

VOLUME I

2017

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# **THE MISSISSIPPI ECONOMIC REVIEW**

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# Who Chooses to Adopt Mississippi's Early Learning Standards and Guidelines? A Demographic Analysis of Use

Kristin Javorsky and Candice Pittman\*

## Executive Summary

This study investigates how the decision to adopt Mississippi's voluntary Early Learning Standards and Guidelines varies across different early childhood care providers throughout the state, and discusses how usage rates might be further increased. Using data from an earlier statewide, large-scale descriptive study of Mississippi's licensed early childhood care providers, this study uses cross-tabulation and chi-square tests of independence to investigate relationships for a number of probable response patterns across the 537 directors who reported whether or not they currently use the state's early learning standards and guidelines. The results of this study indicate that directors who hold at least one degree in early childhood at the Associate's level or higher are statistically more likely to choose to adopt the standards and guidelines for their center than those who do not. Preschool-aged childcare centers that collaborate to some degree with their local school district are also statistically more likely to be using the standards and guidelines themselves. This study also finds that the voluntary nature of the standards and guidelines is the primary reason directors in non-profit, for-profit and Head Start locations report not using them, and that this is a significantly more influential factor for the state's for-profit providers than it is for nonprofit ones. While regional differences in the non-use of early learning standards and guidelines are identified, a statistically significant difference is not able to be determined using the current data. Based on these findings, statewide efforts should be made to increase collaboration between early childhood care providers and their local school districts, to create additional crosswalk documents that identify overlap with existing federal, state and other requirements, and to design a system of ongoing, statewide tracking of the currently voluntary use of Mississippi's standards and guidelines, to inform future policy decisions.

*Key Words:* education; early childhood development; learning standards; preschool

## Introduction

The drafting and implementation of Early Learning Standards and Guidelines (ELSG) for preschool-aged children raises global interest in their role as a "vehicle for fostering a systematic approach to developing an integrated national early childhood agenda, one that creates continuity for children and coherence for their parents" (Kagan and Tarrant, 2010). The call for early childhood education standards has been present in the United States for more than a decade, supported by federally commissioned research that details the need for high quality early care (National Research Council, 2001). The National Association for the Education of Young Children, in a joint statement with the National Association of Early Childhood Specialists in State Departments of

Education (2002) also supports appropriately crafted early learning standards as a vehicle for improved child outcomes, consensus building among stakeholders, and improved relationships between schools and communities. These organizations also emphasize that adequate training and financial supports need to be in place for early learning standards to be an effective part of a larger, multidimensional plan for improving early childhood outcomes (2009).

In the United States, early learning standards typically outline the knowledge, skills and behaviors that three- and four-year-old children should be encouraged to learn and acquire during the preschool years. Likewise, the early learning guidelines generally address the physical, social and emotional aspects of the care and education

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\*Kristin Javorsky, PhD is an Assistant Professor in the College of Education's Department of Curriculum, Instruction and Special Education at Mississippi State University. Dr. Javorsky is the corresponding author and can be reached via email at [kjavorsky@colled.msstate.edu](mailto:kjavorsky@colled.msstate.edu).

Candice Pittman, PhD is a Research Associate III in the National Strategic Planning and Analysis Research Center (NSPARC) at Mississippi State University.

environment provided for them (Kagan et al., 2013). Head Start's Early Learning Outcomes Framework (2015) is one national example of a standards-based approach for early childhood educational settings that continues to be utilized, with periodic updates since 2001.

To date, the Departments of Education in all fifty states maintain their own statewide versions of ELSG, and Mississippi is no exception (Barnett et al., 2015). While Mississippi's current ELSG are written for voluntary adoption, their use as a mechanism to ensure equitable delivery of high quality early childhood education also makes ELSG a potential component of educational initiatives and policies. Should Mississippi decide at some point to invest in universal prekindergarten, researchers predict an eventual possible return on investment of \$9.10 per child (Lynch and Vaguel, 2015; Mississippi Kids Count, 2016), however this expectation is predicated on high-quality preschool experiences, something ELSG were designed to provide.

With the passage of the Early Learning Collaborative Act of 2013, the Mississippi Department of Education (MDE) now mandates the use of the state's ELSG for all preschool classrooms participating in any of the state's new Early Learning Collaboratives. In 2015, the governor-appointed State Early Childhood Advisory Council (SECAC) cited improving and expanding the use of ELSG as one of its top six priorities (SECAC, 2015). Meanwhile, state-funded technical assistance organizations such as the Early Years Network have continued to encourage voluntary adoption of the standards and guidelines as way for childcare providers to improve center quality since 2008.

Despite the increase in discussion around early learning standards in recent years, there is no statewide requirement to track licensed childcare provider awareness, usage or endorsement of the early learning standards or early learning guidelines. A recent statewide survey finds that when asked, 82 percent of responding childcare providers report they currently use or follow the ELSG to some extent (Javorsky et al., 2015a). However, beyond MDE's current requirement for public preschools, little is known about specific differences between respondents that may affect this decision.

### **Possible Implementation Factors**

The voluntary nature of the standards allows for many possible factors to influence a care provider's decision on whether to implement. Perhaps most importantly, the ELSG must be seen as having something worthwhile to offer. The issue of worthiness raises the question of whether possessing a professional degree in early childhood, or working closely with others who do, makes a

Mississippi provider more likely to utilize the state's ELSG. Given the voluntary nature of most states' ELSG, one can theorize that early childhood professionals would be more likely to adopt standards and guidelines that are consistent with their own educational beliefs and training.

Two educational concepts that continue to greatly influence the field of early childhood—and by extension its practitioners—are those of developmentally appropriate practice (Copple and Bredekamp, 2009) and Vygotsky's theories on scaffolding (Berk and Winsler, 1995). Developmentally appropriate practice seeks to match early learning and care experiences to the needs and stages that are unique to young children as they mature. Scaffolding recognizes the role that more knowledgeable others, such as adults and sometimes peers, can play in helping a child use their potential. The language and structure of Mississippi's ELSG can be argued to align with both of these. For example, one of Mississippi's standards for speaking and listening states that four-year-olds should, "with guidance and support, participate in small-group as well as large-group shared conversations about pre-kindergarten topics and texts with peers and adults." (Mississippi Department of Education, 2015). The inclusion of "with guidance and support" coupled with the stipulation that the intended conversations cover "pre-kindergarten topics" demonstrates both elements of this scaffolding and developmentally appropriate practice, and are therefore more likely to be seen as beneficial by knowledgeable childcare providers.

Even without an early childhood degree that addresses these concepts, early care providers who collaborate to some degree with other educators in the local school district may still be influenced by the standards-based approach adopted by current state policy. The Mississippi College and Career Ready Standards are an integral part of K-12 educational content and instruction (Mississippi State Board of Education, 2016). Perhaps as a reflection of that, a recent study of Mississippi's licensed childcare providers found that many believe a greater emphasis on kindergarten readiness during the preschool years is needed (Javorsky et al., 2015b) and Mississippi's kindergarten teachers agree that attention to school readiness during the preschool years is of high importance (Southward et al., 2013).

In addition to, or perhaps even in competition with, the appeal of implementing the ELSG, physical location and access to training support may play a role, particularly in a rural state with limited financial resources for early childhood programs. Financial costs of meeting physical space and materials benchmarks outlined in the early learning guidelines may prevent others. Additionally, some

early childhood providers such as Head Start and Early Head Start are already required to meet multiple sets of expectations, which could deter the adoption of yet another set if alignment isn't clear.

Given all of these possibilities for influence in the decision-making process, the focus of this article is to explore who among Mississippi's approximately 1,600 early childhood care and education providers are more likely to be implementing the ELSG. Is there a difference in ELSG usage between directors who hold or are pursuing an early childhood degree and those who do not? Is there a relationship between childcare centers reporting various types of collaboration with local school districts and their awareness and/or use of the Early Learning Standards and Guidelines? Do some regions of the state report significantly different levels of use of the Early Learning Standards and Guidelines? Are directors' self-reported reasons for choosing not to use the Early Learning Standards related to provider status (public, private, nonprofit, for profit)? Finally, how can this information inform the state's next steps in addressing the need for high-quality early care for Mississippi's youngest citizens?

### Data Collection

The data for this research study comes from data collected as part of a larger earlier statewide survey of Mississippi's licensed childcare providers. The original Early Childhood Care Provider Survey (Appendix A) consists of 38

questions divided into early learning standards and guidelines, professional expertise, governance models, director educational profile, childcare provider staff profile, and childcare center profile. Using information provided by the state's Department of Health (MSDH), the target population for the original study includes all 1,612 early childhood care providers licensed throughout the state. In that survey, a total of 635 directors completed the instrument via telephone or online web link, yielding a response rate of 39.4 percent and a cooperation rate of 86.2 percent. Information was collected from public preschools, Head Start and Early Head Start centers, non-profit providers, and private childcare centers across the state. Results of that survey are publicly available.

This current study narrows the field of inquiry to the responses of the 537 directors who voluntarily answer the question, "Does your facility follow/use Mississippi's Early Learning Standards and Guidelines for children ages 3 and 4?" The scope of this study then includes these directors' responses to additional questions in sections 1, 4, and 6 of the original survey, in an effort to identify significant relationships between the variables of interest.

Given Mississippi's total population of licensed childcare centers at the time of the original survey, the responses included in this study demonstrate a range of statewide representation from a low of 27.3 percent in MSDH Region 3 (Delta/Hills) to a high of 40.7 percent in MSDH Region 2 (Northeast), as shown in [Table 1](#) below.

**Table 1.** Regional Representation of Survey Sample

MSDH Region	Licensed Providers in Region	Providers in Original Survey	Providers Included in This Analysis	Percentage of Regional Representation
Region 1-Northwest	149	56	46	31.8%
Region 2-Northeast	167	80	68	40.7%
Region 3-Delta-Hills	183	59	50	27.3%
Region 4-East	146	65	48	32.8%
Region 5-West Central	447	165	148	33.1%
Region 6-East Central	103	49	40	38.8%
Region 7-Southwest	77	28	22	28.5%
Region 8-Southeast	134	55	46	34.3%
Region 9-Coastal/Plains	206	78	69	33.5%

### Results

Research Question 1: Is there a relationship between directors who report having or currently pursuing an early childhood degree and their awareness and/or use of the Early Learning Standards and Guidelines? Comparison of the responses from these two subgroups to the responses of the entire sample using cross tabulation highlights a clear difference in standards and guidelines usage. Across the

entire sample, 42 percent of the providers report that they either hold or are currently pursuing a degree in Early Childhood at the Associate's level or higher. However, while 89.9 percent of those with at least one early childhood degree report using the ELSG, only 73.2 percent of respondents without one do so. Given the categorical nature of both survey questions, a chi-square test of independence was used to determine that the difference

between these subgroups is statistically significant ( $\chi^2 = 12.36$ ,  $df = 1$ ,  $p < 0.001$ ). Based on the given pattern of response, providers who hold or pursue at least one early childhood degree are significantly more likely to be using the state's early learning standards and guidelines than licensed childcare providers who do not.

Research Question 2: Is there a relationship between directors reporting various types of collaboration with local school districts and their awareness and/or use of the Early Learning Standards and Guidelines? When asked about collaboration efforts, 82.7 percent of all directors in the sample report that they collaborate to some degree with their local school district. These collaboration efforts include activities such as sharing materials and information, kindergarten transition activities, and in some cases even combined training sessions. Cross tabulation indicates differences in ELSG implementation, with 84.9 percent of collaborating directors reporting they use the ELSG versus 75.7 percent of non-collaborating respondents who do so. Given the categorical nature of both survey questions, a

chi-square test of independence was used to determine that the difference in responses between these subgroups is statistically significant ( $\chi^2 = 5.594$ ,  $df = 1$ ,  $p < 0.018$ ). Based on the given pattern of response, collaboration efforts between childcare centers and local school districts are positively related to whether that childcare center also utilizes the state's early learning standards and guidelines.

Research Question 3: Do directors in different regions of the state report significantly different levels of use of the Early Learning Standards and Guidelines? Across the entire statewide sample, 18 percent of respondents statewide report opting not to use the voluntary ELSG. When these responses are disaggregated by region, the number of providers not using ELSG fluctuates between a low of 8.0 percent in (Region 3) and a high of 22.5 percent (Region 6), as shown below in Table 2. While this range between regions appears on the surface to be quite wide, a chi-square test of independence to determine whether these differences are statistically significant is not possible because some categories contain less than 5 responses.

**Table 2.** Use of Early Learning Standards and Guidelines (ELSG) by MSDH Region

MSDH Region	Raw Number Not Using Standards and Guidelines	Total Regional Providers Responding	Percentage Not Using Standards and Guidelines
Region 1-Northwest	9	46	19.6%
Region 2-Northeast	8	68	11.8%
Region 3-Delta-Hills	4	50	8.0%
Region 4-East	7	48	14.6%
Region 5-West Central	33	148	22.3%
Region 6-East Central	9	40	22.5%
Region 7-Southwest	4	22	18.2%
Region 8-Southeast	7	46	15.3%
Region 9-Coastal/Plains	13	69	18.9%

Research Question 4: Are the self-reported reasons that directors choose not to use the Early Learning Standards and Guidelines related to the type of early childhood care they provide? In the original survey, the participants who report they do not utilize the ELSG (17.5 percent) are asked to choose all that applied from a list of choices that include: lack of access, lack of training, not required to use it, too expensive to implement, problems with technical assistance, and other. To answer the research question for this study, those responses are cross-tabulated with the type of care these directors also report providing. As part of this process, some of the categories from the original

survey regarding form of care are removed or condensed down into three categories: Head Start, non-profit care, and for-profit care. Due to low numbers, Early Head Start and Head Start programs are combined to form one subgroup. Also, center types described as 'other' are eliminated since it is not possible to interpret the type of care provided. The results of this cross-tabulation, shown in Table 3 below, indicate that the voluntary nature of the standards is the primary reason for non-use across all subgroups and the only reason cited by Head Start providers.

**Table 3.** Applicable Reasons for Non-Use by Type of Care Provider

Reasons For Not Using Mississippi's ELSG	Head Start Combined (n = 6)	For-profit care (n = 50)	Non-profit care (n = 33)
Lack of access	0.0%	10.0%	9.0%
Lack of training	0.0%	14.0%	12.0%
Not required to Use	100%	62.0%	42.4%
Too expensive	0.0%	12.0%	9.0%
Technical Assistance Problems	0.0%	6%	12%

A chi-square test of independence can be appropriately used to test the statistical significance of the differences between groups for some of these reasons, but not all. Lack of access, lack of training, too expensive, and technical assistance problems cannot be subjected to the chi square test in this instance because at least one subgroup reports less than five instances in a single category. However, sufficient numbers in each subgroup do cite 'not required to use' as a reason, and the differences between subgroups are statistically significant ( $\chi^2 = 7.91$ ,  $df = 2$ ,  $p < 0.019$ ). The voluntary nature of the standards appears to be the sole reason some Head Start providers opt not to utilize them, unlike other center types which cite various reasons. Based on the given pattern of responses, the fact that ELSG are optional also appears to affect the decision-making of a director of a for-profit center much more than it does a director of a non-profit center.

### Discussion

For early learning standards and guidelines to be useful, they must be implemented, and to be implemented, the early childhood care providers for whose use they are designed must believe them worthy. Very little information is available in the research literature regarding how early childhood care providers perceive their own state's early learning standards, and in turn, whether they opt to incorporate them into the early childhood services they provide. The results of this research study contribute new information regarding potential factors that may be influencing why voluntary ELSG are adopted by some of Mississippi's early childhood care and education providers but not others.

There is a strong, statistically significant connection between the collaboration efforts of early childhood care providers and their utilization of the ELSG. While Mississippi Department of Education is already making headway in this direction through the state's Early Childhood Collaboratives, many more children remain to be served than currently allocated funding can support. For this reason, education advocates should make it a priority to explore additional pathways that could bring local school

districts and private providers into stronger collaborative partnerships. Such actions will be beneficial toward increasing school readiness in greater numbers of Mississippi's preschool children.

There is also a positive relationship between directors holding an early childhood degree (Associate's or higher) and the greater likelihood of that they utilize the state's ELSG. While the cost of formal education is high, and to expect all licensed childcare providers to hold a specific degree may be unfeasible or even ill-advised, the larger point cannot be ignored that having formal knowledge of best practices in early childhood makes a difference. In the last year, Mississippi Department of Education released of a strategies guidebook for putting the standards into practice while simultaneously increasing its efforts to educate Mississippi-certified teachers on the contents of the early learning standards and guidelines through a series of free, publicized training workshops. Beyond the K-12 and higher education systems, increasing the efforts of the state's existing technical assistance providers remains the most logical solution for disseminating best practices in early childhood among the state's licensed nonprofit and private childcare centers.

While overall reported usage of Mississippi's ELSG at 82 percent is quite high, their voluntary nature is the definitive factor for those who choose not to adopt. One possible reason for this is that a provider's resistance to using standards is a way for them to maintain autonomy regarding instructional decision-making, without fear of reprisal. In such instances, efforts to build trustworthy relationships between involved parties would be critical for any change in provider attitudes. Another explanation might be that other expectations such as federal or state requirements, already exist which make the provider less inclined to add an additional burden to their work. For these providers, a crosswalk document that details the overlap between federal and state licensing requirements, Head Start frameworks, and other relevant expectations can be developed, similar to the document available on the Early Years Network website created to connect Mississippi's Early Learning Standards and Guidelines with



the its College and Career Ready Standards. In addition, a larger question exists of whether these results suggest that changing the ELSG from voluntary to mandatory would remove the primary barrier to usage, and this may be true. For Mississippi's young children, a statewide policy requiring the use of the ELSG could be a way to ensure to every child, regardless of income, ethnicity, location or other potentially segregating factor, is receiving high-quality care accountable to the same set of standards as that of his or her peers. However, such policies are neither cost-free to implement nor to enforce. Additional research and information on the economic costs associated with such a move should be undertaken prior to taking a strong stance. In the meantime, it would be wise for a system to be developed for consistently tracking licensed childcare provider awareness, usage or endorsement of the early learning standards or early learning guidelines.

### Limitations of Study

Survey methodology was used to collect the data used for this analysis, which always carries with it the limitations of a self-report instrument dependent upon the honesty of the person providing the response. Despite a promise of anonymity to participants in the original study from which this research draws its data, there is always a risk that a respondent will give the most favorable response, which then biases the number of positive responses. The survey is extensive and covers a broad range of childcare topics, which may introduce some answer fatigue on the part of the respondents. Furthermore, because the response options on the original survey are limited to multiple choice, additional response options may provide more accurate data than what is available in the existing dataset. Due to the nature of the received responses, patterns resulting from regional differences may exist within the state that cannot be fully captured in this study.

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**Appendix**

Section 1: Early Learning Standards and Guidelines

*First, I would like to ask you a few questions about your usage of Mississippi’s Early Learning Standards and Guidelines.*

1. Which of the following best describes the curriculum used by your facility?
  - a. We use a formal published curriculum
  - b. We use a teacher created curriculum
  - c. We use a formal published curriculum and teacher created curriculum together
  - d. Do not use a curriculum
  - e. Other (specify)
  
2. To the best of your ability, please list the name(s) of the formal published curriculum that is used at your facility:
  
3. Does your facility follow/use Mississippi’s Early Learning Standards and Guidelines for children ages 3 and 4?
  - a. YES
  - b. NO (Skip Q4)
  
4. On a scale of 1 to 4, please rate the usefulness of Mississippi’s Early Learning Standards and Guidelines for children ages 3 and 4. 1=not at all useful, 4=very useful
 

Not at all Useful	Not very useful	Somewhat useful	Very useful
1	2	3	4
  
5. What are some of the reasons you have chosen not to follow/use Mississippi’s Early Learning Standards and Guidelines for children ages 3 and 4? (check all that apply)
  - a. Lack of access
  - b. Lack of training
  - c. Not required to use it
  - d. Too expensive to implement
  - e. Problems with technical assistance
  - f. Other reason (please specify):
  
6. Would you like to receive information on Mississippi’s Early Learning Standards and Guidelines for children ages 3 and 4?
  - a. YES (If YES, Answer Q6)
  - b. NO (If NO, Skip Q6, Answer Q7)
  
7. What would be the best way for us to make Mississippi’s Early Learning Standards and Guidelines available to you and your teachers?
  - a. Electronically, either by email or viewing online
  - b. On a jump drive or CD
  - c. Hard copy
  - d. Other (please specify):
  
8. What would be the most effective training method for you and your staff as they relate to Mississippi’s Early Learning Standards and Guidelines?
  - a. Weekend workforce training course(s)
  - b. Weekday workforce training course (s)
  - c. Webinar or electronic training source
  - d. More on-site training
  - e. Other (please specify):
  
9. Which of the following technical assistance programs have you received services from? (Check all that apply)
  - a. The Early Years Network (Excel by 5, Allies for Quality Care, MS Shared Services Network, or Partners for Quality Child Care)
  - b. Mississippi Building Blocks
  - c. MDE Pre-K Collaborative
  - d. MS Low Income Initiative

- e. MS Head Start
- f. Other: \_\_\_\_\_

10. If you have not accessed the programs listed above, which ones would you be interested in participating in? (Check all that apply)
- a. The Early Years Network (Excel by 5, Allies for Quality Care, MS Shared Services Network, or Partners for Quality Child Care)
  - b. Mississippi Building Blocks
  - c. MDE Pre-K Collaborative
  - d. MS Low Income Initiative
  - e. MS Head Start
  - f. Other: \_\_\_\_\_

11. Please indicate the type of developmental feedback you provide to parents? (Check all that apply.)
- a. Progress Report
  - b. Developmental checklist
  - c. Competency checklist
  - d. Report Card
  - e. None
  - f. Other (please specify):

12. How often is this developmental feedback provided?
- a. Daily
  - b. Weekly
  - c. Monthly
  - d. Quarterly
  - e. Other (please specify):

13. Does your center currently collaborate with your local school district?
- a. Yes (If YES, Answer Q14)
  - b. No (If NO, Skip to Section 2)

14. In which ways does your center collaborate with your local school district? (Check all that apply.)
- a. Training
  - b. Kindergarten transition day
  - c. Sharing of materials and information
  - d. Special needs children
  - e. Aligned report card/checklist
  - f. other(specify)
  - g. None, do not collaborate

15. How often does your center collaborate with your local school district?
- a. Weekly
  - b. Monthly
  - c. Yearly

Section 2: Professional Expertise and Strategies to Close the Gap

*Next, I would like to ask you a few questions about professional expertise of your staff and strategies to close the gap.*

16. To what extent do you agree that your staff is prepared and qualified in each of the following areas:

	Strongly Disagree (1)	Disagree (2)	Neither Agree/Disagree (3)	Agree (4)	Strongly Agree (5)
Early Learning and Development					
Health, Mental Health, and Nutrition					
Family Support					

17. When you think about professional development in early childhood education, what areas do you feel are the most important to address in order to ensure that your staff is prepared and has the skills needed to close the gaps in these three areas? Please indicate your response by scoring the following items on a 1-5 scale, with 1 indicating Not Important and 5 Indicating Very Important.

	Not Important (1)	(2)	(3)	(4)	Very Important (5)
By providing more hands-on experiences for postsecondary students in early childhood education programs that emphasize a link between theory and practice.					
By providing training experiences designed to improve the knowledge and skills of early childhood professionals.					
By providing training experiences that emphasize the needs of children and families.					
By making sure that training is done in a consistent, equal, and affordable manner for providers across the state.					
By tailoring programs to the unique needs of young children and helping to strengthen sensitivity to diversity in cultural and family backgrounds.					
By providing meaningful opportunities that lead to the retention and career advancement of early childhood professionals.					

Other (please specify)

Section 3: Governance Models

*In this section, I would like to ask you about your feelings on the most effective way to govern the Early Childhood System in Mississippi.*

*Currently, Mississippi’s early childhood education programs do not have an established system for authority and accountability and are instead being governed by multiple agencies such as MDE, MDH, MDHS.*

18. Please rank in order of importance from 1 to 3 where 1 is the best option and 3 is the least option for the following scenarios you believe would be the best fit for creating an integrated governance model where all Early Childhood Education programs would be directed and controlled by one entity in the state of Mississippi.

	Rank (1-3)
Placing authority and accountability for Early Childhood Education under one existing agency, such as the Mississippi Department of Health, Mississippi Department of Human Services, or Mississippi Department of Education.	
Placing authority and accountability for Early Childhood Education under multiple agencies, but coordinated by a council.	
Placing authority and accountability for Early Childhood Education under an independent, stand-alone executive office.	

Section 4: Director Educational Profile

*Next, I would like to ask you about your educational background.*

19. What is the highest level of education you have completed?

- a. Less than High School
- b. High School Diploma/GED
- c. Some College
- d. 2-year college degree (Associate’s)
- e. 4-year college degree (Bachelor’s)
- f. Graduate degree (Masters, Ph.D., Professional)
- g. Other

20. Do you hold a degree in early childhood education? (If they check e, f, or g in Q19)
- Yes
  - No
  - Currently working on a degree in early childhood education
21. Have you received any of the following certifications related to your work with children under the age of 5? (check all that apply)
- Child Development Associate Credential
  - Child Development Associate from a college/university
  - 1 year Certificate of Proficiency in Early Childhood Education
  - Director's Credential
  - National Director's Credential
  - First Aid Certification
  - CPR Certification
  - ServSafe Certification
  - Other (please specify):
22. How many professional development hours have you completed this calendar year?
- Less than 15 hours
  - 15 hours or more
23. When does your licensing year start?
24. Are you a member of any national or regional professional organizations related to your work with children under the age of 5?
- Yes (If YES, Answer Q25)
  - No (If NO, Skip Q25)

25. Please list these organizations

#### Section 5: Childcare Center Staff Profile

26. Does any of your staff hold a degree in a field related to early childhood education (such as elementary education, special education, human development, sociology, or psychology)?
- Yes
  - No
  - Currently working on a degree in a related field
27. How many staff members at your center currently work with children ages 0-5?
28. Does your center provide volunteer opportunities?
29. Does your center have an internship program?
30. How many staff in your center have earned a Certificate (less than a 2-year degree)
31. How many staff in your center have earned an Associate's degree from an accredited community or junior college?
32. How many staff in your center have earned a Bachelor's degree?
33. How many staff in your center have earned a Graduate degree (Masters, Ph.D., Professional)?

#### Section 6: Childcare Center Profile

*Finally, I would like to ask you about your childcare center.*

34. Which of the following best describes your center?
- Early Head Start
  - Head Start

- c. Public, Pre-K
- d. Private, for profit
- e. Private, not for profit
- f. Other (please specify):

35. In what county is your facility located?

36. Is your center licensed to serve the following early childhood groups? (Check all that apply.)

- a. Infants (Birth to 1 Year)
- b. Toddlers (1-2 Years)
- c. 3 year olds
- d. 4 year olds
- e. School age

37. What is the license capacity for your center?

38. How many children from the following early childhood groups are currently enrolled in your program?

- a. Infants (Birth to 1 Year if 'a' was checked in Q36)
- b. Toddlers (1-2 Years if 'b' was checked in Q36)
- c. 3 year olds (if 'c' was checked in Q36)
- d. 4 year olds (if 'd' was checked in Q36)

# Evacuating the Mississippi Gulf Coast from Hurricane Katrina: The Role of Risk and Socioeconomic Factors

Edward Sayre, Candace Forbes Bright, David Butler, and Michael Webb\*

## Executive Summary:

Hurricane Katrina exposed numerous flaws in both the understanding and the practice of disaster driven evacuations. Understanding the factors considered in the decision to evacuate assists officials to better plan and implement an evacuation and thus yields important policy considerations. While most Hurricane Katrina-related evacuation studies concentrate on New Orleans, Mississippi remains relatively understudied despite Hurricane Katrina making landfall directly over Hancock County. This study fills in this gap by looking at evacuation from Hurricane Katrina along the Mississippi Gulf Coast. Considerations include if perceived risk and/or actual risk play a role in the decision to evacuate from the Mississippi coast, when respondents return, and how much respondents spent on evacuation. The multivariable regression analysis includes socioeconomic control variables and data from a unique Disaster Composite Index as a measure of actual risk. The results reveal that both perceived risk and actual risk are significant factors in the decision to evacuate, when to return, and how much the evacuees spent on evacuation. The research supports findings that socioeconomic factors can matter, but risk is the key variable in explaining hurricane evacuation behavior. These findings contribute to the evacuation literature by confirming that risk is important, although socioeconomic factors also matters as they impact risk perception. Believing oneself to be in harm's way appears to be what motivates residents to evacuate or not. The challenge for public officials will be to anticipate who does or does not accurately perceive their risk.

*Key Words:* evacuation, Hurricane Katrina, disasters, risk perception, Mississippi

## Introduction

One of the biggest challenges faced by public officials in the path of a hurricane is the timing of an evacuation order. An evacuation called too early leads to lost income and unnecessary expenses, especially if the storm veers away from its initial path. Even worse, untimely evacuations could prevent those in the hurricanes' true path from being safely evacuated if the roads are already clogged. If called too late, an evacuation order can lead to avoidable injuries and deaths. In order to have a more effective evacuation, it is essential to know how the population is likely to respond. In this paper, the researchers examine data from a survey of south Mississippi residents about their behavior in response to Hurricane Katrina. We find that while certain demographic characteristics can affect an individual's

willingness to evacuate, the actual and perceived risks dominate other determinants of the evacuation decision.

Prior research on evacuations from Hurricane Katrina has focused on the city of New Orleans. The current paper adds to the body of work through the examination of evacuation patterns in Mississippi and relating these choices to risk and socioeconomic status of the evacuees. Furthermore, there are reasons why New Orleans may not be the clearest example to use to understand evacuation. First, while Hurricane Katrina killed over 1,500 in Louisiana, most of those deaths were due to the manmade disaster of the levee failure, not the more predictable disaster of the Hurricane's direct wind and storm surge impacts. Thus, the role of risk assessment is less typical—those who faced the greatest danger had less clear information about their

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\* Edward Sayre, PhD is the Chair and Associate Professor of the Department of Political Science, International Development and International Affairs at The University of Southern Mississippi. Dr. Sayre is the corresponding author and can be reached via email at [edward.sayre@usm.edu](mailto:edward.sayre@usm.edu).

Candace Forbes Bright is an Associate Scientist at The University of Southern Mississippi.

David Butler, PhD is Vice Provost for Research and Dean of the Graduate School at Middle Tennessee State University.

Michael Webb is a Research Analyst at Louisiana Economic Development.

This research is supported by SERRI grant 80041-01 from the Department of Homeland Security.



potential risk than is typical. Second, since many evacuees from New Orleans did not return, their decisions may be less germane for those who are likely to evacuate in order to eventually return.

### Literature Review

Not everyone evacuates from a severe weather threat (c.f., Dow and Cutter, 2000; Baker, 1991). The decision to evacuate from a severe weather threat is complicated as each family or individual must weigh a multitude of factors. As Drabek (2001) notes, people's choices about evacuation reflect the options they perceive they have. Recent studies suggest that risk, either actual or perceived, might be the most important factor in a decision to evacuate. For example, Riad and Norris (1998) argue that the decision to evacuate is a function of risk perception, preparedness, social influences, and economic resources; however, risk perception trumps socio-economic factors. The authors indicate that if one perceives risk to be high, one finds a means to evacuate, suggesting risk perception has primacy over social and economic factors. According to Elliott and Pais (2006), most New Orleans residents who failed to evacuate from Hurricane Katrina underestimated the storm's potential destructiveness. Furthermore, Elliot and Pais contend that all classes and races underestimated the strength of Hurricane Katrina. Of the seventeen Vietnamese-Americans interviewed by Vu et al. (2009) who did not evacuate New Orleans during Hurricane Katrina, ten report that they did not evacuate because they underestimated the impending impact.

One way of measuring risk is to consider proximity to danger. Baker's (1991) analysis of twelve previous evacuation studies covering multiple disaster types finds that evacuation rates are usually high among populations living in close proximity to high-risk locations, suggesting rational behavior in evacuation decision making. Baker implies that the higher frequency of evacuation could be a function of greater risk awareness or increased attention to the area by authorities. Lindell, Lu, and Prater's (2005) study of Hurricane Lili (2002) in Louisiana and Texas finds correlations between evacuation and proximity to rivers, lakes, and the coast. The authors also report that those in high-risk areas tend to follow local media or internet alerts concerning storm damage at greater frequency than those living in low-risk areas. Peacock, Brody, and Highfield (2005) suggest that Floridians who live in an area considered to be high-wind risk for hurricanes are generally aware of such vulnerabilities.

While some studies suggest that risk trumps socioeconomic factors in decisions to evacuate, it is difficult to isolate risk from socioeconomic factors. For example,

location is a risk and socioeconomic variable, as the two are interlinked. For example, location risk exists simultaneously in Mississippi for higher valued-homes directly on the beachfront as well as for homes that are in lower lying areas that are prone to flooding in a high rain producing storm like a hurricane. Drabek (2001) finds living in a mobile home or apartment to be among the most significant social factors in regards to perceptions of risk when surveying employed persons living in five different states that had experienced flooding or hurricanes in the mid-1990s. Whitehead et al.'s (2000) study finds that North Carolina residents were twice as likely to say they would evacuate from a hypothetical hurricane if they anticipated flood risk and five times more likely if they lived in a mobile home. Brodley et al. (2006) report that forty-two percent of survey respondents, the vast majority of whom were from New Orleans, would have not been able to evacuate for Hurricane Katrina, even if they had better awareness of how the storm would have affected them. In addition to financial resources, factors such as language also matters. Messias, Barrington, and Lacy (2011) find little evidence that native-Spanish speakers received disaster information in Spanish prior to Hurricane Katrina.

As Raid, Norris, and Ruback (1999) remark, different subgroups have different reasons for not evacuating. Even if one lives at a location of high risk; values, attitudes, social influences, and cultural identity affect how people perceive their actual risk (Eisenman et al., 2007; Elder et al., 2007; Renn et al., 1992). Furthermore, Cutter, Mitchell, and Scott (2000) observe that groups who are most vulnerable to hazards might not intersect with locations that are most socioeconomically vulnerable. The implications are that studies examining risk must look beyond simple geospatial variables. Kaspersen et al. (1988) posit that the explanation as to why some people may overreact to minor risks lay in the fact that hazards interact with psychological, social, institutional, and cultural processes. An amplification of risk occurs at two stages: the transfer of information and the response level by society. They warn that conceptualizing risks from hazards in terms of probabilities ignores equity and social impacts such as effects on vulnerable groups. Zhang, Prater, and Lindell (2004) suggest those with higher education are more likely to accurately report their risk levels.

Risk affects more than just the decision to evacuate as evacuees must decide when, if ever, to return home. Again, socioeconomic and physical risk factors matter on the return from evacuation. Special health needs, for example, could complicate a person's evacuation efforts (McGuire, Ford, and Okoro, 2007). Landry et al. (2007) find that emotional attachment (connection to place) to one's home

did not affect the decision to return home among Hurricane Katrina evacuees who fled to Houston, Texas. Instead, the opportunity cost of returning home in terms of earning potential in Houston versus at home is what mattered. Vu et al. (2009) report the decision to return to New Orleans one year after Hurricane Katrina by Vietnamese-Americans was not influenced by age, but having an elderly person being cared for in the family or having children in the household did increase the likelihood of returning. Elliot and Pais (2006) find that income levels and homeownership affected the likelihood of one planning to return to New Orleans after Hurricane Katrina. Using survey data of Hurricane Katrina victims who sought help from the American Red Cross, the authors discovered that lesser-affluent homeowners were more likely to return and suspect it is because of mortgage obligations and low income creates an opportunity cost for staying away.

## Methods

This study uses a multivariate regression model to test the relationship between evacuation behavior, socioeconomic factors, and risk by Mississippi Gulf Coast residents during Hurricane Katrina. Risk as used in the model is defined in terms of actual risk due to geography and other vulnerabilities such as socioeconomic factors that impede or aid in one's ability to withstand a severe storm threat. Perceived risk, while not unimportant, is about a person's awareness of actual threats. Research suggests that people perceive risk heuristically rather than in terms of probabilities (Slovic, 1987).

The data were collected for a broader Department of Homeland Security (DHS) funded study of Hurricane Katrina response, resiliency, and recovery. The research period was June 2009 through December 2011. In late spring and early summer of 2011, the researchers conducted a survey examining, in part, those along the Mississippi Gulf Coast that elected to evacuate, those that did not, and those persons that did evacuate details about their evacuation. The team collected 1,830 completed questionnaires. The survey sampling technique used political, economic and social elites within the communities as dissemination nodes. Moreover, community organizations across the coastal counties were also solicited as a means to share with the members. To ensure that diversity was achieved in the sample, the research approached organizations whose memberships are known to predominantly be made up of minority and immigrant populations.<sup>1</sup>

Given the strong relationship between risk perception and observable risk factors such as proximity to waterways

(c.f., Whitehead et al., 2000), the researchers use proximity to the Mississippi Gulf Coast to measure perceived risk. The closer a person lives to the coastline equates to greater potential damage from wind and storm surge. Proximity to coast is indicated in Lindell, Lu and Prater's (2005) study of Hurricane Lili in Louisiana and Texas. Lindell et al. (2001) find that evacuation is more likely if an adjacent risk area is ordered to evacuate. Therefore, one expects to see a level of diminishing evacuation in movement from coastline to inland. Since a hurricane's trajectory cannot be predicted with certainty, the rational approach is for residents to equate proximity to water with higher risk. As with Smith and McCarty (2009), the limitation of our dataset is that perception-related data such as sources of communications are not available. The socioeconomic control variables are grounded in theory as they impact risk perception and subsequent decision making behavior (c.f., Drabek, 2001).

Hurricane Katrina made landfall over Hancock County, Mississippi, about thirty miles west of Gulfport and forty-five miles west of Biloxi. To analyze proximity to danger in the survey population, the zip codes provided by the respondents to their home are geocoded and mapped to measure the physical distance to the coastline. This mapping exercise was conducted to determine if greater proximity to the Gulf of Mexico and greater proximity to the epicenter of Hurricane Katrina landfall have higher evacuation rates than other zip codes in the sample area. An important and unique part of the multivariate regression models is the development of the Disaster Composite Index (DCI). The DCI was developed by the researchers using multiple datasets that included storm surge levels, rainfall amounts and maximum wind speed during the storm. The DCI specifically takes the three scaled values for wind, rain, and storm surge (all weighted equally) to provide a composite index score with a higher number equating to higher potential damage. If residents in neighborhoods with a high DCI score evacuated at greater frequency, then it suggests rational behavior based on perceived risk. The use of the DCI is a unique contribution to the literature because it offers a means to measure actual risk whereas proximity to the coast proxies potential risk.

Given the binary nature of an evacuation decision (evacuate yes or no), the researchers use a binary dependent variable (probit) model to determine what factors are significantly correlated with the decision to

<sup>1</sup> Despite these multiple efforts, whites were still overrepresented.

evacuate.<sup>2</sup> The expectation is that actual risk is a significant predictor of the decision to evacuate. Ordinary Least Squares (OLS) regression is used to test factors affecting duration of evacuation, with the expectation that level of damage as measured by the DCI affects evacuation duration. Because socioeconomic factors are to be expected to influence the decision to evacuate and duration of evacuation, socioeconomic variables, namely race, age, gender, wages, homeownership, and presence of children in the household, appear in the models as controls. It is expected that whites evacuated in greater frequency and for longer duration than other races (c.f., Perry, 1979). It is also expected that females evacuated in higher frequency due to increased awareness of risk perception (Bateman and Edwards, 2002). Those earning more are expected to be able to better provide the resources in order to evacuate. Homeownership provides greater vested interest in not evacuating or returning sooner in order to secure one's property (c.f., Vu et al., 2009; Aguire, 1991). The presence of children in the household and age (elderly) reflect the presence of vulnerable persons within the household, so the presence of children in the household and age of the respondent are expected to have positive effects on the decision to evacuate and subsequent duration (Gladwin and Peacock, 1997; Vu et al., 2009).

## Results

Beginning with descriptive statistics, the survey sample provides evidence that groups with greater vulnerabilities to a severe weather threat evacuated with greater frequency (See Table 1).

By examining the frequency of evacuation in Table 1, one can note a few demographic differences in evacuation patterns. While the gender gap in evacuation rates is relatively small (1.9 percentage points), the difference for race and ethnicity are more pronounced. Both Asians and Blacks were more likely to evacuate than whites. However, it should be noted that the survey participation among Asians, Hispanics, and American Indians is extremely low despite efforts to reach minority populations.<sup>3</sup> Education levels show mixed results as those with the most education and the least education had the highest frequency of evacuation. For those who had other living arrangements than either owning a home or paying rent, the frequency of evacuation drops by nine percentage points. Those with children under the age of eighteen in the household were

**Table 1.** Socioeconomic Demographics of Evacuees  
(Source: Authors 2013)

	Total	Number of Evacuees (percent)
Female	1122	570 (50.8%)
Male	507	248 (48.9%)
White	1411	670 (47.5%)
Black	204	105 (51.5%)
Native American	19	12 (63.2%)
Asian	15	9 (60.0%)
Two or More Races	31	14 (45.2%)
Employed	1349	659 (48.9%)
Unemployed	51	18 (35.3%)
Full-time Student	237	96 (40.5%)
Domestic Duties	52	35 (67.3%)
Retired	114	72 (63.2%)
Disabled	10	7 (70%)
12th grade or less, no diploma	29	21 (72.4%)
High school graduate or equivalent	103	50 (48.5%)
Some college but no degree	355	155 (43.7%)
Associate's degree	197	82 (41.6%)
Bachelor's degree	429	209 (48.7%)
Master's degree	441	222 (50.3%)
Professional degree (MD, DDS, DVM, LLB, JD)	41	20 (48.8%)
Doctoral degree (PhD, EdD)	67	38 (56.7%)
Owned Home	1222	618 (50.6%)
Rent	231	117 (50.6%)
Did Not Pay Rent	327	136 (41.6%)
Other	39	15 (41.6%)
No Children in Household	431	189 (43.9%)
Children in Household	577	282 (48.0%)

4.1 percentage points more likely to evacuate than those without children in the household. This paper also examines duration of the evacuation. As the financial resources a person has available for evacuation could be expected to matter, Table 2 provides descriptive statistics about duration, and Table 3 provides data on the cost of evacuation. In terms of living arrangements, the results are mixed as to the frequency that each group spent on evacuation. What is noticeable is that those with other living arrangements and those who are disabled had remarkably greater frequency of spending more than \$1,000 on their evacuation and to have stayed away for a month or more, reflecting socioeconomic vulnerabilities might be a factor. Homeowners were less likely to evacuate

<sup>2</sup> Both probit and logit models were tested during the statistical analysis and each model produced similar results. Probit results are presented due to the underlying behavior (evacuation yes or no) would be appropriately modeled within the latent variables approach for which probit estimates are more easily interpreted.

<sup>3</sup> The total participation for Asian and Native American/Alaskan Native are 18 and 22 responses respectively, so drawing conclusions concerning these populations is not warranted.

for more than six days, when compared to renters or others. This may reflect concern for personal property (Vu et al., 2009; Aguire, 1991). Results are also mixed in terms of race for both cost and duration. As greater duration can be expected to generate greater cost, the correlation between the two was estimated as 0.479, or \$57 per day, suggesting a relationship might indeed exist between the two variables.<sup>4</sup>

The descriptive statistics on frequency of evacuation can be summarized as providing non-inferential support that risk perception matters and mixed support that socioeconomic factors matter. The sample reveals that those who were unemployed or full-time students evacuated at a lower frequency than those who were employed, disabled, retired, or tending to domestic duties. Minorities evacuated in greater frequency than whites, but the sample size is small. Those who owned a home or paid rent evacuated in greater frequency, as did those who had children in the household. Homeowners had a lower frequency of evacuating for a week or more than non-homeowners. Those with other living arrangements or

who are disabled exhibited a greater propensity to spend at least \$1000 on their evacuation and to stay away for at least a month.

While those living on or near the beach adjacent to the Gulf of Mexico generally have higher incomes, and live in well-built homes as opposed to mobile homes, these individuals are directly in the path of the winds and the storm surge. Figure 1 displays the percent of survey respondents who evacuated by zip code. This visually presents how frequency of evacuation changes in relation to proximity to the coastline.

The patterns on this map suggest proximity to the Gulf of Mexico is an indicator of evacuation, even when the hurricane trajectory is considered. Regardless of home ownership, race, and wages, individuals living near the water evacuated in higher percentage rates in the survey than those living further inland from the coastline. Examining the map from west to east reveals that Hancock County (far west) is the only county where at least seventy-five percent of the residents evacuated. No coast-adjacent zip code in Hancock County had evacuation levels below

**Table 2.** Duration of Evacuation (Source: Authors 2013)

	1-3 Days	4-6 Days	1-2 Weeks	3-4 Weeks	>4 Week
Female	30.7%	18.7%	10.8%	9.9%	18.2%
Male	38.5%	19.5%	19.0%	9.4%	12.5%
White	35.1%	17.6%	21.4%	9.9%	15.9%
Black	33.0%	23.2%	22.3%	7.1%	14.3%
Native American	35.7%	14.3%	21.4%	7.1%	21.4%
Asian	20.0%	30.0%	40.0%	0.0%	10.0%
Two or More Races	7.7%	23.1%	15.4%	23.1%	30.8%
Employed	35.0%	18.9%	21.1%	9.9%	15.2%
Unemployed	25.0%	15.0%	25.0%	10.0%	25.0%
Full-Time Student	22.0%	21.0%	23.0%	15.0%	19.0%
Domestic Duties	27.0%	10.8%	16.2%	18.9%	27.0%
Retired	32.5%	18.8%	21.3%	6.3%	21.3%
Disabled	28.6%	0.0%	14.3%	0.0%	57.1%
Owned Home	37.8%	19.9%	20.0%	7.7%	14.7%
Rent	23.3%	12.7%	24.8%	19.6%	19.6%
Did Not Pay Rent	25.4%	12.7%	23.1%	16.8%	22.0%
Other	16.0%	12.0%	24.0%	8.0%	40.0%
Average	28.1%	16.89%	22.07%	10.45%	22.51%

**Table 3.** Cost of Evacuation (Source: Authors 2013)

	\$0- \$100	\$101- \$150	\$251- \$500	\$501- \$1000	>\$1000
Female	11.6%	13.2%	22.3%	19.1%	33.8%
Male	9.6%	14.6%	26.0%	17.2%	30.7%
White	11.3%	12.4%	23.1%	18.3%	35.0%
Black	8.1%	21.6%	29.7%	20.7%	19.8%
Native American	0.0%	14.3%	28.6%	28.6%	28.6%
Asian	20.0%	10.0%	20.0%	30.0%	20.0%
Two or More Races	7.1%	21.4%	14.3%	21.4%	35.7%
Employed	9.6%	14.0%	23.2%	18.4%	34.8%
Unemployed	23.8%	19.1%	19.1%	4.8%	33.3%
Full-Time Student	19.0%	10.0%	28.0%	16.0%	27.0%
Domestic Duties	10.5%	2.6%	15.8%	34.2%	36.8%
Retired	7.4%	21.0%	27.2%	16.1%	28.4%
Disabled	12.5%	12.5%	12.5%	0.0%	62.5%
Owned Home	9.9%	14.3%	23.4%	18.0%	34.5%
Rent	7.4%	11.9%	20.7%	20.0%	40.0%
Did Not Pay Rent	8.6%	13.1%	20.0%	19.4%	38.9%
Other	9.5%	14.3%	33.3%	28.6%	14.3%
Average	10.8%	14.2%	22.6%	19.6%	32.8%

<sup>4</sup> This value was determined by an OLS regression of dollars spent during evacuation on number of days evacuated. Full regression results are available by request.

fifty-one percent. It is not until zip code 39501 (City of Gulfport) in Harrison County that the evacuation rate drops below fifty percent. One can see that portions of the cities of Gulfport and Biloxi did not evacuate at the same level as communities to the east, where risk presumably is lower further from the epicenter of landfall. Demographically, the cities of Gulfport and Biloxi have a higher percentage of minority residents than other communities. Despite the fact that the aggregate data suggests that minority populations evacuated at a higher rate than the white population, in urban areas such as Gulfport and Biloxi this generalization does not appear to hold. Moreover, Eastern Biloxi is home to minority populations including historic Vietnamese families heavily involved with the local seafood industry. While the survey results indicate higher evacuation rates among non-black minorities, the overall sample size for minorities is low and needs to be understood in that context. Except for two zip codes in Jackson County (far east), the evacuation rate along the coast is in the fifty-one percent to seventy-five percent range. Zip code 39470 (Poplarville) is the only zip code where evacuation rate is below twenty-five percent of the sample. This zip code is in the direct path of Hurricane Katrina, but is inland. Overall, the findings presented in Figure 1 are consistent with Baker's (1991) study, which shows that those in high-risk areas have greater evacuation frequencies than those in low-risk areas.

Table 4 presents results from a set of regression models where the probability of evacuating is regressed on a series of covariates including race, wages, home ownership, number of children at home, and proximity to the impact of the hurricane. Column 1 includes the most parsimonious version of the regression model where the controls include: dummy variables for race/ethnicity (Asian, Black, Hispanic), for sex (female), for home ownership, age (in years) children at home (number) and educational level (in years of schooling). In this first model, the researchers exclude the Disaster Composite Index (DCI) in order to show the impact of its inclusion in models 2-4. In this model only female, age, and number of children at home are significant. Older respondents and women are more likely to evacuate. Additionally, the more children in the house, the more likely a family is to evacuate.<sup>5</sup>

In the second column, distance from the coast and the (DCI) are added. In this specification, the DCI is positive and

Table 4. Probit Model on Likelihood of Evacuation (Source: Authors 2013)

VARIABLES	(1)	(2)	(3)	(4)
DCI		.027** (.012)	0.025* (0.015)	0.026** (0.013)
Black	-0.051 (0.153)	-0.034 (0.153)	0.005 (0.182)	0.010 (0.157)
Hispanic	-0.640 (0.496)	-0.760 (0.500)	-0.529 (0.558)	-0.785 (0.505)
Asian	0.371 (0.455)	0.329 (0.459)	0.419 (0.534)	0.368 (0.460)
Female	0.197** (0.097)	0.201** (0.097)	0.203* (0.122)	0.208** (0.098)
Age	0.009** (0.004)	0.008* (0.004)	0.005 (0.006)	0.009** (0.004)
Education (years)	0.032 (0.021)	0.032 (0.021)	0.024 (0.028)	0.038* (0.022)
Home Owner	-0.149 (0.118)	-0.138 (0.119)	-0.118 (0.142)	-0.176 (0.121)
No. of Children	0.077* (0.043)	0.080* (0.043)	0.136** (0.055)	0.081* (0.044)
% Black in Zip Code	0.002 (0.003)	0.004 (0.003)	0.001 (0.004)	0.004 (0.003)
Coast Distance (Miles)		-0.011*** (0.004)	-0.012** (0.005)	-0.010** (0.004)
Wages			0.006 (0.005)	
Property Loss				0.002 (0.002)
Constant	-1.061*** (0.359)	-1.238*** (0.392)	-1.180** (0.489)	-1.386*** (0.402)
Observations	854	854	609	830

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ ; standard errors in parentheses.

significant, while distance to coast is negative and significant as expected. Furthermore, the age variable, female dummy variable, and children in the house variable remain significant at the ten percent level, but there is some loss of significance for the age variable. The hourly

<sup>5</sup> We also ran numerous other iterations of the models to test for collinearity between the variables potentially affecting our test for statistically significant relationships. We found that there is little inconsistency with the inclusion or exclusion of other variables. Thus, as the variables included in the current tables are the ones that are most closely related to our theoretical *a priori* understanding of the factors that may affect evacuation likelihood (and time and money spent), we chose the existing models that are presented. Full results are available upon request.

wage is added in column 3 and is not significant.<sup>6</sup> Because many individuals did not respond to the wage question, the number of usable observations decreased by 25 percent in this specification. This led to several of the variables to not be as significant or to even have their significance drop below the .10 threshold in this specification. Therefore, in the final specification, we add reported property loss from the survey, but drop wages.

The property loss reflects what the actual risks turned out to be, but the variable is not significant. Without wages also included in this model, the only variables that are significant are DCI, age, female, education, coast distance, and the number of children at home.

Table 5 presents the results from an OLS regression of the same covariates as in Table 4 on the time spent evacuated.<sup>7</sup> In column 1, age, female, homeownership, and children at home are significant. This implies that home ownership, while it did not affect the probability of leaving, it did cut one's time spent evacuated by four and a half days. It seems pressure to protect and restore personal property might not influence the decision to evacuate, but does constrain the duration of it. Homeowners are likely to limit their time away in order to come home to check on and begin repairing their property. Female respondents are more likely to evacuate and they are willing to stay away for longer than male respondents. Finally, the presence of children at home is likely to extend the evacuation time. This is largely due to the difficulties faced when returning to a devastated area are more difficult if one is also having to care for children.

When we add the disaster composite index in column 2, this variable is found to be significantly related to the time spent evacuated. The greater the impact of the storm in a particular location, the longer individuals from that area stayed away. When wages are added in column 3, this variable is not significant and the female dummy variable and the age variable cease to be significant. This result is likely due to the loss of observations with the inclusion of the wage variable. When reported property loss is added in column 4, the loss is significant with an expected positive sign. The more damage, the longer one stayed evacuated. Thus, both the impact of the storm in terms of its meteorological effects and its particular devastation to

one's home affects evacuation duration. In this final model, female becomes significant once again, but age does not.

**Table 5.** OLS Model of Time Spent Evacuated (Source: Authors 2013)

VARIABLES	(1)	(2)	(3)	(4)
DCI		1.069*** (0.142)	0.932*** (0.174)	1.013*** (0.145)
Black	-2.082 (1.972)	-0.313 (1.841)	-1.161 (2.079)	0.126 (1.852)
Hispanic	-4.143 (8.072)	-8.200 (7.493)	-5.121 (7.342)	-9.847 (7.471)
Asian	1.253 (5.172)	1.368 (4.799)	2.965 (5.217)	1.240 (4.775)
Female	3.786*** (1.292)	2.786** (1.205)	0.986 (1.467)	2.540** (1.211)
Age	0.118** (0.051)	0.101** (0.047)	0.055 (0.064)	0.070 (0.048)
Education (years)	-0.199 (0.263)	-0.216 (0.244)	0.304 (0.319)	-0.258 (0.247)
Home Owner	-4.757*** (1.465)	-4.638*** (1.358)	-3.357** (1.561)	-4.828*** (1.369)
No. of Children	1.503*** (0.561)	1.827*** (0.523)	1.749*** (0.625)	1.682*** (0.533)
% Black in Zip Code	-0.038 (0.039)	0.024 (0.037)	0.046 (0.046)	0.022 (0.037)
Wages			-0.084 (0.054)	
Property Loss				0.045** (0.018)
Constant	9.087* (4.654)	-1.467 (4.652)	-5.109 (5.953)	0.655 (4.806)
Observations	418	418	285	407
R <sup>2</sup>	0.061	0.199	0.157	0.212

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ ; standard errors in parentheses.

Table 6 presents a regression of the same set of covariates on the money spent on evacuation. In column 1, the only variables that are significant are age and children at home, with age being significant only at the ten percent level. When the DCI and wages are added, the DCI becomes significant, age ceases to be, and children in the home remains significant. Property loss is significant when added in column 4. The results are not surprising given that children at home and greater property damage are shown

<sup>6</sup> Wages are recorded in two different ways in the survey. Individuals can specify if they are paid hourly or salary and if they are paid hourly, they choose a range of their wage. The midpoint for the wage range for the category is recorded as a cardinal variable in order to be used in the regression model. If the individual is paid on a salary basis, the midpoint of the salary range is taken as the annual salary and then that midpoint is divided by 2,000 to calculate an hourly wage.

<sup>7</sup> This model was also estimated as an ordered probit, given the categorical nature of the variables as they were recorded in the survey. The results from the ordered probit and the OLS regression are qualitatively similar, so the authors chose the OLS results using midpoints of the categories to convert the categorical values to cardinal values.



in Table 5 to increase the time spent in evacuation. More time away presumably means more money spent.<sup>8</sup>

**Table 6.** OLS Model of Money Spent During Evacuation  
(Source: Authors 2013)

VARIABLES	(1)	(2)	(3)	(4)
DCI		23.251***	19.301***	20.689***
		(4.558)	(5.889)	(4.604)
Black	-78.738	-37.311	-57.353	-19.333
	(60.769)	(59.103)	(70.786)	(58.932)
Hispanic	101.228	9.682	6.648	-56.586
	(248.037)	(239.612)	(248.552)	(236.786)
Asian	-74.174	-74.205	64.158	-85.254
	(158.908)	(153.435)	(176.546)	(151.324)
Female	-4.751	-25.245	-23.392	-25.231
	(39.720)	(38.609)	(49.783)	(38.446)
Age	2.714*	2.232	3.357	0.814
	(1.560)	(1.507)	(2.172)	(1.524)
Education (years)	3.098	2.407	-4.733	-1.357
	(8.067)	(7.790)	(10.778)	(7.818)
Home Owner	-28.074	-21.850	-36.914	-37.069
	(44.507)	(42.951)	(52.110)	(42.864)
No. of Children	63.106***	70.759***	74.629***	60.504***
	(17.143)	(16.628)	(20.975)	(16.793)
% Black in Zip Code	-1.837	-0.431	-0.923	-0.549
	(1.204)	(1.186)	(1.582)	(1.172)
Wage			0.558	
			(1.817)	
Property Loss				1.852***
				(0.553)
Constant	411.135***	187.969	295.482	320.042**
	(143.347)	(148.233)	(200.813)	(151.915)
Observations	419	419	287	408
R-squared	0.050	0.122	0.097	0.142

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ ; standard errors in parentheses.

## Discussion

Hurricane Katrina forced evacuations of the Gulf Coast on an unprecedented scale, yet many did not evacuate from harm's way as 225 persons in Mississippi died (Sloan 2006). We find that evacuation rates are correlated with the post-hoc meteorological impact of the disaster, but it is not only impact that explains evacuation. Specifically, we find that there are other factors including age and gender are important determinants of evacuation. Perhaps some of these differences are explained by relative perceptions of risk, but some evacuation made sense. For example, only a quarter of the respondents from Lumberton, Mississippi, evacuated, though the impact through wind and rain in that community indicates that there was a high level of risk to staying.

Mississippi Public officials commit themselves to protecting the public from disasters, and therefore, they have a need for better understanding of how the public will react when a disaster approaches. The literature, including this study, indicates that risk influences the likelihood of one evacuating, but so do socioeconomic forces. Socioeconomic forces likely matter on three fronts: resources available for evacuation, the opportunity cost of evacuating, and how one perceives risk. The last factor is important as living in harm's way is not the same as being in harm's way.

Our study as well as others (Baker, 1991; Peacock, Brody, and Highfield, 2005) suggest those in closest proximity to the beach generally appear to realize that they are in grave danger during a hurricane and are more likely to leave. As these households are most at-risk, it becomes a priority for officials to make sure these areas are evacuated. The fact that there is a greater tendency for these areas to evacuate eases the burden of officials as danger approaches. Baker (1991, p. 296) writes that "Residents are more likely to evacuate when they understand without question that an evacuation notice applies to them, and more personalized modes of delivering the message result in higher response." Baker argues that media messages about evacuations are most effective when they announce information that references specific locations.

Continuing with Baker (1991), evacuees struggle with reliably explaining why they evacuate. Here, quantitative research methods can help overcome that shortcoming. For example, multiple regression analysis can tell researchers if being elderly matters because the data includes elderly who reside away from the coast. Evacuation is a multi-faceted process, and as such, the decision does not rest on any one variable alone. Understanding how people prioritize factors would advance understanding of evacuation behavior theory, but this cannot be achieved through the type modeling conducted in this study.

## Conclusion

Hurricane Katrina exposed numerous flaws in both the understanding and the practice of evacuations. Most Hurricane Katrina-related evacuation studies concentrate on New Orleans, but Mississippi was hard hit and the storm made landfall directly over Hancock County. This study fills in this gap by looking at evacuations in Mississippi. The data obtained from a survey allow us to compare the sample to the literature on evacuation as well construct models for the application of inferential statistics. The use

<sup>8</sup> Simple correlations between the two variables (time spent away and money spent on evacuation) show that the two are statistically significantly related to one another.

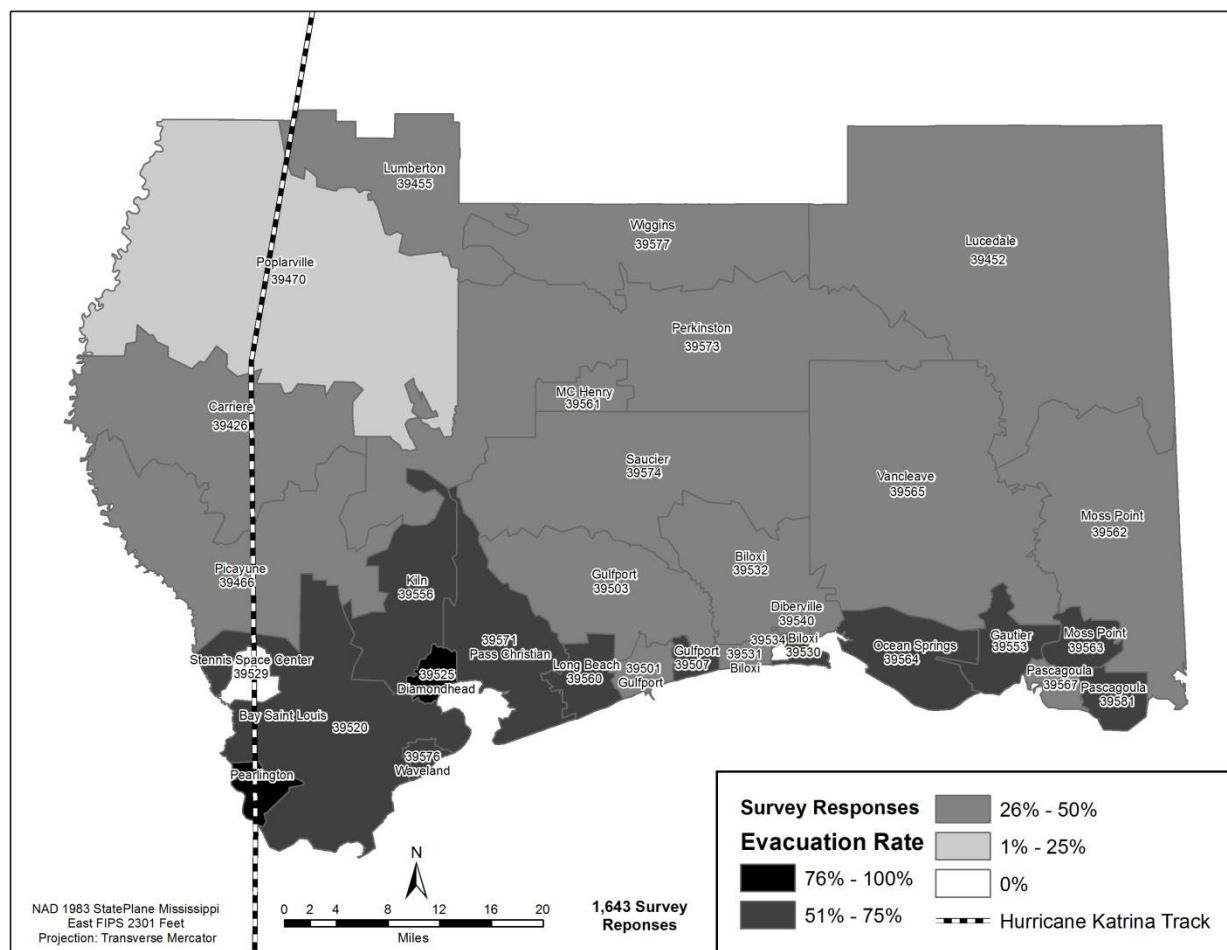


of the DCI data adds a unique way to proxy risk in the models. While socioeconomic factors had some explanatory power with the variation in evacuation rates, this study presents evidence that chance of physical risk is a key driving factor. The analysis of evacuation by zip code and the probit model with DCI data reveals support for the concept that risk motivates persons to move out of harm's way. Specifically, both the perceived risk as measured by the distance to the coast for the zip code of residence, and the actual risk that came about due to the meteorological impact of the storm (DCI) are consistently significant determinants of evacuation. Socioeconomic variables were considered, and several appear to be correlated with the likelihood of evacuation. While race, ethnicity, education and earnings are not related to the likelihood of evacuation, gender, age and household structure (the presence of children) are. Female respondents and older respondents are more likely to evacuate. The presence of small children motivates homeowners to move to safety to

protect them. The presence of children also delays the willingness of families to return to hurricane-damaged homes. Women are also more likely to extend their time away, while home ownership spurs residents to come back and begin working on their property. When trying to predict the expense of evacuation, only two variables are significant: how bad the area was hit as measured by the DCI and the presence of children. Evacuating with children is more expensive and the more intense the storm hits an area; the longer residents are away, resulting in higher costs for evacuation.

These findings contribute to the evacuation literature by confirming that risk is important, although socioeconomic factors also matters as they impact risk perception. Believing oneself to be in harm's way appears to be what motivates residents to evacuate or not. The challenge for public officials will be to anticipate who does or does not accurately perceive their risk.

Figure 1. Percent of Survey Respondents Evacuated By Zip Code (Source: Jennifer Bonin 2013)



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# Understanding the Nature of the Teacher Shortage in Mississippi

Kenneth V. Anthony, Dana Franz, and Devon Brenner\*

## Executive Summary:

Our goal is to understand the nature of the teacher shortage in Mississippi in order to provide policy makers with the knowledge necessary to develop effective solutions. Previous research focuses on the nature of the problem and even questions if there is really a national teacher shortage. Some argue that rather than a national teacher shortage, there is a teacher distribution problem. Our research is guided by the question: What predicts which districts have critical teacher shortages? Because the nature of the question is predictive and binary, we create a logistic regression model. Data for 151 school districts is analyzed. Forty-seven are identified as critical teacher shortage districts. Eight predictor variables are entered into the model: (a) average expenditure per pupil, (b) % revenue generated locally, (c) % students black, (d) % administrative expense, (e) QDI (district accountability score which is assigned by the Mississippi Department of Education), (f) average teacher salary, (g) congressional district, and (h) Delta or not Delta. Only race, geography, and local funding are included in the final model. Our findings indicate that districts with a high percentage of black students, districts located in the Yazoo-Mississippi River Delta Region, and districts that generate less money locally for education are more likely to have a teacher shortage. Our research clearly illustrates the complexity of the teacher shortage problem in Mississippi. The teacher shortage is primarily a function of race and geography. The factors that most influence the shortage extend beyond the world of education and education policy. One possible solution within the realm of education is to implement incentives to enable students from areas with teacher shortages to attend university, prepare to be a teacher, and then return to teach in their home community.

*Key Words:* teacher shortage, rural populations, race, geographic areas of need

## Background

Decades of research have led to indications that the United States education system could be facing a major national teacher shortage. Recently researchers have attempted to define the nature of the shortage and propose ways to address it (Podolsky et al., 2016; Voke, 2003). But the concern is not new. In the 1980s, increasing school enrollment coupled with a significant increase in the number of teachers leaving the classroom and increasing opportunities for women to find better paying work outside of the teaching profession raised concerns about a potential deficit in the teacher workforce. Analysis of these statistical trends led to the belief that the demand of students would eventually far outweigh the supply of teachers (Darling-Hammond, 1984; Dunlap, 1986). In the 1990s, researchers began to reevaluate the issue of teacher

shortages. Upon closer examination, concerns over teacher *quality* rather than quantity took precedence in discussions of teacher shortages (Baker and Smith, 1997). For example, concerns were raised about the quality of teachers prepared by alternate route licensure programs, which were being used as a pathway to address the teacher shortage (Shen, 1998). The debate continued into the new millennium as experts deliberated over what constituted a “quality teacher,” the nature of the shortage, and ways to address the shortage (Podolsky et al., 2016; Russell, 2005; Voke, 2003).

Recent research on K-12 education workforce indicates that many schools in the United States still suffer from an insufficient number of teachers; however, there is no consensus that there is a national teacher shortage (Darling-Hammond and Berry, 2006; Darling-Hammond

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\* Kenneth V. Anthony, PhD is an Assistant Professor in the department of Curriculum, Instruction, and Special Education at Mississippi State University. Dr. Anthony is the corresponding author and can be reached via email at [kanthony@colled.msstate.edu](mailto:kanthony@colled.msstate.edu).

Dana Franz, PhD is an Associate Professor in the department of Curriculum, Instruction, and Special Education at Mississippi State University.

Devon Brenner, PhD is Assistant to the Vice President for Education Initiatives at Mississippi State University.

and Sykes, 2003; Ingersoll, 2001; Murphy, DeArmond, and Guin, 2003). Ingersoll (2003) reports that neither retirement nor enrollment are the sole cause of any significant national teacher shortage. Ingersoll attributes approximately half of all teacher turnover to what he calls cross-school migration, meaning teachers leave one teaching job for another. Therefore, the data suggest that there is not an overall shortage of teachers. The teacher shortages are, as Murphy, DeArmond, and Guin (2003) contend, geographically specific and related to distributions of teachers, particularly in rural and urban settings where there are greater teacher shortages. Rural and very urban areas are often disadvantaged by the scarcity of qualified teachers (Voke, 2003). The unique contexts of rural communities, in particular, make teacher recruitment problematic (Brown and Schafft, 2011).

Much like urban areas, schools in rural locations have had difficulty employing and retaining quality teachers, most notably in mathematics, science, and special education (Collins, 1999; Harmon, 2001). There are many factors that make it difficult to recruit teachers in rural areas, many of which are directly related to economic conditions. Hindrances to recruitment include low salary and benefits, state and national requirements for highly qualified educators, entrance requirements into teacher education, geographic isolation, and poor or limited housing options (Brown and Schafft, 2011; Dessoff, 2010).

Rural schools may also struggle to retain teachers. Teachers in rural communities, particularly those from other areas who are newcomers in rural schools, may struggle to adapt to “rural realities” (Howley and Howley, 2010). Rural teachers may experience social isolation and cultural differences. Teachers in rural schools are often required to wear many hats, teaching many different subjects or with significant extracurricular demands, demands that can overwhelm new teachers (Harmon, 2001). If significant teacher turnover persists in rural areas, the shortage will continue to exist regardless of the national teacher supply. One solution may be to recruit new teachers from the same geographic area in which they will teach (Brown and Schafft, 2011). One way to address rural teacher shortages may be to invest in quality preparation in multiple content areas for pre-service teachers from rural backgrounds (Collins, 1999; Edmondson and Butler, 2010; Harmon 2001).

There are also fewer numbers of minority teachers in the teaching workforce. The American Association of Colleges of Teacher Education reports that in 2010 more than eighty percent of all new, traditionally prepared teachers were white (Deruy, 2013). Few new teachers are black, and even

fewer new teachers are black men. In Mississippi, about one in four teachers is black (NCES, 2011).

Multiple researchers and policy makers reiterate that producing quantities of teachers is too simplistic to address the complex issue of teacher shortages in areas around the United States (Collins, 1999; Howard, 2003; Monk, 2007; Murphy, DeArmond, and Guin, 2003). Aspects of teacher quality, understanding place and community, and long-term retention must all be considered when addressing this issue of geographic teacher shortages. Therefore, maintaining the production of teachers means that an adequate number of teachers who have both the content and pedagogical knowledge to teach a range of diverse learners across many different communities and settings must enter the workforce *and* remain in order to meet the demands of schools across the United States.

The U.S. Department of Education reports a nationwide reduction in enrollment in teacher education programs (Sawchuk, 2014). One factor contributing to the drop in enrollment was the recent reform of admission requirements for teacher education programs. The Council for Accreditation of Educator Preparation (CAEP) raised GPA requirements as well as qualifying scores on tests used for college entrance. Additionally, the Educational Testing Service revised most of the Praxis tests for educational licensure. For instance, the mathematics exam was revised to include more of a focus on application of content and the suggested cut score was raised, which in Mississippi meant an increase of almost thirty points on the Mathematics Content Praxis test. Collectively, these changes lead to a reduction in the number of students eligible to work towards a degree in education (Bernstein, 2013). Therefore, a challenge of how to increase enrollment without lowering program standards ensues as policy makers seek a solution for productivity (Russell, 2005).

### **Mississippi’s Critical Need**

In Mississippi there are forty-seven districts with critical teacher shortages (as of 2014). Mississippi defines a critical shortage district as “those with sixty or more teaching positions that have ten percent of their teaching staff not properly licensed for the subject they are teaching. For districts with fewer than sixty teachers that percentage is fifteen. Also included are districts where at least thirty percent of the teaching staff has enough experience to retire” (Keifer and Mader, 2013). Within these districts (as of 2014) there are sixty-three mathematics and forty-six science teacher positions unfilled. All of this in a state with fewer students statewide than those in the single Miami-Dade County Public School district. Like the rest of the nation, the teacher shortage in Mississippi is characterized

by what Darling-Hammond and Sykes (2003) called a “maldistribution of teachers” with some areas experiencing a surplus supply and others a shortage of teachers (Darling-Hammond and Berry, 2006).

In order to understand the teacher shortage phenomena in Mississippi, it is necessary to understand the context. Like other areas of the nation, within Mississippi there is an outmigration from nonmetropolitan to suburban and metropolitan areas (Domina, 2006). This is readily demonstrated by looking at data from the Mississippi Development Authority (2009) reporting percent change in population for selected counties. Sharkey County, a rural county in the Mississippi Delta, lost 21.37 percent of its population from 2000-2008. DeSoto County experienced a 127.87 percent increase in its population in the same time period. The entire state population grew by 14.20 percent from 2000-2008. Other counties are listed in [Table 1](#).

**Table 1.** Population Change in Select Mississippi Counties 2000-2008

County	% Change 2000-2008	Characteristic
Adams	-11.45	Rural
Bolivar	-11.18	Rural
Coahoma	-13.87	Rural
Sharkey	-21.37	Rural
DeSoto	+127.87	Suburban/Urban
Rankin	+61.66	Suburban/Urban
Mississippi (State)	+14.20	

In Mississippi, there is a strong relationship between population growth and economic development (MDA, 2009). The population growth around selected population centers has led to stronger economic growth in certain areas (e.g., south of Memphis, Tennessee, in the northwest corner of the state; surrounding the capital city of Jackson in the center of the state; and the Mississippi Gulf Coast in the south, among others). As these areas experience population and economic growth, other areas continue to decline in both population and economic prospects (measured by number of families in poverty, median incomes, unemployment, and per capita income) (MDA, 2009; U.S. Census Bureau, 2014).

Though there are areas that are currently experiencing economic growth within Mississippi, the state falls behind the rest of the nation economically. From 2008- 2012, 22.3 percent of Mississippians lived below the poverty line (U.S. Census Bureau, 2014). The figure for the nation in the same period was 14.9 percent. Mississippi’s household median income from 2011-2013 was 51st in the United States (See [Table 2](#): Median Household Income).

**Table 2.** Median Household Income (two year average)

United States 2010-2011	\$52,244
United States 2011-2012	\$51,849
Mississippi 2010-2011	\$41,664
Mississippi 2012-2013	\$39,012

Of course, these statewide figures obscure the great disparity that exists within the state. DeSoto County, a suburban county just south of Memphis, has a median income (\$58,851) greater than the national median income and has only 10.2 percent of its population living below the poverty line. Washington County, a rural Delta county on the Mississippi River, has a median household income significantly lower than the state median income (See [Table 3](#): Income and Poverty Statistics for Selected Mississippi Counties).

**Table 3.** Income and Poverty Statistics for Select Mississippi Counties

County	Median Household Income	Persons below poverty level 2008-2012
Washington	\$27,610	37.5%
DeSoto	\$58,851	10.2%
Mississippi	\$38,882	22.3%
United States	\$53,046	14.9%

In Mississippi, the Yazoo-Mississippi Delta is the area of greatest poverty and population decline. The Delta is both a geographic and cultural label. Wilson (2004) defines the geography of the Mississippi Delta as “the delta of the Yazoo River, in the eastern floodplain of the lower Mississippi River” (para. 2). David Cohn (1948) (cited in Saikku, 2010), describes it in more cultural terms when he wrote, “The Mississippi begins in the lobby of the Peabody Hotel in Memphis and ends on Catfish Row in Vicksburg” (para. 4). A map of critical shortage districts almost matches the geographic map of the Delta. The same can be said of the counties in Mississippi with the highest levels of poverty. The Delta is a nexus of poverty, isolation, and teacher shortage. The hindrances to recruiting teachers in rural areas are all present in the Yazoo Delta region and much of Mississippi.

Mississippi’s historical contexts may also affect teacher distribution. Until the 1960s and 70s, Mississippi’s schools operated under explicit policies of segregation. Although the student population in general is increasingly diverse, across the nation, segregation in schools is increasing (Ayescue and Orfield, 2015; Breslow, Wexler, and Collins, 2014; Hannah-Jones, 2014). In the South, racial integration in schools peaked in the 1970s and 80s. In those decades,



the majority of black students (three out of four) attended an integrated school with substantial populations of both black and white students. However, by 2011, more than half of black students in the South attended schools with a single race, changes fueled by decreasing enforcement of federal desegregation orders (Hannah-Hones, 2014).

### Methods

Our goal is to understand the teacher shortage problem in Mississippi in order to provide policy makers with the knowledge necessary to develop effective solutions. We are guided by the research question: What predicts which districts are critical shortage districts? Because the nature of the question is predictive and binary, we create a logistic regression model. For the purposes of this study, we use both a geographic and cultural definition of the Yazoo Delta Region to identify those districts which are identified as being in the Delta. Thirty-four districts are identified as Yazoo Delta Region school districts for the study (Table 4).

Our research hypothesis is that the likelihood that a school district has a teacher shortage is related to (a) average expenditure per pupil, (b) % revenue generated locally, (c) % students black, (d) % administrative expense, (e) QDI (district accountability score), (f) average teacher salary, (g) congressional district, and (h) Delta or not Delta. Three of the variables are related to the impact of money spent or raised, one related to the impact of teacher salaries, and two related to geography. The dependent variable is whether or not the district is identified as a critical teacher shortage district by the state. The dependent variable is coded as 1= shortage and 0 = no shortage.

### Analysis

Eight predictor variables are entered into the model: (a) average expenditure per pupil, (b) % revenue generated locally, (c) % students black, (d) % administrative expense, (e) QDI (district accountability score), (f) average teacher salary, (g) congressional district, and (h) Delta or not Delta. Data is drawn from public reports available on the Mississippi Department of Education website. Data for 151 districts is analyzed. Forty-seven are identified as critical teacher shortage districts (consolidation reduced the number in 2014. Further consolidation in 2015 and 2016 continued to reduce the number of school districts in Mississippi). The logistic regression analysis is carried out using SPSS version 15. All eight variables are entered, but only the statistically significant variables are included in the final model for parsimonious reasons and because it results in the greatest degree of predicted classification.

**Table 4.** Yazoo Delta Region School Districts

Benoit School District	Leland School District
Canton Public School District	Mound Bayou Public School District
Claiborne County School District	Natchez-Adams School District
Clarksdale Municipal School District	North Bolivar School District
Cleveland School District	Shaw School District
Coahoma County Agricultural High School	South Delta School District
Coahoma County School District	Sunflower County School District
East Tallahatchie Consolidated School District	Tate County School District
Greenville Public Schools	Tunica County School District
Greenwood Public School District	Vicksburg Warren School District
Hollandale School District	West Bolivar School District
Holmes County School District	West Tallahatchie School District
Humphreys County School District	Western Line School District
Indianola School District	Wilkinson County School District
Jefferson County School District	Yazoo City Municipal School District
Leflore County School District	Yazoo County School District

The final model includes three variables that are statistically significant: (a) % revenue generated locally, (b) % students: black, and (c) Delta or not Delta. Variables not statistically significant and not included in the final model are (a) average expenditure per pupil, (b) % administrative expense, (c) QDI, (d) average teacher salary, and (e) congressional district (See Table 5: Variables Included in Model). The result show that

$$\text{Predicted logit of (TEACHER SHORTAGE)} = -3.445 + (-8.703)*\text{REVENUE} + (6.174)*\text{PERCENT BLACK} + (4.742)*\text{DELTA OR NOT DELTA}$$

The Hosmer and Lemeshow Test for Goodness-of-fit yields a  $\chi^2(8)$  of 5.063 and is insignificant ( $p = .751$ ) indicating that the model is fit to the data well.



Additionally, both the Cox and Snell  $R^2$  (.533) and the Nagelkerke  $R^2$  (.779) are insignificant further evidence of goodness of fit. The classification table indicates that the model correctly predicts that a district will not have a teacher shortage 97.1 percent of the time and that a district will have a shortage 83.0 percent of the time. The model predicts 92.7 percent correct overall, an improvement over the original model (68.9 percent) (See Table 6).

According to the model (see Table 5: Variables Included in Model), the log of the odds of a district having a teacher shortage is negatively related to the amount of revenue generated locally ( $p = .046$ ) and positively related to the percentage of black students in the district ( $p = .001$ ) and located in the Delta ( $p = .001$ ). In other words, the more revenue locally generated, the less likely a district is to have a teacher shortage; a district with a high percentage of black students is more likely to have a teacher shortage; and a district located in the Yazoo-Mississippi River Delta Region is more likely to have a teacher shortage. To illustrate the nature of the impact of geography, the odds of a Delta school district having a teacher shortage were 114.72 ( $= e^{4.742}$ ) times greater than a non-Delta school district. The influence of race dwarfed the influence of geography. According to the model, race accounts for four times more than geography when attempting to predict teacher shortages.

**Table 5.** Variables Included in Model

Variable	B	S.E.	Wald	Sig.	Exp(B)
% revenue generated locally	-8.703	4.354	3.996	.046	.0001
% students black	6.174	1.456	17.972	.000	479.955
Delta	4.742	1.158	16.762	.000	114.717
Constant	-3.445	1.449	5.649	.017	.032

## Discussion

According to the model the teacher shortage in Mississippi is a function of race, geography, and local funding, however, race accounts for four times more than geography when attempting to predict teacher shortages. In other words, if a district is in or near the Yazoo-Mississippi River Delta region it may experience a teacher shortage, and the odds of facing a shortage are four times more likely if the district has a percentage of black students significantly higher than an adjacent school district. For illustrative purposes, consider Table 7, Shortage as a function of race. The percentage of black students for adjacent school districts within the same county are presented along with whether the district has a teacher

**Table 6.** Classification Table

Observed		Predicted			
		Shortage		% Correct	
		No	Yes		
Step 3	Shortage	No	103	3	97.1
		Yes	8	39	83.0
Overall Percentage					92.7

shortage. In counties with multiple districts, the one district with a very high percentage of black students has a teacher shortage and the district with a lower percentage does not have a shortage. This holds true with each county illustrated below with the exception of Tate County, but in that county black students do not make up a majority of the students in either district. To further illustrate the impact of race on the teacher shortages consider Pike County. North Pike has a student population with thirty percent black students and no teacher shortage, but South Pike has eighty-three percent black students and a teacher shortage. The distance between North Pike High School and South Pike High School is about twelve miles along Interstate 55.

Though race is by far the best predictor of whether or not a district is a shortage district in Mississippi, geography also is a very strong predictor. The districts with teacher shortages are generally clustered in the region of Mississippi known as the Yazoo-Mississippi Delta. These counties are experiencing population outgrowth at astonishing rates (see Table 1). While Mississippi as a whole has experienced a 14.20 percent growth in population from 2000-2008, the rural Delta Counties are being drained of people with the attending negative consequences, most significantly increases in poverty. As stated earlier, the Yazoo-Mississippi Delta is the area of greatest poverty and population decline in Mississippi and this decline is further magnified by the teacher shortage and associated academic problems most telling of which is markedly lower high school graduation rates than the rest of the state (Family and Children Research Unit (2016)). As these Delta counties continue to experience negative population growth, this leads to further economic decline, reducing the ability of districts to raise revenue locally, which leads to the third factor- locally generated revenue.

Schools are financed through a combination of local property taxes and state allocations, along with a small but significant federal allocation. Shrinking populations and increasing poverty mean that districts in rural locations are under resourced, largely because of a lack of a local tax

**Table 7.** Shortage as a Function of Race

District	Black	Teacher shortage
North Pike	30%	No
South Pike	83%	Yes
North Panola	97%	Yes
South Panola	55%	No
Winona (Montgomery Co)	57%	No
Montgomery County	90%	Yes
Madison County	39%	No
Canton City (Madison Co)	94%	Yes
Tate County	37%	Yes
Senatobia (Tate Co)	47%	No

base. Districts that generate less local revenue are resource-poor districts regardless of the amount of money that is pumped into them through Federal and State aid. The Mississippi Adequate Education Program formula was designed to offset differences in local revenue. Federal Title I funds are allocated based on the number and concentration of students in poverty in a school or district. These federal and state allocations may result in higher per-pupil expenditures in districts with less local revenue. However, these districts are still resource poor. In part, this is because low-income communities, particularly in rural areas, have few resources outside of school to support student learning (e.g., museums, libraries, early childhood education). Also, students who are raised in families with few resources may present educational challenges that schools must overcome. Many of the districts with shortages spend more money per pupil than those districts without teacher shortages (Wright, 2014). In other words, teachers are electing to teach in districts with greater resources and in areas with greater economic prospects. Of course, the ability to raise local revenue is related to population and geography. These same districts are already experiencing the negative impact on their economic prospects by continued population outgrowth.

These three factors—race, geography, and local revenue—are very hard to address. Previous efforts to address the teacher shortage in Mississippi have included incentives to teach in critical shortage districts, alternate route certification programs, and increasing teacher quality (Boggan and Jayroe, 2012). These are important efforts and should not be discounted, but like efforts to address achievement which only focus on school factors, they are only small bandages on a major wound. In his conclusion on the impact of out of school factors on student achievement, Berliner (2009) concludes that, “Inputs to schools matter. As wonderful as some teachers and schools are, most cannot eliminate the inequalities that have roots

outside their doors and that influence events within them” (p. 40). He then goes on to call for “a broader, bolder approach to school improvement” (p. 40). This principle holds true when addressing the problem of teacher shortages in Mississippi. The factors that most influence the shortage extend outside the world of education and education policy. They include people’s perceptions and ideas about race, the economics of place and what makes a place a valuable place to live, and the economic health of places. All of these problems are place-based and the solutions must be found in the places. Some of them can be addressed by education policy, but others must be addressed by the larger society. Of those that can be addressed within the field of education are attempts to produce teachers who come from the places experiencing teacher shortage and who are committed to staying and becoming productive members of the community.

### Conclusions and Future Directions

This research has clearly illustrated the complexity of the teacher shortage problem in Mississippi. Teacher shortage is primarily a function of race and geography. Unfortunately, these two factors exist outside the direct influence of teacher education programs and education policy makers. These factors are situated squarely in enduring cultural, social, and historical issues of race in Mississippi and the current reality of out migration from economic and social isolation of the Yazoo-Delta.

One possible step is to implement economic incentives enabling students from these economically, socially, and educationally depressed areas to attend a public state university to prepare to be a teacher. For illustration purposes, consider a student with a 21 ACT score from Greenville, Mississippi. Currently she is not eligible for a scholarship at most universities in the state and may not have the resources needed to attend a four-year institution to completion. But this student is grounded in the community and may come back to teach in the community. Currently, our incentives focus on bringing in “excellent” students, but the reality is that many of these “excellent” students (as measured by their ACT scores) do not come from critical needs districts, undermining their potential impact in geographic areas of greatest need (Darling-Hammond and Sykes, 2003; Darling-Hammond and Berry, 2006). There is a need for teacher education programs to target stayers and returners (Carr and Kefalas, 2009). These students might be average or below average students as measured by the ACT, but have potential to be strong teachers in their home communities.

This brings us to the difficult question: How willing or able are universities and teacher education programs to take

average or below average students and develop them into strong teachers? We cannot hope that we will recruit enough students with ACT scores of 24-28 who are willing to move to these geographic areas of need. The students sitting in Greenville, Itta Bena, Cleveland, and other Delta high schools are the answer. We must do all we can to prepare these students as best we can in their K-12 experience. It is then incumbent on the universities and their teacher education programs to be prepared to take them just as they are and prepare them to become the next generation of teachers who will break the cycle of educational isolation. The question is how. This process will challenge our current understanding of who should be a teacher, how we prepare teachers, and how we provide scholarships and other incentives to students who would be teachers.

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# Is Hinds County Mississippi Really Less Desirable than Madison or Rankin County; What do Implicit Amenity Estimates Tell Us?

Maury Granger and Gregory N. Price\*

## Executive Summary

Is Hinds County Mississippi Really Less Desirable than Madison or Rankin County? Answering this question objectively serves two purposes. First, the answer illustrates a different way to compare and contrast locations. Secondly, the answer provides a rationale for using caution when relying on public opinion and biased ranking schemes to summarily judge locations. In this study the answer to the question is obtained by using implicit amenity estimates.

Using a spatial equilibrium econometric approach, implicit county level amenities are estimated and used to compare the named counties. The approach provides researchers and policy makers with a theoretically tenable and unbiased method appropriate conducting cross-county comparisons. The approach follows an axiom of urban economics which puts forth that prices are adjusted to achieve locational (spatial) equilibriums. Within this context, regression analysis is used to uncover relevant interactions that occur among income, land values, and amenities. Implicit amenity estimates (the values of location-specific attributes—amenities) are captured by regressing estimated median household income on the estimated median value of owner-occupied housing. The difference between the actual and predicted home values constitutes our measure of implicit amenity estimates.

The rubric used to rank the counties is neutral to affluence, economic growth, and other ad hoc measures of desirability. Upon implementing the ranking scheme, Hinds County is found not to be the least desirable county. In fact, Hinds and Rankin Counties tied for first place.

*Key Words:* amenities, quality of life, rural/urban growth

## INTRODUCTION

The title of this paper poses a generally subjective question. Attempts to answer this question using subjective assessments introduce bias into potential ranking schemes. This paper attempts to answer the question objectively.

Bias ranking schemes could easily lead one to suspect that among Hinds, Madison and Rankin counties, Hinds is the least desirable county in which to live. A random internet search of the phrase “best counties in Mississippi” illustrates this point. Among the results of such a search, NICHE (2016) boasts that its rigorous analyses of dozens of public data sets and millions of reviews produces comprehensive rankings of places. In Mississippi it ranked Madison County number one (1), Rankin and Hinds Counties fifth (5th) and forty-second (42nd) respectively. Similar findings are omnipresent and serve to reinforce the

aforementioned conclusion. These types of subjective assessments are known to be biased and not based on economic theory. Nevertheless, they have captured the attention of policy makers and have become important policy tools used to attract physical and human capital. Implicit to these approaches are the presumption that researchers can determine a priori which location-specific attributes matter to people and firms across the economic landscape. Even when great care is exercised, arbitrarily choosing the variables to include in such subjective assessment processes introduce selection bias.

The implicit amenity pricing approach used in this study is theoretically tenable and unbiased. Implicit amenity prices are found using a spatial equilibrium amenity estimation process. That process captures both observed and unobserved location-specific factors by viewing location decisions as representing each household’s desire to

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\* Maury Granger, PhD is a Research Fellow at the Mississippi Urban Research Center and a Professor in the Department of Economics, Finance and General Business at Jackson State University. Dr. Granger is the corresponding author and can be reached via email at [maury.granger@jsums.edu](mailto:maury.granger@jsums.edu).

Gregory N. Price, PhD is a Professor in the Department of Economics at Morehouse College.



maximize well-being subject to various constraints. Given that a significant amount of what people value in the places they choose to live is intangible, the value individuals place on those intangible, location-specific attributes are reflected in the difference between their amenity-adjusted housing costs and their amenity-adjusted incomes. This notion connects microeconomic theories to our empirics. We expect that housing prices are amenity-adjusted since their market value reflects conditions surrounding the home (i.e., these conditions are capitalized into its value). Likewise, we expect that wages are amenity adjusted due to changing supply and demand conditions across markets. In this abstraction of spatial economics, location decisions are partially driven by amenities.

Capturing the value of amenities by regressing income on housing prices is useful for intra- and inter-county level amenity analysis and extends the literature devoted to implicit amenity pricing. Using this approach, we uncover a ranking of counties where Hinds and Rankin Counties both rank first place and Madison County ranks third place. The ranking is based on mean and median census-block amenity estimates. Keep in mind that our calculations are neutral to affluence, economic growth, and other ad hoc measures of desirability.

#### RATIONALE FOR OUR APPROACH

The theoretical foundation for spatial equilibrium amenity estimates spans nearly fifty years of urban economic theory. Extending this body of knowledge to capture the value of intangible/unobserved amenities is possible if we view residential location decisions as representing a spatial equilibrium. Early attempts to incorporate amenities into economic theory evolved from intra-urban housing models and interregional labor market models. Here, researchers working with intra-urban housing models develop rent differentials where consumers make trade-offs between local housing prices and amenities (Polinsky and Shavell, 1976; Ridker and Henning, 1967). Others, working with interregional labor market models, develop wage differentials in which consumers make tradeoffs between local wages and amenities across regions (Getz and Huang 1978; Rosen 1979). These two approaches are later integrated and it is established analytically that interregional amenity variations are related to interregional differences in both wages and land rents (Roback, 1982). This work advances the notion that a three-way tradeoff among housing prices, earnings, and amenities exist.

Central to this research is the realization that amenities are capitalized into housing prices or rents (Glaeser, Kolko and Saiz, 2001; Shultz and King, 2001), and wages/incomes (Ezzet-Lofstrom, 2004). Amenities also influence business

location (Granger and Blomquist, 1999). Glaeser, Kolko and Saiz (2001) use Ordinary Least Squares (OLS) residuals from a regression of median housing prices on median incomes and find that the residuals now referred to as implicit amenity prices, are correlated with population growth. More recent research also supports the notion that location decisions are influenced by local amenities (Winters, 2013). Building upon this work, Granger and Price (2015), estimate state-level spatial equilibrium amenity values to analyze migration patterns. The current study uses that line of research to determine an objective answer to the question, “Is Hinds County Mississippi, really less desirable than Madison County or Rankin County Mississippi?”

The microeconomic theory supporting our approach shows that the implicit-price-of-amenities ( $\mathcal{A}^*$ ) is the difference between a housing premium induced by amenities ( $\mathcal{H}^{p \leftarrow a}$ ), and a wage premium induced by amenities ( $\mathcal{W}^{p \leftarrow a}$ ).

$$\mathcal{A}^* = \mathcal{H}^{p \leftarrow a} - \mathcal{W}^{p \leftarrow a} \quad (1)$$

Equation (1) contains the foundation of our study. To better appreciate the story contained in equation (1), picture an extremely desirable place. All else held constant, pressures will arise that will decrease wages due to the influx of workers (increase supply of labor) and increase land values due to competition for places to locate (increased demand for housing). Placing these amenity-induced housing and wage effects into equation (1) produces a positive implicit amenity price ( $\mathcal{A}^* \geq 0$ ). If the story were reversed, and one pictured an undesirable place, the opposite would happen and the implicit amenity price would be negative ( $\mathcal{A}^* \leq 0$ ). Of course, when all else is not held constant, externalities, scale economies, etc., would produce an equilibrium between the two places where we would observe people being attracted to both places. For a more detailed development of these results see Roback (1982). Equation (1) is a generalization of compensating wage and rent theory that embodies the foundation for our spatial-equilibrium amenity estimation framework: the expectation that residential land purchases are influenced by income and local amenities.

Households maximize their utility or happiness by consuming local goods and services, residual land, and amenities. Amenities, unlike other goods, are location-specific and they are only accessible in a given location. They differentiate geographic areas by changing the opportunity cost of local goods and services, and the cost of residential land. A household’s preference for amenities is revealed through residential land purchases which are constrained by income. This provides a mechanism for uncovering the value of amenities by analyzing the

statistical relationship between land purchases and income (covariance) within the context of income's stochastic nature (its standard deviation). In other words, we uncover the values of amenities through use of an Ordinary Least Squares (OLS) Regression where income and housing data are, respectively, the independent and dependent variables. This follows from the paradigm motivating Equation (1). All else held constant, the error term from this regression yields an estimate of amenity levels. Obviously, income is not the sole determinate of residential land purchases and thus the error term necessarily contains the influences of other factors. However, theories are by design simplified generalizations of reality and here, the error term captures the essential part of the paradigm we seek to find.

### DATA AND AMENITY ESTIMATES

The data used in this study are obtained from the 2010-2014 American Community Survey 5-year estimates. Housing and income data are obtained from 112 census-tracks (320 census-blocks) contained in the Hinds, Madison, and Rankin Counties MS (three of five contiguous counties that makeup the Jackson-MS Metropolitan Statistical Area). The data used are estimated median household income database-B19013 and the estimated median value of owner-occupied housing unit database-B25077 (U.S. Census Bureau).

Estimated median household income ( $I_h$ ) and the estimated median value of owner-occupied housing ( $H_v$ ) are used as proxies for the housing and wage premiums, which are the key components of the model this study is built upon—equation (1). The sample OLS regression framework useful for estimating a value for the intangible amenity follows from a rearrangement of equation (1); this can be noted as follows:

$$\widehat{H}_v^* = \widehat{\beta}_0 + \widehat{\beta}_1(I_h^*) + \mu. \quad (2)$$

In Equation (2) the asterisk indicates that the variable is influenced by local amenities,  $\mu$  is a random error term, and  $\widehat{H}_v^*$  is the predicted value of  $H_v$ . This regression function captures the noted tradeoff among housing prices ( $H_v$ ), income/earnings ( $I_h$ ), and amenities ( $\mathcal{A}^*$ ). Combining Equation (2) with its corresponding population regression function, bridges the compensating wage and rent theory with the implicit amenity pricing concept developed in this paper. The population regression function for Equation (2) can be specified as follows:

$$H_v^* = \beta_0 + \beta_1(I_h^*) + \beta_2(\mathcal{A}^*) + \epsilon. \quad (3)$$

In Equation (3),  $\epsilon$  is a random error term, and after repeated sampling,  $\widehat{\beta}_0 + \widehat{\beta}_1(I_h^*)$  equals  $\beta_0 + \beta_1(I_h^*)$  (Gujarati 2003). Therefore, the difference between Equations (2)

and (3) establishes that the error term is a tenable amenities measure:

$$\mu = \beta_2(\mathcal{A}^*) + \epsilon \quad (4)$$

Given the expectation that the value of " $\epsilon$ " is zero, the residual error from an OLS estimation of Equation (2) generates an unbiased estimate of the implicit value of location-specific amenities. Table 1 shows the regression results for the three counties.

**Table 1.** Regression Results Model (1) and Core Population Statistics

	$\widehat{H}_v^* = \widehat{\beta}_0 + \widehat{\beta}_1(I_h^*) + \mu$			
Hinds	$\widehat{H}_v^* = 3726.678 + 2.51675(I_h^*)$ t = (0.62)	(18.86)	N = 181,	R <sup>2</sup> = 0.6653
Madison	$\widehat{H}_v^* = 18546.66 + 2.768327(I_h^*)$ t = (0.77)	(8.37)	N = 55,	R <sup>2</sup> = 0.5692
Rankin	$\widehat{H}_v^* = 37141.95 + 1.768066(I_h^*)$ t = (2.17)	(6.65)	N = 73,	R <sup>2</sup> = 0.3839

	Population	Percent Population White	Present Population in Poverty	Population per Square Miles
Hinds	242,891	26.9	27.1	282.0
Madison	103,465	58.0	12.7	133.2
Rankin	149,039	76.9	9.7	182.6

Source: US Census Bureau, QuickFacts: 2015, Population Per Square Mile 2010 Estimates.

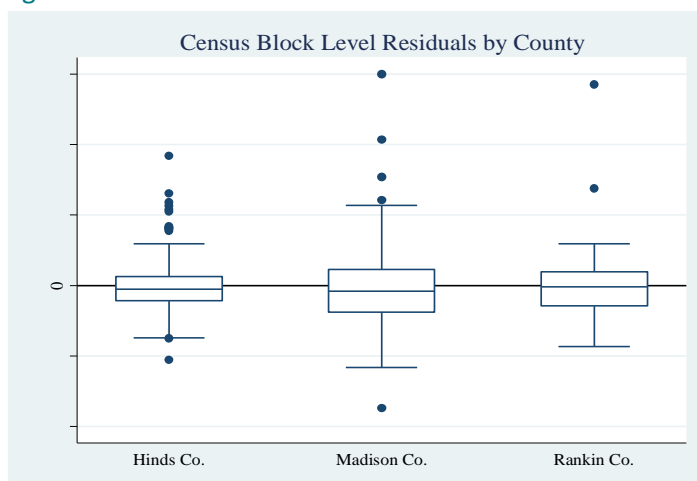
The insignificant intercepts for Hinds and Madison counties, and the moderate R<sup>2</sup> values pose no problem. The generalized model specification, Equation (2), omits key explanatory variables that would contribute to predicting values of  $H_v$ —the value of owner-occupied housing. The models summarized in Table 1 are used to generate census-block-level residuals ( $N$  denotes the number of census-blocks in the county excluding those with missing data). Notice that Hinds County has more than twice the number of census-blocks than the other two counties. Also note differences in the reported core population statistics in Table 1. These datum may drive rankings that typically give Hinds County low ratings, they may also be related to perceptions not based on science. Uncovering how Hinds County's larger population and more urban geography affects the rankings is beyond the scope of this study. Moreover, recognizing these statistics add context to the analysis this study undertakes.

There is considerable variation in the implicit amenity estimates (the OLS residuals) within each county. This chronicles the large swings in values of location-specific amenities between census block residual—and thus, amenity estimates within a county. Figure 1, conveys information about the residual estimates' center, spread, symmetry, and outliers at a glance. The OLS process, by design, generates residuals that have expected values



equal to zero; therefore, their averages are centered on zero. In Figure 1, the horizontal line at zero helps us see that for each county the median residual value (the line splitting each box) is below the line demarcating the expected mean value of zero. The Box-plots also illustrate the dispersion or wide fluctuation in the values people implicitly assign to intangible amenities. Within the context of the question this study addresses, the county with the lowest average (or median) mean value for its residuals—will win top rank. Note how the line bisecting each box (the median) is close to zero for each county's residual estimates. These boxes demarcate the interquartile range (IQR).

Figure 1.



In Figure 1, note that the highest ranked counties, Hinds and Rankin, have the smallest IQR, or box demarcating the middle fifty percent of the data. The distance between the first and third quartiles (the IQR) and the location of the second quartile, the median, indicates the degree of dispersion and suggests skewness toward low residual value census-block. The outlier residual values, those that are beyond 1.5 times the boundary of the IQR, are shown as large dots, they indicate the presence of extreme high and low amenity locations within a county. From observing the dots above and below zero the mean line, we can recognize the dispersion of estimates within a county. Madison County exhibits the most dispersion and the lowest block level residual. Given that we only analyzed three counties, it is hard to generalize about the relationship between extreme values and county level median residual values. Table 2, provides a more comprehensive picture of the dispersion of residuals.

Amenity values for each county are computed by averaging or finding the median value of its census-block level residuals. Here, the interplay between census-blocks with high (positive) and low (negative) residuals ultimately

determined the final reported amenity level. Using the medium of the residuals mitigates the problems associated with averaging highly disperse data and is the best measure of central tendency for skewed data.

Nevertheless, both mean and median residual values are used to compute the county's implicit amenity value. Summaries of both mean and median amenity calculations are shown in Table 3. Between the two measures, Hinds and Rankin Counties change positions for first in the ranking thus, a tie is declared.

Table 2. Residual Percentiles and Summary Statistics

Hinds County (n=181)			
1%	-74703	-105292	Smallest
5%	-50168	-74703	
10%	-37572	-74270	
25%	-22182	-57549	
50%	-5387		
75%	12710	113136	Largest
90%	40013	118260	
95%	81403	130514	
99%	130514	183898	
<b>Mean</b>	0.0000598		
<b>Std. Dev.</b>	38783.45		
Madison County (n=55)			
1%	-174132	-174132	Smallest
5%	-95343	-116091	
10%	-72448	-95343	
25%	-37498	-91836	
50%	-8127		
75%	23087	121145	Largest
90%	104311	153906	
95%	153906	206462	
99%	300012	300012	
<b>Mean</b>	-0.0003096		
<b>Std. Dev.</b>	76322.3		
Rankin County (n=73)			
1%	-86715	-86715	Smallest
5%	-64637	-78926	
10%	-48549	-64959	
25%	-29252	-64637	
50%	-1983		
75%	19244	52171	Largest
90%	43071	59443	
95%	52171	137656	
99%	285323	285323	
<b>Mean</b>	-0.0001079		
<b>Std. Dev.</b>	49933.93		

In order to determine what effect income had on the ranking, income measures were contrasted with the amenity ranking. With only three counties analyzed, generalizations about the relationship between county level income and implicit amenity levels are not possible.

**Table 4** suggests that higher income is not positively correlated with higher rank. However, the reported incomes do correlate well with the NICHE (2016) ranking where Mississippi's Madison County was first (1st), Rankin and Hinds Counties fifth (5th) and forty-second (42nd) respectively. It remains to be seen whether in a larger study income levels, population-density and degree of urbanization systematically affects overall county amenity level ranking. Causal inspection of **Table 4** suggests the possibility that higher incomes and/or the larger spreads are not correlated with the amenity rank. Thus, the ranking process appears to be independent of affluence. From **Table 4**, and **Figure 1**, it appears that the more affluent counties have higher income inequality and a more dispersed amenity endowment. Generalization about how this affects implicit amenity values, cannot be made given that only three counties are analyzed. However, given that Madison County is not ranked first, despite its higher income, larger spread (reported in **Table 4**) and largest positive residuals (highest amenity values), supports the contention that the spatial equilibrium approach is independent of income/affluence.

**Table 3.** Summary of County Level Amenity Estimates

County	Ranking Based on Mean of Census-Block Census-Block Values	Mean of Census-Block Residuals Amenity Value	Ranking Based on Median of Census-Block Values	Median of Census-Block Residuals Amenity Value
Hinds	1	0.0000598	2	-5387.412
Rankin	2	-0.0001079	1	-1982.923
Madison	3	-0.0003096	3	-8126.919
	<b>Amenity Rank (1)</b>		<b>Amenity Rank (2)</b>	

## CONCLUSION AND POLICY IMPLICATIONS

The intent of this research is to provide an objective answer to a generally subjective, but important question, "Is Hinds County really less desirable than Madison or Rankin Counties Mississippi?" Additionally, the authors want to demonstrate the use of a locational (spatial) evaluation tool that is capable of overcoming selection bias inherent to the subjective amenity accounting processes. This study should motivate a rationale for dampening the tendency to summarily-judge the economic disposition of a location/county based on pseudoscience. In this study, the measure is based on economic-science and is unbiased. The results provide evidence based on implicit amenity levels that Hinds County is not less desirable than Rankin or Madison County.

The approach utilized in this study provides researchers and policy makers with a tool useful for comparing and contrasting counties (cross-section analysis) and analyzing them over time (time-serious analysis). Conceivably, the implicit amenity pricing approach opens up a window through which we can gauge the benefits related to infrastructure/economic development projects and public investments in projects aimed at improving health, education and welfare. More generally, amenity analysis may contribute to more accurate evaluation of public policies that impacts housing quality/values and incomes.

**Table 4.** County Income Data, Amenity Rank, and Core Population Data

County	Average Income (A)	Median Income (B)	Spread (A-B)	Amenity Rank (1)	Amenity Rank (2)
Madison	\$90,375	\$63,156	\$27,219	3	3
Rankin	\$73,307	\$58,811	\$14,496	2	1
Hinds	\$55,190	\$38,021	\$17,169	1	2
	Population	Percent White	Present Population in Poverty	Population Pre Square Miles	
Hinds	242,891	26.9	27.10	282.0	
Madison	103,465	58.0	12.70	133.2	
Rankin	149,039	76.9	9.70	182.6	

Sources: US Census Bureau, 2010-2014 American Community Survey 5-Year Estimates (Avg. Income, Median Income, Spread, and Amenity Rank); US Census Bureau, 2015 QuickFacts (Population data).

Conjointly, implicit amenity estimates may be useful in future research concerned with accessing the impact of uneven economic development and changing demographic effects on economic development. Migration patterns within Hinds, Madison, and Rankin Counties covering the past four decades have had a polarizing effect on the Jackson Metropolitan Statistical Area. This may be at the heart of Hinds County being typically ranked below average by "place-rating" agencies and public opinion. Likewise, implicit amenity analysis may shed new light on our understanding of the consequences of inequality on economic growth, and ultimately facilitate further investigation of the related research conducted by Price and Mozee (2005).

The degree of income inequality, or income-spread, in **Table 4** is uncorrelated with our implicit amenity estimates. However, this assertion is weakened since only three counties are analyzed. Nevertheless, the information presented in **Table 4**, combined with the region's economic history, supports the conclusion that the amenity estimate is not a mirror image of income.

The findings of this study show that residents of counties with smaller residual standard deviations exhibit less

income inequality and the variation of amenities is smaller. This can be seen through [Figure 1](#) and [Table 4](#), where Rankin County's median amenity rank was higher than its two, more affluent, urbanized neighboring counties. Future research is needed to determine if this holds for a larger sample of counties drawn from Mississippi. One could argue that in terms of amenities, Hinds and Rankin counties are more income-homogeneous (having a smaller range), as can be gleaned from the income-spread reported in [Table 4](#). The lowest ranked county, Madison, is often subjectively viewed as more desirable than Hinds and Rankin counties. Even so, rural poverty, extreme amenity fluctuations, and its income spread appear to lessen Madison County's rank (see [Figure 1](#) and [Table 4](#)) and increase the standard deviation of its implicit amenity value. This can be seen through comparing the height of the boxes and positions of outliers in [Figure 1](#).

The variation of census-block amenity estimates chronicles the degree to which income inequality and divergent taste for amenities exist within and between counties. Two rankings of amenity estimates are reported, one based on mean census block and the other based on median census block measures of amenities. When the mean values of a county's census block's implicit amenity estimates are used, Hinds County is ranked number-one. When the median value of a county's census block's implicit amenity estimates is used, Rankin County is ranked number-one. Madison County is ranked third under each method.

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# STUDENT PAPERS

Each year University Research Center (URC) holds a student paper competition. The winners of the competition are given the opportunity to present their papers at the annual Advancing Mississippi conference and have them printed in this journal. The papers are not peer-reviewed, but judged by a committee at URC. The students work with their advisors prior to submission to create original research that focuses on systemic issues in Mississippi. The next three papers are the 2016 winners.

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# Improving Developmental Mathematics Courses: A Study of Various Methods for Replacing Developmental Mathematics Courses in Higher Education\*

Lyle Wallace, Selah Weems, Marti Pulido, Chris Kelly, and Flora Sumrall

Faculty Advisor: Mark Fincher\*\*

## Executive Summary

While many college students need to take developmental mathematics courses before entering into accredited math courses (i.e. college algebra, calculus, etc.), the time and money both the student and institutions of higher education have to spend on these courses are not feasible. This paper overviews the most successful alternatives for replacing traditional developmental mathematics courses. Programs of study include accelerated math, boot camps, summer bridge, self-paced learning, and SREB Math Readiness.

*Key Words:* mathematics, education, remediation, college preparation, college success, developmental mathematics

There are very few certainties in life. Students needing help with mathematics, regardless of age, is as close to certainty as one can get. The odds of a college student leaving the college or university with a degree decreases if that student begins in a remedial math class. Nevertheless, a study conducted by SREB College and Career Readiness (2013) reported that only 44 percent of students leaving high school meet the College Readiness Benchmark in math. This alarming report signifies that not even half of potential college freshmen are prepared to dive into accredited math courses. In addition to unprepared high school graduates moving into the college environment, there is also an increase in nontraditional students returning to school who need developmental mathematics courses (Jesnek, 2012).

As crucial as developmental math courses seem to be for many college students, the graduation success rate for students who enroll in these courses are low (Yamada, 2014). Yamada (2014) reports that up to 80 percent of students enrolled in the entry level math program never receive an actual math credit at the college level. Since almost all developmental math courses do not count toward college credit and many community colleges are undergoing budget reductions, the option for students to take classes such as beginning algebra, elementary algebra, and intermediate algebra is gradually being removed. This paper examines popular alternatives to full semester length remedial classes. One of the advantages of the following

programs is being able to save time and money for students. The first is an accelerated program, which is an intensive semester course that combines multiple developmental math courses. The next program is a boot camp option which is defined as a 1-3 week program focusing only on math. A summer bridge program which consists of a 5-10 week program that includes other topics with math being the primary focus. Several colleges are successfully utilizing a self-paced computer option. Finally, some colleges are removing all remedial math classes and using the K-12 educational system to offer a remedial math class to seniors who do not meet minimal standards. This class is offered by the Southern Regional Education Board. Their program is known as SREB Math Ready (SREB, 2013).

## Accelerated Course Method

While the accelerated method takes on a few different forms, the basic tenet of this strategy is to accelerate the time needed to progress through different stages of development math. One community college that is effectively implementing this strategy is Broward College in Ft. Lauderdale, Florida. This college restructured their developmental math classes into a more streamlined approach. Now if a student needs two different levels of developmental math prior to college algebra, then they can accelerate their studies by completing two levels of pre-algebra math in one semester (Broward College, 2012b). Broward has a simple and straightforward approach of

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\* Student papers.

\*\* Mark Fincher, PhD is an Assistant Professor in the Meridian Division of Education at Mississippi State University.

allowing the student to test at the mid-semester point. If the student passes the exam on the material covered in the first half of the semester, then they move into the next class level over the course of the second half of the semester. Once the student completes the second half and passes the exam, credit is given for both developmental math courses even though only one semester has passed. At the mid-semester testing time, if the student did not pass their exam then they would simply begin on the next Monday morning repeating the first 8 week course (Broward College, 2012b). This allows entire semesters to be shaved off, which keeps students motivated and earn some easy “wins” earlier in their college career.

There are multiple studies that indicate the accelerated method can be successful. According to statistics compiled by Broward Community College, the math completion success rate at Broward Community College increased by a range of 6 percentage points, to a high of 13 percent vs the traditional remedial math classes without the accelerated format (Broward College Institutional Data, 2012). At the Community College of Denver, the program known as FastStart was established in 2005 by several different grants (Baker, Edgecombe, and Silverstein, 2011). While the name has since been changed to Compressed Courses at Denver, the concepts are essentially the same as the accelerated semester method used with FastStart (Bragg, Baker, and Puryear, 2010). The following is a description of the Compression method by the college:

*An accelerated and compressed developmental curriculum using contextualized instruction, active learning, and computer-based instruction epitomizes the instructional approach. Students advance through two levels of developmental math in one semester by combining the first and second levels (MAT 30-60), second and third levels (MAT 60-90), or the third level and first level of college study (MAT 90-106). The English option combines two, three, or four sequenced courses of developmental English and reading (Bragg, Baker, and Puryear, 2010).*

Denver continues to add courses to meet the needs of an even larger body of students. