideally incorporate information on normal operating ranges (allostasis), for the individual, of biological mediators, as well as alterations in the operating range of diverse system parameters in response to challenges. With few exceptions, measurement of AL to-date has focused on identifying chronic, steady state levels of activity of mediators related to diurnal variation and/or the residual effects of chronic stress or failure to shut off responses to acute stressors. Understanding the short, intermediate, and long-term AL consequences of exposure to natural disasters -- one of our primary foci of interest -- requires measurement technology that is oriented to system dynamics. It also requires operationalization of the concept of AL that goes well beyond the rather coarse indices utilized to-date. Moving in this direction is a limited literature focused on mitochondrial and metabolic formulations of AL. Both of these directions emphasize system dynamics, return (or not) of key indicators to normal operating levels, and a focus on energy as a basis for operationalizing AL. These foci, among others, will enter into the workshop discussion of measurement of AL in the context of a human health observing system. Finally, it is important to emphasize that we are not aiming for closure on this topic. We seek new ideas from all participants, and proposals for constructive ways to advance the development and understanding of AL.

## PRESENTATIONS AND DISCUSSION

Monday, February 4

8:00 - 8:30 AM -- Breakfast and refreshments

8:30 - 8:50 AM -- Introduction of participants

8:50 - 9:10 AM -- Background and introduction to Allostatic Load (AL) in the context of a human health observing system:

A -- Overview of November 14 - 16 workshop. What were the key take-home lessons? Description of forms and frequency of measurement of different types. Observation during quiescent periods vs. assessment of immediate responses and long-term follow-up of particular disasters.

B -- What is AL? 'Price' and 'Cost' formulations from 1993 to the present. An index of AL introduced in 1997 and its varied offspring. What's missing, and how do we get to more nuanced operationalizations? How might we embed AL assessment in an observing system? How does AL relate to the exposome?

*Paul Sandifer (College of Charleston) and Burton Singer (University of Florida)*

9:10 - 9:45 AM -- Allostasis and AL: Where are we? What are some research priorities looking ahead?

*Bruce McEwen (Rockefeller University)*

9:45 - 9:55 AM -- Questions, responses, and very brief discussion

9:55 - 10:30 AM -- Measurement of AL to date: How can it be adapted to a health observing system?

*Teresa Seeman (UCLA)*

10:30 - 10:40 AM -- Questions, responses, and very brief discussion

10:40 - 11:00 AM -- Coffee Break

11:00 - 11:35 AM -- Mitochondrial AL: What is it? What about operationalizations (current? future?). What is the research agenda?

*Martin Picard (Columbia University)*

11:35 AM --11:45 AM -- Questions, responses, and very brief discussion

11:45 AM--12:15 PM -- Group discussion covering the three morning talks

12:15 - 1:00 PM -- Lunch

1:00 - 1:35 PM -- Toward dynamic formulations of AL

*Richard Sloan (Columbia University)*

1:35 - 1:45 PM -- Questions, responses, and very brief discussion

1:45 - 2:20 PM -- Formulations of AL with emphasis on mental health

*Robert-Paul Juster (University of Montreal)*

2:20 - 2:30 PM -- Questions, responses, and very brief discussion

2:30 - 2:50 PM -- Coffee Break

2:50 - 3:25 PM -- Metabolic AL and computational advances

*Kirill Veselkov (Imperial College London)*

3:25 - 5:00 PM -- Group discussion synthesizing ideas presented in the talks with emphasis on advances in operationalization of AL to include dynamics.

6:30 PM -- Group dinner and informal discussion

Tuesday, February 5

8:30 - 9:00 AM -- Breakfast and Refreshments

9:00 AM - Noon -- Group discussion focused on practical implementation of AL assessments in a human health observing system. Considerable attention will be given to sampling strategies and their adaptation to disaster follow-up. Cost considerations will require that we think about measurement of 'AL light': What can we say about this on the basis of what we learned yesterday? One portion of this discussion will focus on AL assessment in clinical practice. This is admittedly a large topic in its own right, but the conversation between population-based information and the content of patient records is relevant for implementation of a human health observing system.

*12:00 - 1:00 PM – Lunch with continued discussion and adjourn*