

# Exploring The Relationship Between Stress and Cortisol in Full-time and Part-time Nurses



Dr. Michael S. Kerr,  
School of Nursing,  
University of Western Ontario  
Workplace Studies Area,  
Institute for Work & Health



# ABSTRACT

One of the remaining challenges in directly linking work or life stressors to health problems is the paucity of biological evidence for a causal pathway. Recent animal and human research examining cortisol as a potential biomarker for stress is starting to address this issue of causality. This emerging evidence, coupled with recent field method developments, such as non-invasive sampling through saliva collection, has made it possible to consider large-scale epidemiologic studies that can better explore the causal pathway for stress.

The main purposes of our quasi-pilot study were to explore the differences in stress levels between full and part-time nurses and to determine if any relationships exist between the major standardized instruments for work and life stressors and salivary cortisol. The study addresses the following two questions: 1) Do full-time and part-time nurses differ with respect to major work and life stressors? 2) Do nurses with higher job or life stress instrument scores also have higher mean daily salivary cortisol? We will also explore some methodological points regarding options for cortisol sampling and analysis given the pilot framework for the study.

Two groups of nurses were chosen to participate: 100 full-time nurses and 100 part-time nurses. To control for organizational effects, all participants were chosen from the same acute care teaching hospital.

Participants completed a self-administered questionnaire addressing work and life stressors, self-reported health outcomes and some basic demographic information such as age, sex, etc. Cortisol samples were obtained using cotton swabs (Salivettes®) placed in the mouth for about 30 seconds. Samples were obtained at 1, 4, 9, and 11 hours after waking and just before bedtime, on each of 2 work and 2 non-work days. Cortisol data will be analyzed using the mean level over the day (or “area under the curve” approach), as this method is considered well suited for normal populations, particularly when examining the relationship between cortisol levels and psychological functioning (Schwartz and Stone, 1998). We will also model mean cortisol levels using a multi-level approach to multivariate regression analyses that controls for potential confounders as well as within person/time autocorrelation. Preliminary results will be available at the poster presentation.

CORRESPONDING AUTHOR: Mickey Kerr PhD, Institute for Work & Health, 481 University Avenue, Toronto, ON, M5G 2E9, Canada

# Purpose

- ◆ To explore differences in self-reported work stress levels and health outcomes between full and part-time nurses.
- ◆ To determine if any relationship exists between salivary cortisol, a potential biomarker for stress and the major questionnaire instruments for work life stressors.

# Cortisol and Stress

- ◆ Emerging evidence (Kelly et al., 1997) and new field methods for saliva sampling (Kirschbaum & Hellhammer, 1994)
- ◆ Goldstein et al. (1999), concluded that an increases in cortisol levels was a sign of negative emotion or distress.
- ◆ Own previous work indicated significant differences in stress and health for full and part time nurses (Shamian et al, 2002)

# Hypothesis

- ◆ Full-time nurses will have worse stress levels and and poorer health profiles than part-time nurses.
- ◆ Increased salivary cortisol secretions will be associated with poorer work environment scores

