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## 2nd Annual Research Day- Event Proceedings

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# 2nd Annual UIW Research Day

February 20, 2009 – Rosenberg Skyroom



University of the Incarnate Word  
4301 Broadway San Antonio TX 78209

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## EVENT PROCEEDINGS

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*Sponsored by:*  
*UIW EARDA Project [Funded by the National Institute of Health]*  
*UIW School of Graduate Studies and Research Office of Research Development [ORD]*  
*UIW Office of Instructional Technology*



Dear Colleagues,

With great pleasure I welcome you to the University of the Incarnate Word's Second Annual Research Day. Today we continue a new tradition in celebration of academic accomplishment by showcasing the UIW faculty research enterprise which contributes so much to our classrooms as well as to the world. We are indeed fortunate to be a community of educators and scholars seeking to advance our disciplines and help shape the broader community.

Elements crucial to the pursuit of academic excellence include a central place of reasonable and transparent discussion, where the path forward is determined by a critical examination of the past; a focus on reliable interpretations of the natural and moral world; the application of consistent standards of accomplishment; and the inclusive nature of truth-seeking, where insight is prized from commentators of all backgrounds. The relationship between these elements and the pursuit of knowledge remains even as disciplines change form and degree programs come and go. Today, more than ever, the world community must rededicate itself in support of academic environments which nurture this relationship.

As a result of a broad spectrum of work in higher education and by the significant achievements of faculty and students, University of the Incarnate Word enjoys a special place in the world of academe. The research presented today not only showcases disciplinary accomplishment in the art and practice of discovery, but serves to illustrate UIW's commitment to academic excellence.

Research Day would not be possible without the support and effort of many individuals. The list is too long to recount here in full, so instead I will simply indicate the groups that participated in organizing and sponsoring Research Day. These include the UIW EARDA project (sponsored by the National Institute of Health), the members of the Faculty Research Advisory Group, the administrators and staff of the Office of Instructional Technology, and the School of Graduate Studies and Research Office of Research Development. To each individual who contributed to the planning and success of today's event I offer my sincere thanks and gratitude. To all presenters and attendees, please accept my best wishes on this special day.

Sincerely,

A handwritten signature in cursive script that reads "Kevin B. Vichcales".

Dr. Kevin B. Vichcales, Dean  
School of Graduate Studies and Research

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# PROTOCOL FOR TRANSLATED INSTRUMENTS

Judith E. Beauford, Ph.D., Ming-Hsun Wu, Yosuke Nagashima

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## Purpose

To develop a translation protocol for validation of instruments written in English for Western cultures and used in other cultures and languages.

## Research Question

What are the experiences of UIW students in the use of translated instruments?

## Rationale

As international students prepare dissertations they often apply their research efforts to topics of interest in their home countries. Differences in value structures and social mores can dramatically affect responses to a research instrument. The translation strives for “equivalence of item meanings and idioms in both cultures” (Yu, Lee & Woo, 2004, p. 310). But “the wider apart the structures of the two languages, the less simple the task” (Hofstede, p. 21).

The literature is fairly consistent in its recommendations for translation strategies. Many suggest that multiple translators be used in the process and that translators be most familiar with the target language and culture, familiar with the subject matter, and trained in testing and scale construction. Using a committee approach where each strength is represented, the translation is developed and then tested for equivalence (Hambleton & Kanjee, 1993; Maneesriwongul & Dixon, 2004).

The literature is not as consistent in recommendation for the establishment of validity of translated research instruments by statistical methods. When any change is made to a research instrument including translation, the result is a new instrument that must be tested for validity and reliability (Griffiee, 2001). With a compilation of recommendations from several sources and personal experience of our students a strategy evolves.

## Methodology

Four international doctoral students put into practice the suggestions found in a review of the literature during the 2006-2007 academic year. Interviews with these students revealed the strengths and challenges of each as they struggled to establish validity for the instruments used. Analysis of these results informed the researchers in development of a translation protocol.

## Findings

Our students have experienced most of the drawbacks of established translation protocols. Assuming that bilingual participants would give the same answers in both languages, Pai (2006) used a small (n=10) pilot study to check for translation accuracy. In his instruments measuring physical activity identity and stress, he found good correlation between versions of the instruments. But J. Wu's (2006) instrument was a measure of comfort level and the answers varied widely between depending on language. Seeing this result, M. Wu (2006) devised a method of using his bilingual pilot sample to come to consensus about the translations of his instruments. Ko (2006) used a well known instrument on a sample of 753 students in Taiwan and found a difference in the underlying constructs from English versions.

## Discussion

The translation protocol for UIW includes an initial translation evaluated by a committee, a small pilot study to develop consensus on the instrument, a larger pilot study from the target population with statistical analysis compared to published results, application of the instrument to the full study, results evaluated for reliability and construct validity. Items, subscales, and factors that do not reach satisfactory levels are removed from further analysis.

## EFFECTS OF ALCOHOL CONSUMPTION ON BLOOD PRESSURE: AN EVIDENCE-BASED ANALYSIS

Catherine Childers

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### Purposes

1) To examine the relationship of blood pressure and alcohol consumption among healthy men ages 25-50 years hospitalized for alcohol abuse; 2) to determine if medication management follows JNC guidelines.

### Significance

Alcohol misuse is a documented risk factor for hypertension (Brewer, 2006). Daily alcohol intake was associated with a higher risk of hypertension compared to those who abstained in a number of studies; the amounts of alcohol consumed have been associated with an increase in both systolic and diastolic blood pressure. JNC 7 guidelines recommend specific treatment for Stage 1 and Stage 2 hypertension.

### Methods

Retrospective review of computerized records of twenty-five randomly selected patients with ICD-9 code of alcohol abuse from all admission to a detox unit from August-November 2008 was conducted. All patients were admitted for alcohol detox. A researcher designed Excel spreadsheet was used by one nurse researcher to collect data. The project was approved by the university IRB.

### Findings

The mean age was 40 years; most were Hispanic, male, married with BMIs greater than 25. The majority drank beer daily (13; 52%) or whiskey daily (5; 20%). The mean daily beer intake was 234 oz. and the mean daily whiskey intake was 13oz. The mean admission and discharge blood pressures were 145/85 and 133/78 respectively. No significant relationships between blood pressure and daily alcohol intake except a weak association between beer intake and discharge diastolic blood pressure ( $r=.30$ ). Differences in admission systolic and discharge systolic and admission diastolic and discharge diastolic blood pressure were significant ( $p<.001$  and  $p<.002$ , respectively), suggesting abstinence from alcohol even for a short time of two weeks results in lowered blood pressure. Nine (36%) were pre-hypertensive or normotensive; 16 (64%) were Stage 1 (12) or Stage 2 (4) for admission systolic blood pressure. None of Stage 2 patients met standard of care treatment; 5 of 12 Stage 1 patients were treated according to standard of care.

### Conclusions

Alcohol consumption and blood pressure appear to be related. Management of blood pressure may be overlooked during detox hospitalization.

### Implications

CNSs can assure standards of care for hypertension are implemented.

## **RELATIONSHIPS AMONG ANGER, SPIRITUALITY AND OBJECTIVE CARDIAC HEALTH INDICES IN COLLEGE STUDENTS**

Jennifer Cook, Ph.D., RN, Gary Norgan, Ph.D., RN, Maureen Rauschhuber, Ph.D., RN,  
Mary Elaine Jones, Ph.D., RN, Jolynn Lowry, MSN, RN

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### Purposes

This presentation describes the results of a combined data analysis from three studies that investigated subjective and objective measures of cardiac risk in a college age population; and, described the relationship between measures of cardiac risk and levels of anger and spirituality. Also, with the 386 students the investigators sought to determine the impact of a spirituality and anger management intervention on the relationships among cardiac risk, anger and spiritual well-being.

### Rationale/Significance

Little is known about how beliefs and practices affect cardiovascular risk or whether spirituality and religion may mediate anger, particularly among young adults. This paper describes the results of three studies of the subjective and objective risks for cardiovascular disease and their relationship to measures of anger and spirituality. In the pilot study, 104 college students comprised the sample; a follow up study included 135 college students and an intervention study had 147 college students. All three samples were predominately Hispanic single females, primarily freshmen and sophomore level students, born in the United States with a mean age of 19.3 years.

### Methods

The convenience samples consented to an assessment of cardiac risk consisting of subjective questionnaires eliciting medical history and health practices, and the measurement of BP, capillary blood screening for lipids and glucose, height, weight, waist circumference and calculation of BMI. The subjects also completed measures of anger using the State Trait Anger Expression Inventory-2 (STAXI-2) and spirituality with the Spiritual Well-Being Scale (SWBS).

### Findings

Common across all three studies was the finding of mean BMI of 25.3 in the overweight classification, a substantial number of subjects in the pre-hypertensive classification (22- 25%), and hypercholesterolemia. With all three studies there was an inverse negative relationship between anger and spirituality measures. Body mass index and waist circumference were both negatively correlated with index scores of existential well-being. State anger and anger expression scores were negatively correlated with spiritual well-being and existential well-being subscales. Religious well-being was negatively correlated with trait anger temperament. A multiple regression was performed regressing systolic blood pressure on BMI, waist circumference, cholesterol levels, blood glucose, anger expression and spiritual well-being. Only waist circumference was predictive of systolic blood pressure, accounting for 31% of the variance. How these variables are associated with weight remains unanswered from the findings. Anger Expression Index, a measure of overall intensity of angry feelings, and Anger Expression Out, a measure of energy required to prevent the outward expression of anger were negatively correlated with waist circumference while State Anger Physical, reflecting intense feelings to express anger physically, was positively correlated with waist circumference. Existential well-being, a reflection of satisfaction with purpose and life, was negatively correlated with BMI and with waist circumference.

### Conclusions

These studies show clearly that a substantial number of Hispanic college students in these three samples have cardiovascular risk profiles indicative of the need for life style modification interventions. The associations between anger expression and spiritual/existential well-being and weight suggest that further study is warranted to clarify the relationship among these variables.

## **CURRICULUM AND OPTIONAL PHARMACY PRACTICE EXPERIENCE**

Jeffrey T. Copeland, Ph.D.

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### **Objective**

This study proposed to evaluate the student's perception of the importance of the first professional year courses in an Optional Pharmacy Practice Experience (OPPE).

### **Methods**

Data were collected and analyzed from anonymous questionnaires distributed to pharmacy students at the beginning of the second professional year following the OPPE using SurveyMonkey.com. Descriptive analysis performed.

### **Results**

Fifty-six pharmacy students participated by identifying the three courses most beneficial in experience preparation. The overall most beneficial courses were Pharmacy Calculations (64.3%), Applied Pharmacy Care II Lab (48.2%), and Applied Pharmacy Care I Lab (41.1%). Pharmaceutical Science courses (11 courses totaling 27 credit hours) received 131 responses (50.6%) and Pharmacy Practice courses (8 courses totaling 9 credit hours) received 128 responses (49.6%). The most beneficial Pharmaceutical Science courses were Pharmacy Calculations (64.3%), Pharmaceutics I (26.8%), and Anatomy and Physiology II (25%). The most beneficial Pharmacy Practice courses were Applied Pharmacy Care II Lab (48.2%), Applied Pharmacy Care I Lab (41.1%), and Applied Pharmacy Care I (33.9%). All courses in the first professional year were ranked as one of the three most beneficial courses by a minimum of four students.

### **Implications**

Study findings indicate practice experience benefit for all first professional year courses. Results may be utilized by each Department, the Curriculum Committee, and the Assessment Committee for curricular review.

# **CREATING AN IMPACT SURVEY TO EVALUATE PERSONAL AND SOCIAL EMPOWERMENT OF GRASSROOTS WOMEN IN DEVELOPING COUNTRIES**

Susana Deku, Dorothy Ettling, Ph.D., Paula Caffer, Ph.D., M. Alison Buck, Ph.D.

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## *Purpose of the Study*

In 2008 a UIW research team designed an evaluation tool to assess the impact of the economic development program created by Women's Global Connection (WGC) on personal and social empowerment of grassroots women and rural communities in two developing countries: Tanzania and Zambia. The survey was designed to ascertain the women's self-perception of whether they had gained new knowledge and skills, and that they were able to apply these in their daily life.

## *Rationale and Significance*

An increasing number of not-for-profit organizations in the US are challenged by the funding community to adhere to business-oriented standards of accountability. Strict systems of evaluation and reporting of the activities provided and populations served are required. Women's Global Connection also has a genuine interest in assessing the impact of the activities it has implemented in the past five years to be able to identify areas in need of enhancement and reformulation. Due to lack of research data on the population served by WGC, it is crucial to systematically collect data and create evaluation tools for the continuity of a successful program in women's economic development.

## *Methodology*

The research design utilized an interviewer-administered paper questionnaire with a convenience sample of 10 women from six Bukoba villages. The instrument contained approximately 70 forced and multiple choice items, plus demographic questions. The participants were 20 to 64 years old (average age, 42), had an average of 4 children and 5 total dependents, were married (6) or widowed (4), and had completed seven years of school. Four outcome indicators were identified to pilot an initial personal and social impact survey in October 2008 in Bukoba, Tanzania. The indicators incorporated in the evaluation instrument were: 1) ability to engage in micro-business, 2) ability to manage resources, 3) awareness of political-legal gender barriers, and 4) ability to take-action on gender-barriers. Other specific indicators were incorporated that demonstrated concrete application in the particular African culture. They were: a) involvement in major family-decision making, b) participation in public action, c) physical mobility/social interaction, d) political and legal awareness, and e) ability to make small and large purchases.

## *Findings and Conclusions*

Ten respondents who attended WGC's capacity building workshops from 2004-2008 participated in the pilot study, and the survey results showed that the respondents believed positive changes occurred after the capacity-building projects were implemented. 100% of the respondents reported the acquisition of new knowledge and skills in the following areas: business, agriculture, nutrition/health, technology, HIV education, and leadership. The major areas where participants reported personal and social empowerment were participation in community groups, increase in self-esteem, greater involvement in family decision-making, and greater respect in the local community. The overall findings suggest that participation in community groups and access to capacity building opportunities have the potential to create positive changes in the way grassroots women choose to live. WGC's goal is to continue to conduct the survey and utilize the findings in efforts to monitor the social and personal empowerment program impact.

## **DEVELOPING A COMPETENCY-BASED GRADUATE PROGRAM IN HEALTHCARE ADMINISTRATION: THE ROLE OF AN EXECUTIVE ADVISORY BOARD**

Daniel G. Dominguez, Ph.D., Kevin G. LaFrance, Ph.D., FACHE, Mark S. Teachout, Ph.D.

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### Purpose

Within the context of developing a Master of Health Administration (MHA) program a study was conducted to determine the competencies critical to managerial effectiveness in early-career healthcare administrators in the San Antonio MSA though the use of input from an advisory board.

### Rationale/Significance

The need for healthcare administrators with the knowledge, skills, and abilities (KSA's) to efficiently and effectively manage healthcare organizations is at the forefront of discussion among healthcare practitioners and academics. Leaders in the field have called for significant reform of course-based curricula in favor of competency-based education that focuses on demonstrable skills and abilities believed to be critical to managerial effectiveness. Toward this end, several models have been developed to include the five domain, 300 competency, Healthcare Leadership Alliance (HLA) model and the three domain, 21 competency, National Center for Healthcare Leadership (NCHL) model. These models were developed as comprehensive collections of competencies required of healthcare administrators over the course of a career, i.e., from entry-level to CEO. Both were developed by collaborative groups comprised of scholars and health administrators. Practitioner input is believed to be critical to the identification of appropriate and relevant competencies. A third model developed by the Saint Louis University consists of 64 competencies categorized within six domains. This model was developed by program faculty as a framework for a competency-based MHA curriculum built upon the KSA's required of entry-level healthcare administrators.

### Methodology

Using the six domains of the Saint Louis University model as a framework, the UIW MHA Program Development Group (PDG) consisting of five health administration practitioner-scholars, obtained competency input from a seven member Executive Advisory Board. The Board was comprised of a diverse cross-section of senior healthcare industry executives from the San Antonio MSA. Using a modified Delphi technique, the PDG aligned Board input with specific competencies from the NCHL and HLA models as a means of assessing the comprehensiveness of the Board's input. A matrix of the Board's input and associated NCHL/HLA competencies and measures was fed-back, reviewed, and modified by the Board to ensure relevancy and appropriateness of both the competencies and the associated measures. The final step in the process was to align the identified competencies and measures with course content areas.

### Findings/Conclusions

This study resulted in the identification of 24 competencies and associated measures grouped into a model with six domains: Knowledge of the Healthcare Environment, Critical Thinking and Analysis, Business and Management Knowledge, Political and Community Development, Communication, and Leadership. Built upon input from an advisory board, the 24 competencies aligned closely with the Saint Louis and NCHL models in terms of scope and with the NCHL model in terms of measure specificity, providing evidence for the validity of the process. More importantly, the refined competency measures, targeted to the needs of San Antonio MSA entry-level health administrators, aligned well with required course content areas and served as the course outcomes within the MHA curriculum.

## **DEVELOPMENTAL MATHEMATICS: GATEKEEPER FOR HISPANIC SUCCESS IN HEALTHCARE PROFESSIONS**

Renea Fike, Ph.D., David Fike, Ph, D.

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### Purpose

The purpose of this study is to assess the impact of developmental mathematics on educational attainment of Hispanic students.

### Research Question

Is developmental mathematics the primary gatekeeper course for Hispanics pursuing a profession in health care?

### Rationale/Significance

Eighty percent of Texas' Hispanic community college students require at least one developmental course and Hispanics are disproportionately represented in developmental mathematics. Thus, for those pursuing an education leading to health care careers and for Hispanics in particular, developmental mathematics may be the single most important gatekeeper course in higher education.

### Methodology

This quantitative, retrospective study of 16,479 students at a Texas community college provides a comparison of student outcomes in development math with other academic disciplines. The descriptive study also compares outcomes of Hispanics to non-Hispanic Whites in developmental education. For this part the sample consists of 1,197 students. Given this sample size, statistical power exceeded 80%.

## IMPROVING LEARNING OUTCOMES FOR MINORITIES

David S. Fike, Ph.D.

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### Purpose of Study

The purpose of this prospective cohort study is to explore the learning outcomes of students in a basic science course grounded in the Keller method to determine if use of the Keller method is associated with a reduction in educational achievement disparities for minorities, regardless of the levels of academic preparedness of the students at the beginning of the course.

### Rationale/Significance

Traditional lecture format courses often do not accommodate diverse academic backgrounds and learning skills of students. The Keller method is an alternative instructional format where course content is modularized and students progress through learning modules at their own pace. Students are allowed to repeatedly test on module exams until competency is achieved. Thus, the Keller method provides opportunities for academic achievement for students with differing backgrounds and learning styles. The Keller method is proposed as an intervention focused on reducing educational achievement disparities for minorities.