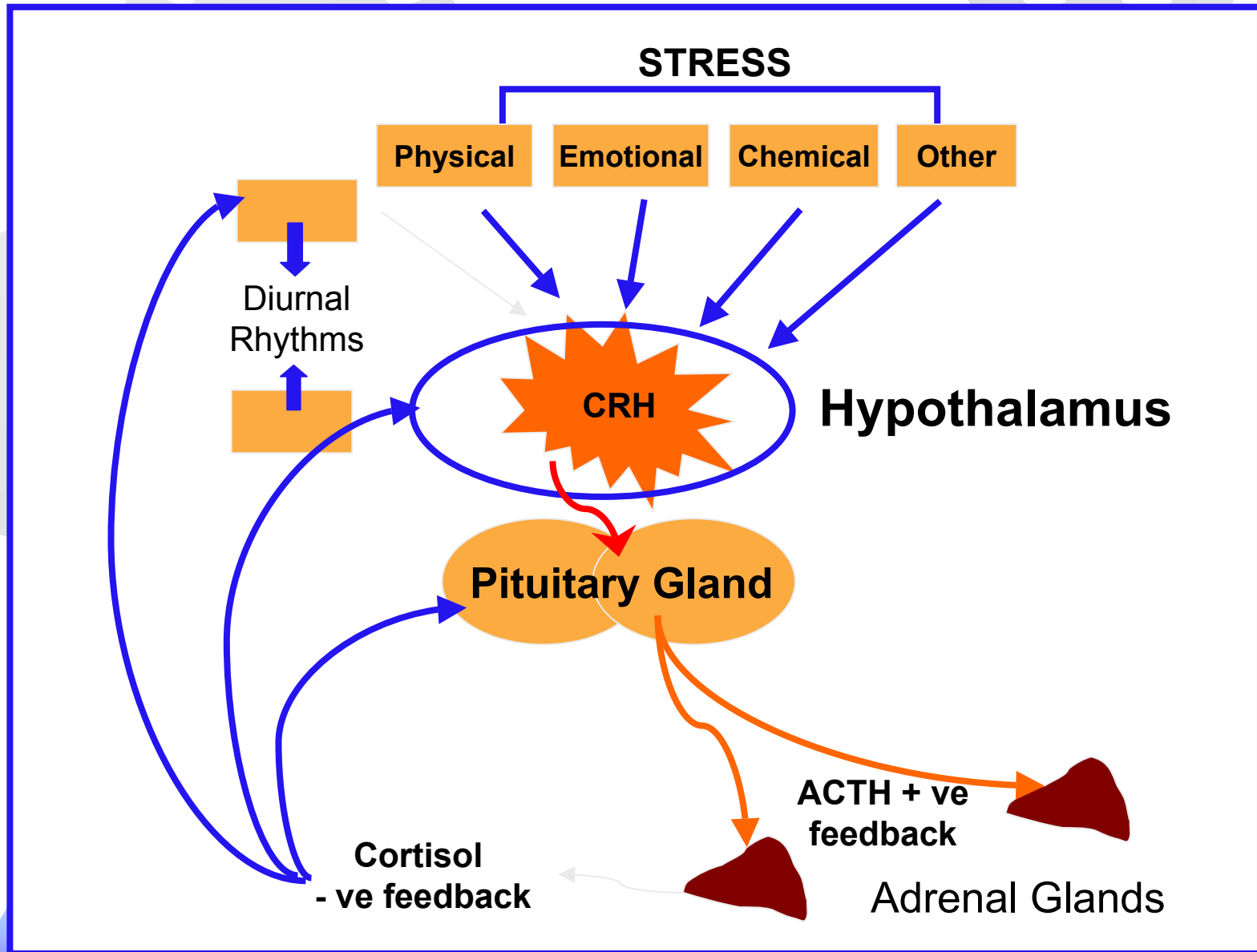


# Cortisol - Background

- ✦ Is a steroid hormone and the principal glucocorticoid in the body
- ✦ Synthesis and secretion are stimulated by the release of ACTH by the anterior pituitary gland



# Cortisol and Stress Biopathways

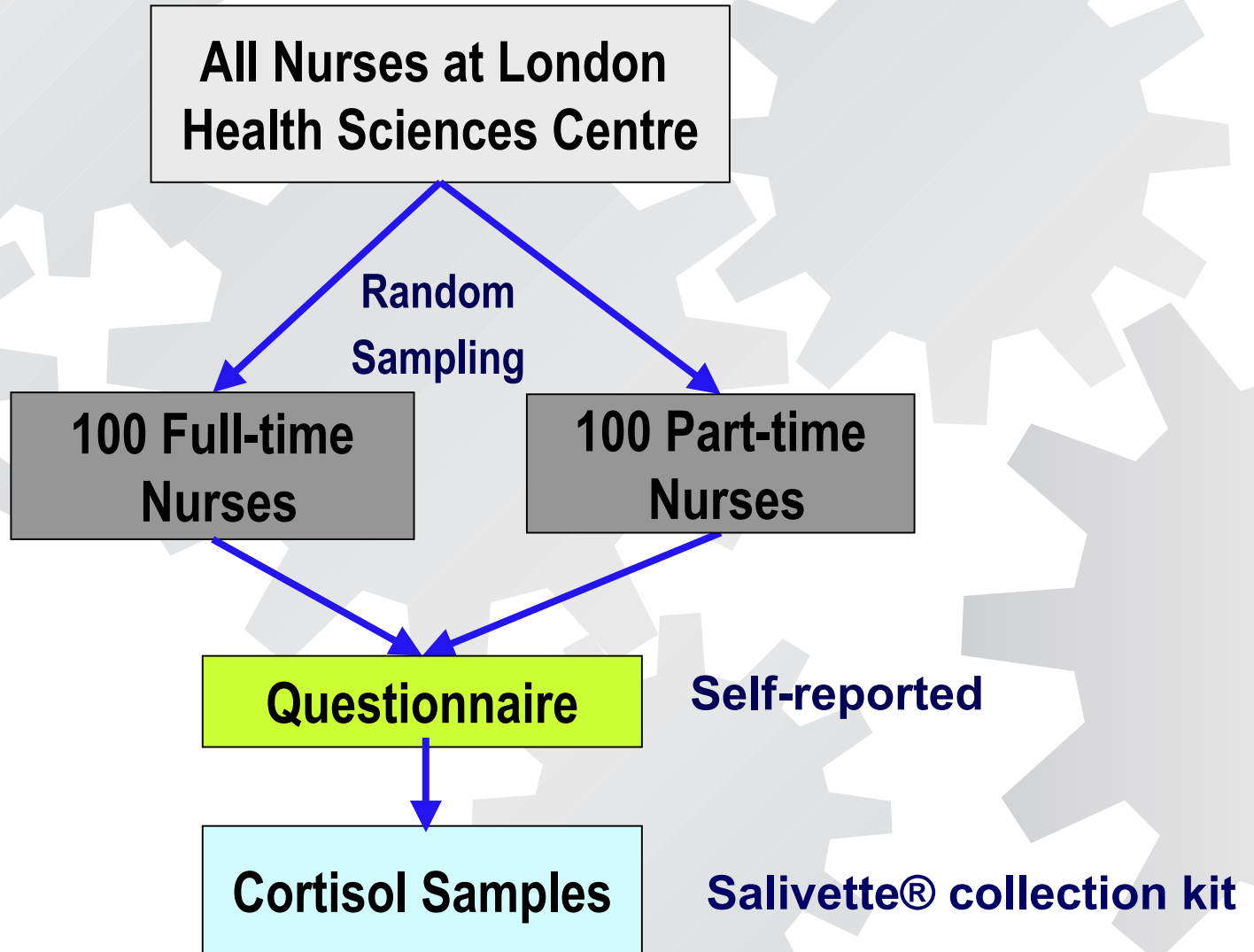


# Functions of Cortisol

- ✦ To help maintain glucose levels during fasting and stress.
- ✦ To maintain normal vascular responsiveness.
- ✦ To promote anti-inflammatory effects.



# Study Outline



# Eligibility to Participate:

- ◆ Full and Part-time Acute Care Registered Nurses
- ◆ Employed at the London Health Sciences Centre for at least six months
- ◆ Between the ages of 20-65



# Participants were asked to:

- ✦ Complete a self-administered questionnaire based on work and life stressors and health outcomes (approximately 30 minutes to complete).
- ✦ Collect saliva using Salivette® collection kit at 1, 4, 9, and 11 hours after waking and just before bedtime on each of 2 work and 2 non-work days.

# Some Key Measures Used

- ◆ Job Content Questionnaire (JCQ) - Karasek
- ◆ Effort-Reward Imbalance (ERI) - Siegrist
- ◆ Copenhagen Burnout Inventory - Kristensen
- ◆ Maslach Burnout Inventory (MBI) - Maslach
- ◆ SF-36 Health Survey - Ware
- ◆ Nurse Work Index – Aiken & Patrician
- ◆ Empowerment - Laschinger

Provides analysis options for inter-scale comparisons between the two major psychosocial factor and burnout scales and association of burnout with SF-36 and cortisol

# Analysis

- ◆ Cortisol data will be analyzed using the mean level over the day (“area under the curve”) approach (Schwartz and Stone, 1998).
- ◆ Sub-group analyses within each arm of study will look for correlations of health outcomes and cortisol responses with stressors
- ◆ Multi-level approach to multivariate regression analyses will control for potential confounders as well as within person/time autocorrelation.

# Results of this Study will Inform Researchers by:

- ✦ Identifying key factors associated with differences in stress levels between full and part-time nurses
- ✦ Determining if any relationship exists between work and life stressors and salivary cortisol, and provide important practical information regarding cortisol sampling and some key work stress and health measures

# Potential Practical Outcomes

- ◆ Possible contribution to more effective intervention strategies aimed at improving nurses' health and well-being, job satisfaction, and work-related stress.
- ◆ Inform workplace programs designed to attract and retain nurses.
- ◆ Contribute to a better understanding of stress and health pathways and tools used to assess work-related stress and health

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## For Additional Information Please Contact:

**Dr. Michael S. Kerr**  
**Principal Investigator**  
**Institute for Work & Health,**  
**Toronto, Ontario, and**  
**Associate Professor**  
**The University of Western**  
**Ontario, School of Nursing**  
**London, Ontario**  
**N6A 5C1**  
**Phone: (519) 661-2111 ext. 86580**  
**E-mail: [mkerr@uwo.ca](mailto:mkerr@uwo.ca)**

**Sarah Dusky**  
**Project Co-ordinator**  
**The University of Western**  
**Ontario, School of Nursing**  
**London, Ontario**  
**N6A 5C1**  
**Phone: (519) 661-2111**  
**E-mail: [sdusky@uwo.ca](mailto:sdusky@uwo.ca)**

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