### Methodology

An anatomy course, designed using the Keller method, was implemented in a pharmacy school in the Southwest US. For this quantitative, prospective, intervention-based cohort study, the sample was comprised of 130 pharmacy students enrolled in the anatomy course; the sample size assured that statistical power exceeded 80%. Student outcomes were explored to provide insight into the potential benefits of use of the Keller method, particularly for minority students. One-way ANOVA was used to determine if levels of initial academic preparedness of students differed by race/ethnicity. Multilevel analyses were conducted to develop prediction models for final learning outcomes; this provided a basis for determining if the intervention (Keller method) yielded a reduction in educational achievement disparities for minorities.

### Findings

At baseline, there was substantial variation between race/ethnicity groups (mean exam scores ranged from 49.7% to 73.2%), yet variation of mean final learning outcomes by race/ethnicity was minimal (94.1% to 98.3%). The educational achievement gap for minorities was reduced and all racial/ethnic groups achieved excellence in learning outcomes. Although not a causal design, the findings from this cohort study suggest that the Keller Method may be instrumental in neutralizing educational achievement disparities for minorities.

### Conclusions

This study suggests that the Keller method may provide a useful framework for creating a learning environment in which educational achievement disparities for minorities are reduced, and it provides a basis for further exploring the potential benefits of the Keller method in courses where race/ethnicity disparities exist. Lastly, the study identifies an instructional method that may help to improve outcomes of students enrolled in healthcare programs, thereby leading to the prospects of increased diversity in the healthcare workforce.

### Acknowledgements

This research study was supported by the Minority Health Research and Education Grant Program, a grant program funded by proceeds from the State of Texas Tobacco Lawsuit Settlement and administered by the Texas Higher Education Coordinating Board.

# **A PILOT STUDY OF THE EFFECT OF A MULTIDISCIPLINARY, PALLIATIVE CARE COURSE ON STUDENT ATTITUDES AND PERCEIVED COMPETENCE IN END OF LIFE CARE**

Bradi Frei, Pharm.D., Irene Gilliland, MSN, RN, Jeanette A. McNeill, Ph.D., RN

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## Objectives

The purpose of this pilot study was to determine whether a multidisciplinary, palliative care and end of life issues course would positively influence student attitudes and perceived competence in regards to caring for the terminally ill.

## Rationale/Significance

Education, didactic or experiential, influences a student's perceived competence and attitude related to the specific subject. Very few palliative care and end of life issues courses are taught in professional healthcare programs in the United States. Demonstrating a positive, significant effect on student's perceived competence and attitude in the care of the terminally ill will encourage similar courses to be offered in other healthcare programs.

## Methods

This IRB approved study employed a pre and post comparative design to examine a multidisciplinary, palliative care and end of life issues elective course. Twelve pharmacy students in their third professional year consented to participate in the study. Two instruments, using Likert-type scale, were administered at the beginning and end of the course. The first instrument, Attitudes Toward Death Survey, consisted of three sub-categories: attitudes toward death, the importance of eleven problems in caring for the dying patient, and perceived areas for improvement in educational programming. The second instrument, End of Life Competencies Survey, assessed the student's perception of competence in seven areas of caring for the dying patient and how effective their education has been in these areas. Statistical analysis was performed using Wilcoxon Signed Rank Test.

## Findings

Students were significantly more likely to believe that more can be done to achieve peace at end of life for dying patients ( $p < 0.01$ ) and patient death does not constitute a medical failure ( $p < 0.01$ ). Students rated the importance of pain control ( $p < 0.05$ ) and legal issues ( $p < 0.05$ ) in the care of a dying patient higher after completing the course in palliative and end of life care. Students felt their competencies significantly improved regarding communication with terminally ill patients ( $p < 0.05$ ), communication with family caregivers ( $p < 0.05$ ), cultural issues related to end of life ( $p < 0.01$ ), and overall care at end of life ( $p < 0.05$ ). Finally, students believed their education improved in all 7 domains surveyed ( $p < 0.01$  for all domains): pain management, other symptom management, communication with terminally ill patients, communication with family caregivers, managing the death event at home, cultural issues in end of life care, and overall end of life care for the terminally ill.

## Conclusions

Students participating in a novel, inter-professional, palliative care and end of life issues course reported improved attitudes and increased perception of competence in caring for terminally ill patients. The incorporation of such a course into standard curriculum would be beneficial to pharmacy students and, most likely, other health care professionals. It would also create more empathetic healthcare professionals.

# UNDERSTANDING GENDER SPECIFIC LEADERSHIP ATTRIBUTE ASSESSMENT AND DEVELOPMENT IN A GLOBAL CONTEXT

Richard L. Henderson, Ed.D.

NOTE: This exploratory effort in the study of leadership as a social-psychological process began in 2001.

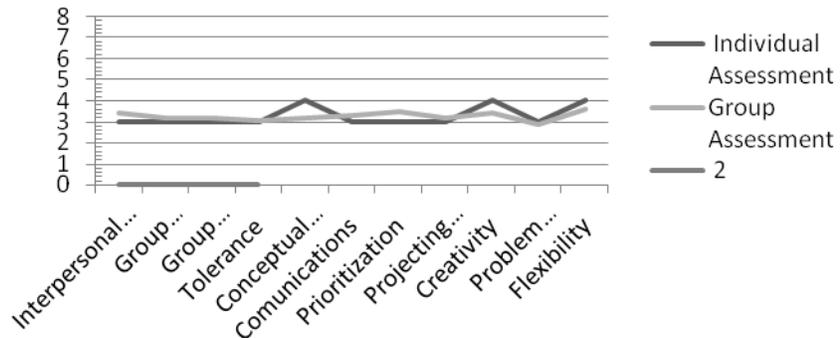
## Purpose

The purpose of the initial research effort was to identify and measure the perceived level of critical attributes that must be held by the leader in order for the leadership process to be effective.

## Initial Questions

What attributes are important for leaders to hold in order to function at an effective level, and how can those attributes be measured? International leadership research literature was reviewed to discover the twelve most commonly agreed to primary attributes. Attributes were analyzed and categorically assigned as having either a cognitive or an affective basis of development. Data was collected and analyzed relative to the perceived level of effectiveness of each attribute by the leader as well as the group involved in the process. This exploratory research in leadership was conducted in a global context. The initial data was collected in Hakima, Tanzania, East Africa; Saltillo, Mexico; Taipei, (ROC) Taiwan and is available in publication [sample analysis below].

*Table 1.*  
*Individual (#1) Self Assessment and Assessment by Group Shown Together*



The initial exploratory research was primarily quantitative and did not seek to discern the differences among national cultures or genders within different cultures. Therefore, the next steps in this global research effort is designed from a qualitative perspective and accordingly, the purpose is to identify and analyze the differences among several cultures across the globe related to women and men within specific cultures as well as the probable differences in the importance of the various attributes associated with leadership in those cultures studied. The data will be derived from interviews and focus group activities conducted with selected secondary and post-secondary students from the identified national cultures. The completion of this ongoing research plan includes the collection of qualitative data from Tanzania, Mexico, and Taiwan as a continuation of the initial steps in identifying and analyzing data related to gender specific leadership attribute assessment and development.

## Significance

The significance of this research is extensive. Completion of this research may provide insight into a global perspective on the leadership process and has particular importance for developing nations. This research is designed not only to identify and analyze leadership attributes from specific developing nations, but also to distinguish necessary attribute development among the research participants. This ongoing research is designed not only to contribute to the general development of communities but also, through specific knowledge, provide a means to contribute to the growth of perspective leaders in developing nations.

# COMPARING PULMONARY FUNCTION AND RESTING VO<sub>2</sub> MAX ON SWIMMERS WITH RELAXED VERSUS CONTRACTED ABDOMINAL MUSCLES

Tim Henrich, Ph.D., Robert Pankey, Ed.D.

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## Introduction

Pulmonary function has not been shown to limit exercise capacity because associated postures and segmental movements do not impede the ventilatory muscles and there is time between segmental movements to ventilate the lungs adequately. In the competitive swimming Crawl Stroke (CS) the position of the head in the water and movement sequence permits adequate pulmonary ventilation and has not been shown to limit CS performance. Some sport theorists have suggested that posture should be altered during CS to decrease the hydrodynamic resistance and theoretically increase speed. However postural alteration has never been documented to alter resistance and may impose limits on the cardiorespiratory system. The postural changes involve contracting the abdominal muscles, obliques and muscles controlling the lumbar spine to hypothetically straighten the lumbar spine.

## Hypothesis

We hypothesized that this posture interferes with the coordination of movement between the abdominal muscles and the diaphragm while working in direct opposition to the accessory respiratory muscles limiting the swimmer's ability to ventilate air and consume oxygen.

## Purpose

The purpose of this pilot study to determine if contracted abdominal muscles negatively affected pulmonary ventilation and oxygen consumption measured in a controlled laboratory setting.

## Methods

Thirteen subjects involved in swimming activities (8 Males, 5 Females) ages 22-60 + 6.9 y volunteered to participate We measured Vital Capacity (VC), Maximal Ventilatory Volume (MVV), Forced Vital Capacity (FVC) and Resting VO<sub>2</sub> (RVO<sub>2</sub>) under Controlled (CON) normal seated posture and Experimental (EXP), abdominal muscles contracted in a seated posture using a Flowmate III Spirometer for pulmonary function and a metabolic cart for RVO<sub>2</sub> with 3 minute rest periods between counter-balanced trials. Pulmonary functions and RVO<sub>2</sub> were expressed relative to age, weight and height. A repeated measures t-test was used to compare CON and EXP conditions.

## Results

Significant differences between EXP and CON on all pulmonary functions and RVO<sub>2</sub> were found. [VC (4.1+1.05, 5.2+.97, p < .01), MVV (87.6+34.4, 127.1+44.3), p < .01), FVC (4.1+.92, 5.1+.98, p < .01), and RVO<sub>2</sub> (6.7+1.1, 5.13+.97), p < .01].

## Conclusions

There was a negative effect on pulmonary functions and an increase in energy cost to maintain posture, resulting in less oxygen being available to the propulsive muscles and offsetting the hypothesized benefits.

## Discussion

These findings indicate that contraction of abdominal musculature to alter posture has a negative effect on pulmonary ventilation and oxygen consumption potentially limiting maximal swimming performance.

## RECONNECTING CONTEMPORARY STUDENTS WITH THE CIVIL RIGHTS MOVEMENT

M. Sharon Herbers, Ed.D., Shannon Johnson-Quaife

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### Purpose

The purpose of this action research project is to examine the effectiveness of Reader's Theater as a strategy for teaching college students lessons from the Civil Rights Movement (CRM). Kohl (2005) and other educational researchers have identified misperceptions based on the myth of Rosa Parks as taught in children's literature and in many classrooms. The intent of this pilot project was to identify student perceptions of Parks and of the CRM, to provoke thought and challenge limiting assumptions through the use of historical documents in a Reader's Theater format. The research questions guiding this study are: 1) What are the perceptions of Rosa Parks among undergraduates in a teacher education course; and, 2) Does knowledge of the Civil Rights Movement increase following involvement in Reader's Theater exercises which give voice to Parks and other leaders?

### Significance

Future teachers must be informed about the CRM in order to critically assess instructional materials before incorporating lessons related to the Movement in their own curricula. It has been more than fifty years since the events of the CRM unfolded. Distance can lead to distortion. This study explored some of the complexities of the Movement through engaging pre-service teachers in experiential learning activities designed to prompt reflection and discussion. This approach is based in Mezirow's theory of Transformative Learning (1981, 1991, 2000).

### Methodology

This is a qualitative project with quantitative methods incorporated. A pre and post test of ten multiple choice questions, plus one open-ended question were given to identify changes in knowledge and perception, reflective papers following the activities examined student responses to the activities. Students read quotes from Rosa Parks, participated in three Reader's Theater activities and examined relevant children's literature in two class sessions. Collected data were analyzed by SPSS. Reflective papers were analyzed to identify common themes.

### Findings

Eleven students were enrolled in the class; six students completed both the pre and post test of knowledge. The Wilcoxon Signed Ranks Test was used to compare the medians ( $z = 2.032$ ,  $p = .021$  one sided). The difference was significant. Analysis of themes indicated that students were surprised to learn of Park's activism, "enjoyed" the activities, and gained an appreciation for Reader's Theater as a way to increase reading fluency and the social skills of future students. Some concerns emerged that adolescents and majors in other fields may be less responsive to dramatic readings.

### Discussion

This pilot research project showed that participants entered the study with minimal knowledge of Parks and the CRM and through active engagement in Reader's Theater gained awareness of Parks' activism and community involvement. Further research on the use of Reader's Theater as a teaching strategy in higher education is warranted.

## EFFECTS OF 'BLOOD PRESSURE CLASSES' AMONG HYPERTENSIVE MEXICAN AMERICAN WOMEN

Sara Kolb RN, PhD, Jean Deliganis, RN, PhD, Maria Gillespie, RN, MSN,  
Amy Witte, Pharm.D., Perla Zarate-Abbott, RN, MSN, Jolynn Lowry, RN, MSN

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### Purpose

The purpose of this quasi-experimental study was to evaluate the effectiveness of a 7-week self-management program on the short-term and long-term knowledge and select physiological measures such as blood pressure, weight, BMI, and waist-hip ratio among Mexican American women diagnosed with hypertension.

### Rationale/Significance

Chronic disease self-management programs have been widely used for teaching people how to manage a variety of disease conditions and have been shown to be effective for many conditions and outcomes. Disease management programs are becoming more popular, but are not equally available. Mexican Americans have levels of hypertension that are comparable or lower than whites, however the rates have been increasing in recent years and Mexican Americans with hypertension are less likely to have their blood pressure treated and controlled compared to whites and African Americans (Perez-Stable & Salazar, 2004). In 2006, the CDC reported that there are disparities in both treatment and control of hypertension based on ethnicity. Fewer Mexican Americans with hypertension are taking medications and are controlled compared with both White non-Hispanic and Black Non-Hispanic adults.

### Methodology

A purposive convenience sample of 15 bilingual Mexican American women diagnosed with hypertension participated in a 7 week 'Blood Pressure Class' held at a partnership between the University of the Incarnate Word and St. Philip of Jesus Parish. After obtaining a signed informed consent, measures of blood pressure, BMI, waist-hip ratio and researcher-developed knowledge test were completed. Classes met weekly and each included a healthy cooking session where sharing and socialization occurred. Topics were based on literature review recommendations for chronic disease self-management knowledge and skills. Measures were taken at the end of the 7 weeks, 3 months, and one year after classes completed.

### Findings/Conclusion

The age range of the 15 participants was 58 to 90 years and the duration of treatment for hypertension was 1 to 25 years. None of the participants had attended previous classes on hypertension. The mean blood pressure at the beginning of classes was 145 systolic and 71 diastolic. One year post class mean pressures were 126 systolic (ANOVA,  $F=4.590$ ,  $p=.006$ ) and 63 diastolic. While all other measures moved in the desired direction at the end of 7 and 12 weeks, there were no statistically significant changes from the pre-class on any of the measurements except systolic blood pressure. Participants rated learning about self monitoring of blood pressure and communication with providers high. The major conclusion is that effecting changes in hypertension self-management is an on-going process.

# STUDENT AND FACULTY PERCEPTIONS OF SUPPLEMENTAL INSTRUCTION WORKLOAD

David F. Maize, R.Ph., Ph.D., Lila P. LaGrange, Ph.D.

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## Introduction

Supplemental Instruction (SI) is a program designed to improve the performance of students facing academic challenges within a course. Students who fall below specific academic criteria are assigned to small group help sessions conducted by faculty. These sessions require increased workload on students and faculty alike, and the resulting benefits are not known. Therefore, this study was conducted to determine workload concerns for both students and faculty.

## Methods

First-year (P1), second-year (P2) students (n=137) and faculty (n=18) completed a 16-question online survey.

## Results

Currently, SI sessions are mandatory for assigned students. Results show a stark difference in opinion regarding SI attendance. Students indicated that SI should be open to all students (80.8%); whereas, faculty report that attendance should be by invitation with students then having the option to attend (88.9%). If SI became voluntary, 75%-84% of students would still attend. Students reported that SI sessions were useful although their self-reported performance increased by only  $\frac{1}{2}$  a letter grade. Most students indicated that they were only partially prepared for SI sessions. Foremost faculty concerns included increased workload (50%) and student participation (63%) and preparation (50%).

## Implications

Theoretically, helping students before failing a course is important, but implementing SI presents challenges. P1 students consider one hour/week to be sufficient compared to 2 hours/week as suggested by P2 students. Faculty and students experience an increase in workload to prepare for SI sessions; however, the concurrent perception is that SI has positive learning value despite the small impact on grades and workload concerns.

## STABILITY OF NYSTATIN IN A COMPOUNDED MIXTURE

Kathleen S. Martin, Ph.D., Jessica V. Simpson, B.S.

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### Introduction

The stability of nystatin was evaluated in a compounded mouthwash mixture (MM) stored at room temperature and under refrigeration. Nystatin is an antifungal often combined with other drugs to treat oral *Candida* infections which commonly afflict immunocompromised patients. Nystatin is a polyene complex produced by *Streptomyces* spp. that contains at least 3 biologically active components (MW ~ 926). A rapid loss of activity has been reported for nystatin diluted in aqueous solutions or suspensions. Because the composition of medicated preparations influences stability, pharmacists rely on published data to support beyond-use dating of compounded preparations and storage recommendations for patients.

### Methods

MM includes nystatin with tetracycline, hydrocortisone and diphenhydramine hydrochloride in a liquid vehicle. To evaluate the activity of nystatin in MM, a microbiological assay was used. MM was prepared on Day 0 and divided, with a portion stored at room temperature and another under refrigeration. Plates were prepared from overnight growths of *Candida albicans* using the Kirby-Bauer method of susceptibility testing. Samples of MM were mixed with dimethylformamide and diluted with pH 6.0 potassium phosphate buffer. Twenty microliters of each sample were pipetted onto sterile discs which were transferred to the prepared plates after each sample was fully absorbed. In like manner, reference standard curves and control samples were diluted and plated each test day. Standard and control samples were randomly placed among the MM samples on the plates. Plates were incubated overnight and zones were measured and recorded.

### Results

All other drugs and excipients in the MM mixture were shown to have no influence on the growth of the *C. albicans*. On Day 183 following the preparation of the MM, the zone of inhibition diameters surrounding the sterile discs saturated with MM were virtually unchanged from Day 0 zones. Daily standard curves were consistent; 92% had correlation coefficients of 0.995 or higher. The percent error for back-calculated standard concentrations ranged from 0 to 2%, with coefficients of variation (CV) ranging from 1.8 to 3.2%. Controls (890 Units/mL) prepared from a commercial nystatin suspension mixed with other excipients present in the compounded mixture maintained consistent zones of inhibition, with an average concentration of 809 Units/mL (SD 66.8) throughout the testing period.

### Discussion/Conclusions

Growth of *Candida albicans* was inhibited for 183 days whether the MM was stored at room temperature or refrigerated. Current standards of practice from the USP <795> indicate that compounded preparations should not be assigned beyond-use-dates longer than 6 months (180 days). These results demonstrate that nystatin in MM remains active and effective for this time period. One limitation to this work is that only one of the 4 drugs in the mixture has been tested; other studies are in progress. This current work supports a 6-month beyond used date for similar compounded mixtures containing nystatin. Pharmacists can advise patients to store similar mixtures either at room temperature or in the refrigerator.

# STUDENT PERCEPTIONS OF THE VALUE OF PEER FOCUS GROUPS TO FACILITATE COMMUNICATION AND IMPROVE THE LEARNING ENVIRONMENT

Kathleen S. Martin, Ph.D., Jodie V. Malhotra, Elda E. Martinez, Ph.D.,  
Marcos Oliveira, Ph.D., G. Scott Weston, Ph.D., R.Ph.

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## Objective

The purpose of this study was to determine if the SFGs met student expectations and were perceived as a positive communication process.

## Rationale

Timely identification of academic issues allows for continual quality improvement of both courses and curricula. Student Focus Groups (SFGs) were developed to gather student input as one aspect of program assessment at the Feik School of Pharmacy (FSOP). SFGs have been used elsewhere to assess the learning environment, but focused primarily on specific course issues. Although course specific information is collected from FSOP SFGs, an equal emphasis is placed on gathering information about the learning environment to facilitate ongoing refinement of the FSOP program.

## Methodology

Representatives from 10 first-year pharmacy student (P1) "Mentoring Groups" met monthly with a facilitator who listened to student-presented issues and collected responses to questions about the academic environment posed by the FSOP Assessment Committee. SFG participants completed a Likert-format survey ("October Survey") developed by the facilitator in October 2007. In part, the survey's intent was to discern whether students perceived SFGs as facilitating communication between students and the FSOP administration and faculty. Out of 100 P1 students, 56 who were not members of the SFGs as well as 7 of the 10 SFG participants opted to complete an anonymous Likert-format questionnaire using SurveyMonkey in January 2008. The January Survey included 15 questions regarding the perceived value of the SFGs, including questions asked in the October Survey. In May 2008, selected questions from the October Survey were included in the FSOP Year End Survey (80 P1 responses received, SFG participants were not isolated). The results were analyzed using SPSS software.

## Findings

Although most students (80%) had no previous experience working with focus groups, over 76% felt that the SFGs were an asset. The SFGs helped students identify common issues (69%) and provided an outlet to communicate information to professors (70%) and administration (71%). The majority of students (76%) viewed SFGs as an easy way to communicate with instructors and the administration, and saw at least one course change as a result of SFG input. Additionally, at least one curricular change was made between the fall and spring semesters to improve the FSOP learning environment. Although there were some statistically significant findings ( $p < 0.05$ ) in the January Survey comparing SFG participant to non-SFG student responses, the most commonly selected responses were "Strongly agree" (SFG participants) and "Agree" (non-SFG participants). Differences between October Survey and FSOP Year End Survey results were not significant.

## Discussion/Conclusions

Students recognized that their input was being valued, and commented on changes observed in classes and the program. Overall, the SFG members ranked most items more positively than did the class as a whole; comments received from classmates not participating directly in the SFGs suggested that not all SFG participants reported effectively back to their teams. Overall it was found that SFGs are valued by students to foster communication among students, faculty, and administration and provide a regular outlet for students to voice suggestions to improve the learning environment.

## VALUE-ADDED RISK ASSESSMENT: THE FAMILY HEALTH HISTORY

Jeanette McNeill, Ph.D., RN, Jennifer Cook, Ph.D., RN, Marveen Mahon, RN, BSN,  
Maureen Rauschhuber, Ph.D., RNC, Cynthia Richardson, MSN, RN, Rosanna Estrada,  
Christina Rosetta, Mary Elaine Jones, Ph.D., RN

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### Background/Significance

The relationship between low cardio respiratory fitness, cardiac disease and mortality in both men and women is well-documented. Awareness of risk may influence health promotion and prevention activities to decrease risk for cardiovascular disease, cancer, and diabetes. Collection and interpretation of family history data is an important mechanism for risk identification and raising awareness of risk which improves screening and patient compliance.

### Hypothesis

Working adults who complete the online My Family Health Portrait and receive specific information regarding personal objective risks and information on resources to improve lifestyle behaviors will demonstrate differences in intent to change exercise behavior when provided with information about family history, objective cardiac risk assessment and exercise behavior six months post assessment.

### Methodology

A quasi-experimental, pre-post, crossover design was used. Volunteers from employees of four primary and secondary educational institutions were randomly assigned to an intervention or control group. Two groups received the intervention at baseline; at the 6 month assessment, the control group participants cross over to the intervention condition. Objective (height, weight, waist circumference, blood pressure, blood lipids and glucose) and subjective measures (stages of change regarding exercise behavior, awareness of heart disease risk, acculturation, spirituality, depression, "My Family Health Portrait," and the 10 Year Risk Calculator) assessed the variables under study.

### Preliminary Findings

Ninety-three participants were recruited and completed the initial data collection; they were primarily female (75%), married, Roman Catholic, born in the USA. The mean age was 45 years and mean BMI was 30 (obese category). The mean blood pressure was 124/80; 15% had blood pressures greater than 140/90; 28% had total cholesterol levels greater than 200 mgm/dL, in the treatable range. Twenty-five percent had a score of 16 or greater on the depression inventory, the majority of who were female. Almost ¾ of the sample had never smoked and a majority reported engaging in some exercise during each week; almost half reporting walking or jogging/running as the preferred type of exercise. Of those who exercised, the mean length of time was 50 minutes and an average of 4 days per week. Over half (55%) believed obesity is the leading cause of death for women. Sources of information were television; a physician or nurse was cited by 15% as a source of information on heart health. Only 42% reported discussing heart health with a physician; 20% cited a family history of heart disease as a risk factor. Twenty-eight individuals completed the family health history. Of these, 17 (61%) had health knowledge of three generations of family, sufficient to build a 3 generation genogram. The mean number of first degree relatives (FDR) was 7 (Range 2-15). Specific disease risks associated with family history: Twelve (43%) participants reported one or more FDRs with heart disease, 7 (25%) (n=7) with diabetes, and 5 (18%) with cancer. A family history of depression was reported by 32% of the participants; 15 (61%) reported FDRs with hypertension.

### Conclusions

The web-based family history tool can identify cardiac risk among working adults; whether this information increases exercise behavior needs further study.

# THE EFFECTS OF ENROLLMENT IN DEVELOPMENTAL MATHEMATICS UPON STUDENT ACHIEVEMENT IN COLLEGE GEOMETRY

Paul F. Messina, Ph.D.

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## Purpose

The research study examines whether completion of required developmental mathematics coursework for select students prepares those students for success in MATH 1306 – College Geometry. The study is composed of  $n = 113$  students who have enrolled for MATH 1306 over the past 3 semesters.

## Research Question

Is there a difference in student achievement in MATH 1306 between students who were required to first enroll in a developmental mathematics course and those students who directly placed into MATH 1306 at the University of the Incarnate Word (UIW)?

## Rationale/Significance

Student success in a core mathematics course is a basic requirement for graduation from UIW. Many entering freshmen or transfer students have an identified mathematics deficiency. Those students are required to take a developmental mathematics course, specifically, MATH 0318 - Introduction to Algebra, Geometry, Probability & Statistics, in order to prepare them for entry into MATH 1306. This study examines student achievement in MATH 1306 to determine whether successful completion of MATH 0318 places those students with diagnosed deficiencies in mathematics on an equal playing field with those students directly placed into MATH 1306.

## Methodology

The research used an ex-post facto design and the Kruskal - Wallis test to determine whether the two group medians are statistically significant. Because the Kruskal - Wallis test is sensitive to outliers, the removal of four extreme values during the analysis was appropriate.

## Findings/Conclusions

The analysis shows that the final course average earned by those students who completed MATH 0318 are statistically equivalent ( $p > 0.05$ ) to the final course average earned by those students directly placed into MATH 1306 at UIW. We are then unable to conclude that successful completion of MATH 0318 for students who are not prepared to enroll directly in MATH 1306 has an equalizing effect for that group.

## **AWARENESS OF COLLEGE STUDENTS ON CARDIOVASCULAR DISEASE AND RISKS AMONG WOMEN**

Laura R. Muñoz Ph.D. RNC NNP, Annette Etnyre MSN RN, Melinda Adams Ph.D., Sharon Herbers Ed.D., Amy Witte Pharm.D., Cheryl Horlen PharmD, Sally Baynton Ph.D., Mary Elaine Jones Ph.D., RN

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### **Background/Significance**

Preventive health care depends, in part, upon awareness and perception of personal risk. One in three American women dies of heart disease. Most people believe cardiovascular disease (CVD) is a man's disease; however, since 1984, the National Heart Lung and Blood Institute (Feb.2003) has recognized that more women than men have died of heart disease in the United States (US). Until recently, the health care needs of women have been under-researched and little has been taught in educational programs regarding the special health needs of women. Although awareness of heart disease as the leading cause of death in women showed a steady increase from 30% in 1997 to 57% in 2006 among women ages 25 to 65 years (Christian, Rosamond, White, & Mosca, 2007) little is known about the awareness of CVD in college age students and individuals of different genders and ethnic/racial backgrounds. Few examples exist of initiatives at the local level to increase awareness among men and youth.

### **Purpose**

This study describes the level of awareness and knowledge of heart disease in women based on a questionnaire conducted in spring, 2008, among diverse college students within the context of a campus-wide Red Dress event.

### **Methodology**

Using a descriptive design, the setting for the study was a private, federally designated Hispanic-serving Catholic university in south Texas. A convenience sample of 440 student volunteers were recruited from graduate and undergraduate courses. A multidisciplinary team of faculty served to recruit and administer the questionnaire.

### **Findings**

Results of this study suggest that age, gender, and ethnicity may be significant factors in awareness and knowledge of CVD. The mean age was 23 years; the majority were single (78%), female (73%), and of Hispanic ethnicity (54%). Proportionately fewer young, male, and ethnically diverse students recognized that heart disease is a major health problem and leading cause of death in women. One-third believed breast cancer was the greatest problem facing women. Less than a fourth ever discussed CVD with their healthcare provider. Information was gained primarily from television, magazines, and the internet.

### **Implications**

Research of innovative and efficient methods to support behavior change among young adults is needed to increase awareness of health risks. These results add to the body of research on CVD risk and the raises questions about the role of colleges and universities in promotion of student health. Colleges and universities may provide the last opportunity to reach youth as a group with knowledge which positively affects their health and our nation's future.

# **A STUDY OF THE EFFECT OF AN ADA DIET ON FASTING BLOOD GLUCOSE AND HEMOGLOBIN A1C IN PATIENTS WITH TYPE 2 DIABETES MELLITUS: AN EVIDENCE-BASED ANALYSIS**

Marlene Pearcy

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## **Purpose**

To examine if the current American Diabetes Association (ADA) recommended diet is effective in controlling blood glucose and A1c in hospitalized, Type 2 diabetics.

## **Significance**

Diabetes is the sixth leading cause of death in the United States. Prevention of diabetes complications rests with adequate blood glucose (BG) control, as measured by the current standard of care, hemoglobin A1c (HbA1c). The target goal of < 7% is documented to be predictive of diabetes complications (ADA, 2008). Diet is the most recommended method of controlling blood glucose in type 2 diabetics. A weight loss of 5% of body weight has been shown to lower measurements of blood glucose and insulin resistance (ADA, 2008). Whether the ADA diet is effective is controversial.

## **Methods**

Descriptive design using retrospective chart review. Twenty-five randomly selected computerized records from patients hospitalized on one floor from May 15, 2008 to November 15, 2008 with an ICD 9 code for Type 2 diabetes were reviewed. All patients were on physician ordered ADA diets. Snacks were closely monitored; no outside food or drinks were allowed. A researcher-designed Excel spreadsheet was used by one nurse researcher to collect demographic indices, days hospitalized, first and last fasting blood glucose, and admission A1c data. The project was approved by the University IRB.

## **Findings**

The mean age of the subjects was 45 years; the majority were Hispanic, married, hospitalized 14 days, and had an admission BMI of 34 or greater. The mean admission blood glucose was 163 mg/dL; the mean discharge fasting blood glucose was 132 mg/dL. The difference was significant ( $t=2.5$ ;  $df=20$ ;  $p<.02$ ). The difference in diastolic blood pressure from admission to discharge was also significant ( $t=2.5$ ;  $df=22$ ;  $p<.02$ ).

## **Conclusions**

The ADA diet, the standard of care, is effective in reducing levels of blood glucose in hospitalized patients and may also influence blood pressure.

## **Implications**

Clinical Nurse Specialists can implement standards of care for diet which can change health outcomes for patients with Type 2 Diabetes. More study of non-hospitalized populations is needed to determine ways to encourage dietary adherence.

# INHIBITING POLY(ADP-RIBOSE) GLYCOHYDROLASE TO IMPROVE CANCER THERAPY OUTCOME: SYNTHESIS OF ADENOSINE DIPHOSPHATE (HYDROXYMETHYL) PYRROLIDINONE-3,4-DIOL, (ADP-HPnD)

Sushma Ramsinghani, Ph.D., Brian Walker, Ph.D.

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## Purpose/Background

To develop a potent and specific transition state inhibitor of poly(ADP-ribose) glycohydrolase (PARG), an enzyme that plays a key role in poly ADP-ribose metabolism. It is hypothesized that disrupting this biological pathway may potentiate the DNA damaging effects of chemotherapeutic drugs or radiation therapy. When cells of an organism are subjected to genotoxic assault, they respond by either repairing their DNA to maintain genomic integrity or undergo self destruction. These cellular responses involve the cycling of poly(ADP-ribose), a polymer that synthesized by poly(ADP-ribose) polymerase (PARP-1) and degraded by poly(ADP-ribose) glycohydrolase (PARG). PARP-1 has been found to be involved in a myriad of pathological events viz. carcinogenesis, ischemic/reperfusion injury, diabetes and neurodegenerative diseases. Inhibitors of PARP-1 are being evaluated as agents to potentiate the effects of cancer therapy or to abate neuronal toxicity. PARG on the other hand remains to be exploited even though it is an integral component of the polymer metabolism.

## Rationale

The overall goal of this research is to develop inhibitors of PARG that would prevent the repair of damaged DNA in cancer cells after chemotherapy and radiation therapy. Such an intervention would be more effective in eradicating the cancer cells and yield better therapeutic outcomes. To date, the only designed inhibitor of PARG is adenosine diphosphate (hydroxymethyl)pyrrolidinediol (ADP-HPD). Modifying the structure of ADP-HPD from a pyrrolidinediol to a lactam would resemble the likely transition-state of glycohydrolase reaction. Mimicking the transition state is likely to cause potent inhibition of PARG. Toward this goal, the synthesis of Adenosine diphosphate (hydroxymethyl)pyrrolidinone-3,4-diol (ADP-HPnD), a lactam analog of ADP-HPD was proposed.

## Methods

ADP-HPnD was synthesized from commercially available (2S,4R)-1-benzyloxycarbonyl-4-hydroxyproline in several steps. The synthesis began by protecting the carboxylic acid as methyl ester, followed by conversion of the 4-hydroxy group to the 4-tosylate, substitution with diphenyldiselenide and selenoxide elimination to yield (2S)-1-benzyloxycarbonyl-3,4-dehydroproline methyl ester. The olefin was oxidized with OsO<sub>4</sub> and the diol, was protected as acetonide. The methylester was reduced and the alcohol protected with TBDMS. The Cbz protecting group was exchanged to t-Boc. Oxidation with RuO<sub>2</sub> afforded the lactam derivative. Removal of the TBDMS group followed by phosphorylation of the secondary alcohol yielded 2-phosphoxymethylpyrrolidinone-3,4-diol. This was coupled to activated AMP to yield the target compound ADP-HPnD.

## Results/Discussion

The proposed compound ADP-HPnD was synthesized through a multistep synthetic scheme. ADP-HPnD and novel reaction intermediates were characterized by methods such as <sup>1</sup>H-NMR, <sup>13</sup>C-NMR, HPLC, and ESI-MS. ADP-HPnD was developed as a potent and specific inhibitor of PARG by mimicking the likely transition state of the hydrolytic reaction. In the current work, ADP-HPnD was obtained in small quantities. The synthesis of ADP-HPnD will be scaled up to enable its testing for potent and specific inhibitor of PARG in vitro and also its inhibition kinetics. ADP-HPnD will also be evaluated in cell culture for its chemo-potentiating effect. Results garnered from these studies will drive future work toward a second generation of clinically effective PARG inhibitors.

# DIFFERENCES IN EXERCISE IDENTITY SCORES BETWEEN UNIVERSITY WELLNESS CLASS STUDENTS AT THE BEGINNING AND END OF A SEMESTER OF INSTRUCTION

Gregory J. Soukup, Sr., Ph.D.

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## Purpose

Lack of physical activity has led to serious health problems for Americans. Researchers estimate 300,000 American deaths each year are attributable to obesity and sedentary lifestyle.

## Research Question

University of the Incarnate Word requires undergraduate students to take a Dimension of Wellness class to graduate. Students perform one hour of aerobic exercise per week in class and 30 minutes per week outside of class. The curriculum is designed to improve student attitudes towards aerobic exercise. This study wanted to determine if significant differences in exercise identity developed in students during the semester.

## Rationale

Role identities influence behavior. Individuals with strong exercise identities validate and reinforce their identities by exercising. Several studies have demonstrated an association between exercise identity and exercise behavior. Helping individuals develop stronger exercise identities will help them adopt more physically active lifestyles.

## Methodology

Data were collected from 40 (35 female, 5 male/ 2 African-American, 25 Hispanic, 13 White) UIW students that took the Dimensions of Wellness class. The Exercise Identity Scale (Anderson & Cychosz, 1994) was used to test for differences in exercise identity. The EIS consists of nine items rated on a 7-point Likert format with responses ranging from strongly disagree (1) to strongly agree (7). Scores range from 9 to 63, with higher scores indicating greater rates of exercise identity. Data were analyzed to determine if significant differences in exercise identity existed between groups with desirable BMIs and overweight/obese BMIs. BMIs less than 18.5 are underweight, 18.5 - 24.99 desirable, 25 - 29.99 overweight, and over 30 obese. Level of significance for data analysis was  $p < .05$ .

## Findings

EIS mean for participants, at the beginning of class, was 35.98 and 37.48 at the end. T-tests determined significant differences in female and Hispanic females between participants with desirable and overweight/obese BMIs. Females with desirable BMIs had significantly higher exercise identities than overweight/obese females. At the beginning of class, females with desirable BMIs had a mean EIS of 37.91 and overweight/obese females 28.25. T-test analysis determined significant differences in exercise identity between groups at .037. At the end of the semester, females with desirable BMIs had a mean EIS of 38.19, and overweight/obese females 32.56. EIS scores improved slightly among desirable BMI females; however, overweight/obese females improved by 4.31 points. T-test analysis determined no significant differences on exercise identity between groups at the end of the semester. At the beginning of the semester, desirable BMI Hispanic females had a mean EIS of 34.8 and overweight/obese Hispanic females 24.12. T-test analysis determined significant differences between groups on exercise identity at the .041 level. EIS scores at the end of the semester found desirable BMI Hispanic females had a mean EIS of 36.38 and overweight/obese Hispanic females 27.57. T-test analysis determined no significant difference on exercise identity between groups.

## Conclusions

The study suggests the Dimension of Wellness class improved exercise identity in students and eliminated significant differences in exercise identity between female and Hispanic female students with desirable and overweight/obese BMIs.

# THE SEARCH FOR A SUSTAINABLE CONTINUOUS PROFESSIONAL DEVELOPMENT MODEL FOR PRE-SCHOOL TEACHERS IN ZAMBIA

Lisa Uribe-Kozlovsky, Ph.D., Angela Sanchez

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## Context

In Zambia, pre-school education is in a precarious state with overcrowded classrooms, few or no educational materials with untrained or insufficiently prepared teachers who, in many instances, are unable to provide more than mere care-giving for the children. Though the Ministry of Education has committed to Training and Continuous Professional Development, they can only do it with the help of interested NGO's such as the Women's Global Connection (WGC). In 2007, WGC conducted its first 4-week Teacher's Training Institute Workshop with 30 teachers in attendance. Those teachers went on to implement their new skills in their own classrooms and eight of them volunteered to become mentors for other teachers in the District. For over a year, these mentors facilitated additional workshops and conducted in-class mentoring with other teachers and logged their weekly experiences in a web forum.

## Purpose

The purpose of this qualitative study is to explore these mentors' journey of professional development, identifying how they are implementing new skills learned through the training and how they are growing professionally through the process of learning and mentoring.

## Rationale/Significance

According to a model from the Center for Creative Leadership, the development of leadership and the capacity to mentor others flows from the ability to learn through a variety of developmental experiences. Using this model, the study focuses on the mentors capacity to learn and then to apply their learning in their own classrooms and in the mentoring of other under-prepared teachers. The mentors were provided training and on-going support through a variety of developmental experiences. The study aims to demonstrate a viable model of strengthening teachers' capacity to create a child-friendly classroom environment and engage in child-centered learning activities in regions where teacher training and learning materials are insufficient or unavailable. This can offer a major step in furthering sustainable professional development in Zambia.

## Methodology

This qualitative exploratory study included two strategies: 1) analysis of the Manual used in the Teacher Training Institute, which aspects were modified for cultural appropriateness; and 2) analysis of the internet 240 logs entries kept by the eight mentors for over their year of mentoring. This data was coded and categorized into themes depicting the development evidenced in the mentors reporting. Data was coded and themes determined by unbiased researcher brought in the last stages of the project.

## Findings/Conclusions

Findings included the following overall themes: challenges, developmental experiences, coaching attributes and other. The findings also confirm that the learning opportunities provided by WGC coupled with the opportunity for the mentors to participate in a variety of developmental experiences positively helped these eight mentors acquire leadership skills, such as increased confidence; ability to plan, manage and monitor; work collaboratively; exercise accountability; and creatively overcome challenges.

## UNRAVELING THE MOLECULAR MECHANISMS LINKING POLYAMINES TO BIOFILM FORMATION IN YERSINIA PESTIS

Brian W. Wortham, Chandra Patel, Jackie Fetherston, Robert D. Perry, Marcos A. Oliveira

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### Purpose

To test the hypothesis that a specific mechanism is involved in the regulation of biofilm in *Yersinia pestis*, through the action of the natural metabolites known as polyamines.

### Rationale/Significance

Biofilm is a factor that contributes to pathogenesis in a growing number of persistent or chronic bacterial infections. *Y. pestis* is a class A bioterrorism agent where biofilm is important in the transmission of the disease. The discovery of a new target that disrupt/prevents biofilm formation in bacteria is highly desirable.

### Methodology/Results

We have used HPLC, enzymatic assays and radio labeled polyamines to show through three independent experiments that there exists a correlation between levels of polyamines and biofilm in *Y. pestis*. In addition using an animal model of bubonic and pneumonic plague we show that *Y. pestis* virulence is reduced by four orders of magnitude. This was the first recorded evidence linking polyamines to biofilm formation and virulence in bacteria. We then focused on determining a mechanism. We started by measuring the levels of proteins known as Hms, which are known to be involved in the biosynthesis of a key second messenger cyclic-di-GMP (c-di-GMP). c-di-GMP has been characterized as a regulator of biofilm formation in bacteria. We show through western blotting that polyamine deficiency results in a  $\sim 93\% \pm 6$ ,  $43\% \pm 25$  and  $90\% \pm 2$  reduction in the protein levels of three key proteins that control c-di-GMP biosynthesis, HmsR, HmsS and HmsT, respectively. An investigation using transcriptional reporters and quantitative RT-PCR indicated that polyamine modulates translation of select Hms genes. A close look at the shine dalgarno sequences of genes coding for HMS proteins shows that HmsR and HmsT, the two proteins most affected by polyamine deficiency do not have a canonical shine dalgarno sequence. This suggests that polyamines may be binding to mRNA and regulating the translation of select proteins.

### Conclusion

We have shown that polyamines may be regulating biofilm by selectively binding to and controlling the translation of genes involved in the biosynthesis of the second messenger c-di-GMP.

# GENERAL MODEL FOR OBSERVABLE SYSTEMS

Zhanbo Yang, Ph.D.

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## Introduction

A system is usually considered as a collection of some objects with some kind of relations defined among the objects. The General System Theory attempts to study systems under the broadest possible framework. The concept of general system was introduced in late 1960's and early 1970's. Various models for general system have been introduced since then and most of them were based on the language of set theory. Yang introduced a new model of general system in 1989 which was a slight modification of the model first introduced by Lin and Ma a few years earlier to correct what he perceived as a shortcoming of the Lin&Ma model. Yang also used categorical theory to study a general system. Observable systems are systems endowed with real valued observations. A.M. Louie introduced the observable system concept in 1983. He defined an Observable system as a set with a collection of real valued functions defined on the set, although he did not introduce the idea of "relations" in his definition. This research project will study Observable System within the framework of General System and Category theory, as introduced by Yang, and discuss the concept of "stability" of observations and sequences of observations.

## Rationale/Significance

A "Model" should provide a theoretical frame work for a topic of study with sufficient flexibility to accommodate the specifics within that frame work. This allows the researchers to obtain results that are applicable to the extent that is as wide as possible. Through this research project, the author was able to show that Yang's 1989 model can encompass Louie's model of Observable systems. Through this model, this researcher also established the connection between objects in terms of "Weakly Relation Preserving" mapping and "Weakly Relation Reversing" mapping, hence made it possible to study connections between objects and their inter-relationships. Furthermore, this model allowed a connection to the theory of topology, which was the basis for the concept of "stable Observations". By applying some of the well-known topological results, we were able to clarify what is the meaning of the word "stable" observation and under what circumstances we can expect a sequence of stable observations can converge to a stable observation.

## Methodology

The researcher will characterizing the properties of general systems and observable systems using the method and terminologies of category theory, establish the connections between the general systems and general topology and finding applications of topological results in general systems theory.

## Findings/Conclusions

The categories of general systems with "Weakly Relation Preserving" mappings or "Weakly Relation Reversing" mappings are defined and studied. The observable system defined by A.H. Louie in 1983 is shown to be a faithful subcategory of the category with "Weakly Relation Preserving" mappings. Observable systems and the stability of observations are characterized in terms of topology. Some problems are posted for further exploration.

# SYNTHESIS OF NOVEL BINUCLEAR PALLADIUM(II) COMPLEXES USING 1,2-DI(4-PYRIDYL)ETHYLENE AS BRIDGING LIGAND

Adrian Zapata, Nicole Sanchez, Rafael A. Adrian, Ph.D.

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## Purpose

This study was conducted to determine whether multinuclear palladium(II) complexes could be synthesized by the reaction of palladium bipyridine and ethylenediamine complexes with the bidentate linear ligand 1,2-di(4-pyridyl)ethylene.

## Hypothesis

The bidentate linear ligand 1,2-di(4-pyridyl)ethylene have been used as a bridging ligand for the synthesis of polynuclear cadmium(II), rhenium(I) and ruthenium(II) among others. We believed that this ligand should be able to provide similar bridging between palladium(II) center to generate binuclear and polynuclear structures.

## Rationale/Significance

Platinum complexes as cisplatin and carboplatin have been successful chemotherapeutic agents. Recently, considerable effort has been directed to the study and understanding of the chemistry of polynuclear platinum(II) and palladium(II) with structural characteristics similar to these agents due to their potential application in antitumor therapy. With that in mind, our group has been exploring the use of palladium(II) complexes as a starting material in the synthesis of polynuclear structures.

## Methodology

In order to test our hypothesis we would try to synthesize binuclear palladium(II) complexes using Pd(bpy)Cl<sub>2</sub> and Pd(en)Cl<sub>2</sub> (where bpy = 2,2'-bipyridine and en = ethylenediamine) as starting materials. Displacement of the chlorides from the starting material will be done by the reaction with silver triflate, AgOTf, and the resulting complexes will then react in a 2:1 metal to ligand ratio with the 1,2-di(4-pyridyl)ethylene ligand. Infrared (IR) spectroscopy and <sup>1</sup>H Nuclear Magnetic Resonance (NMR) would be used to characterize the resulting complexes.

## Findings

Complexes [Pd(en)(CH<sub>3</sub>CN)<sub>2</sub>](OTf)<sub>2</sub> and [Pd(bpy)(CH<sub>3</sub>CN)<sub>2</sub>](OTf)<sub>2</sub> react with 1,2-bis(4-pyridyl)ethylene to afford binuclear palladium complexes of the general formula {[Pd(Ligand)(CH<sub>3</sub>CN)]<sub>2</sub>(m-BPE)}(OTf)<sub>4</sub>. IR spectroscopy data shows a shift in the signals associated by the ligand suggesting the coordination of the ligand to the palladium(II) center. <sup>1</sup>H NMR spectroscopy data suggest the existence of the complexes as dimers with the palladium (II) centers linked together by the 1,2-di(4-pyridyl)ethylene ligand.

## Conclusion

The bidentate linear ligand 1,2-di(4-pyridyl)ethylene could be used for the synthesis of binuclear palladium(II) complexes. In the future we will study if it is possible to obtain different polynuclear palladium(II) complexes by changing the metal to ligand ratio.

## Directory of Researchers

**Adams, Melinda K., Ph.D.**

Assistant Professor, Fashion, UIW, 210-805-1204, madams@uiwtx.edu

**Adrian, Rafael A., Ph.D.**

Assistant Professor, Chemistry, UIW, 210-805-3036, adrain@uiwtx.edu

**Baynton, Sally, Ph.D.**

Instructor, English, UIW, 210-829-3885, baynton@uiwtx.edu

**Beauford, Judith E., Ph.D.**

Professor, Education, UIW, 210-829-3171, beauford@uiwtx.edu

**Buck, M. Alison, Ph.D.**

Adjunct Faculty, Education, UIW, 210-659-4326, lioop@flash.net

**Caffer, Paula, Ph.D.**

Associate Director, Women's Global Connection, UIW, 210-832-3208, paulacaffer@gmail.com

**Childers, Catherine**

Master's Student, Nursing, UIW, 210-387-9804, cchilder@uiwtx.edu

**Cook, Jennifer, Ph.D., RN**

Assistant Professor, Nursing, UIW, 210-829-3978, cook@uiwtx.edu

**Copeland, Jeffrey T., Ph.D.**

Assistant Professor, Pharmacy, UIW, 210-883-1051, jtcopela@uiwtx.edu

**Deku, Susana**

Master's Student, Business, UIW, 210-724-8169, deku@uiwtx.edu

**Deliganis, Jean, Ph.D., RN**

Coordinator, Nursing, UIW, 210-224-7122, deligani@uiwtx.edu

**Dominguez, Daniel G., Ph.D.**

Associate Professor, Business, UIW, 210-829-3180, domingue@uiwtx.edu

**Estrada, Rosanna**

Master's Student, Nursing, UIW, 210-367-9045, restrada@uiwtx.edu

**Etnyre, Annette D., MSN, RN**

Instructor, Nursing, UIW, 210-829-3873, etnyre@uiwtx.edu

**Ettling, Dorothy, Ph.D.**

Professor, Education, UIW, 210-829-2764, ettling@uiwtx.edu

**Fike, David S., Ph.D.**

Research Statistician, SGSR Office of Research & Development, UIW, 210-832-2148, dfike@uiwtx.edu

**Fike, Renea, Ph.D.**

Assistant Professor, Education, UIW, 210-832-3218, fike@uiwtx.edu

**Frei, Bradi, Pharm. D.**

Assistant Professor, Pharmacy, UIW, 210-883-1000, frei@uiwtx.edu

**Gilliland, Irene, MSN, RN**

Instructor, Nursing, UIW, 210-829-3970, gillilan@uiwtx.edu

**Gillespie, Maria, MSN, RN**

Assistant Lab Coordinator, NLRC, UIW, 210-832-2113, mgillesp@uiwtx.edu

**Hadnott, Eboney**

Doctoral Student, Pharmacy, UIW, 713-875-9365, hadnott@uiwtx.edu

**Henderson, Richard, Ed.D.**

Professor, Education, UIW, 210-829-2763, henderson@uiwtx.edu

**Herbers, M. Sharon, Ed.D.**

Assistant Professor, Education, UIW, 210-805-3073, herbers@uiwtx.edu

**Henrich, Tim, Ph.D.**

Associate Professor, Human Performance, UIW, 210-829-6036, henrich@uiwtx.edu

**Horlen, Cheryl, Pharm. D.**

Assistant Professor, Pharmacy, UIW, 210-883-1000, horlen@uiwtx.edu

**Johnson-Quaife, Shannon**

Doctoral Student, Education, UIW, 210-324-6093, sjohnson@uiwtx.edu

**Jones, Mary Elaine, Ph.D., RN**

Brig. General Lillian Dunlap Chair, Nursing, UIW, 210-829-3956, jones@uiwtx.edu

**Kolb, Sara, Ph.D., RN**

Professor, Nursing, UIW, 210-829-3163, kolb@uiwtx.edu

**LaFrance, Kevin, Ph.D., FACHE**

Associate Professor, Health Administration, UIW, 210-295-2332, Lafrance@uiwtx.edu

**LaGrange, Lila, Ph.D.**

Assistant Professor, Pharmacy, UIW, 210-883-1000, lagrange@uiwtx.edu

**Lieveld, Patricia, Pharm. D., M.P.H.**

Interim Assistant Dean, Chair of Pharmacy Practice, UIW, 210-883-1000, lieveld@uiwtx.edu

**Lowry, Jolynn, MSN, RN**  
Instructor, Nursing, UIW, 210-829-3989, lowry@uiwtx.edu

**Maize, David, R.Ph., Ph. D.**  
Associate Dean of Academic Affairs, Pharmacy, UIW, 210-883-1000, maize@uiwtx.edu

**Mahon, Marveen RN, BSN**  
Director, Health Services, UIW, 210-805-3549, marveenm@uiwtx.edu

**Malhotra, Jodie V., Pharm. D.**  
*[formerly]* Assistant Professor, Pharmacy, UIW

**Martin, Kathleen, Ph.D.**  
Assistant Professor, Pharmacy, UIW, 210-883-1000, kamartin@uiwtx.edu

**Martinez, Elda E., Ph.D.**  
Assistant Professor, Education, UIW, 210-832-3297, eemartin@uiwtx.edu

**McNeill, Jeanette A., Ph.D., RN**  
Visiting Professor, Nursing, UIW, 210-829-3161, mcneill@uiwtx.edu

**Messina, Paul, Ph.D.**  
Assistant Professor, Mathematics, UIW, 210- 832-5665, messina@uiwtx.edu

**Muñoz, Laura R., Ph.D. RNC NNP**  
Assistant Professor, Nursing, UIW, 210-805-3033, lrmunoz@uiwtx.edu

**Nagashima, Yosuke**  
Doctoral Student, Education, UIW, 210-340-0653, ynagashi@uiwtx.edu

**Norgan, Gary, Ph.D., RN**  
Associate Professor, Nursing, UIW, 210-829-3955, norgan@uiwtx.edu

**Oliveira, Macros, Ph.D.**  
Assistant Professor, Pharmacy, UIW, 210-883-1000, oliveira@uiwtx.edu

**Pankey, Robert, Ed.D.**  
Professor, Kinesiology, Texas State University, 512-245-2958, rpankey@txstate.edu

**Pearcy, Marlene**  
Master's Student, Nursing, UIW, 210-675-2367, pearcy@uiwtx.edu

**Ramsinghani, Sushma Ph.D.**  
Associate Professor, Pharmacy, UIW, 210-883-1000, ramsingh@uiwtx.edu

**Rauschhuber, Maureen, Ph.D., RNC**  
Assistant Professor, Nursing, UIW, 210-829-3995, rauschhu@uiwtx.edu

**Richardson, Cynthia, MSN, RN**  
Instructor, Nursing, UIW, 210- 829-3161, cyrichar@uiwtx.edu

**Rosetta, Christina**  
Master's Student, Nutrition, UIW, 210-545-5884, rosetta@uiwtx.edu

**Sanchez, Nicole A.**  
Undergraduate Student, Chemistry, UIW, 210-320-2561, nasanche@uiwtx.edu

**Soukup, Sr., Gregory J., Ph.D.**  
Assistant Professor, Kinesiology, UIW, 210-832-2176, soukup@uiwtx.edu

**Simpson, Jessica V.**  
Doctoral Student, Pharmacy, UIW, 210-373-3223, jvsimpso@uiwtx.edu

**Teachout, Mark S., Ph.D.**  
Assistant Professor, Organizational Development, UIW, 210-829-3177, teachout@uiwtx.edu

**Uribe-Kozlovsky, Lisa, Ph.D.**  
Adjunct Instructor, Education, UIW, 210-829-3137, luribe@uiwtx.edu

**Yang, Zhanbo, Ph.D.**  
Associate Professor, Mathematics, UIW, 210-283-5008, yang@uiwtx.edu

**Walker, Brian, Ph.D.**  
Teacher, Surry County Public School, Virginia

**Weston, G. Scott, Ph.D., R.Ph.**  
Assistant Professor, Pharmacy, UIW, 210-883-1000, weston@uiwtx.edu

**Witte, Amy, Pharm. D.**  
Assistant Professor, Pharmacy, UIW, 210-883-1000, awitte@uiwtx.edu

**Wu, Ming-Hsun**  
Doctoral Student, Education, UIW, 210-378-2730, mwu1@uiwtx.edu

**Zapata, Adrian**  
Undergraduate Student, Chemistry, UIW, 210-342-1248, azapata1@uiwtx.edu

**Zarate-Abbott, Perla, MSN, RN**  
Enfermera de los Pies, Ministerio de Salud, 210-224-7122, spj1@uiwtx.edu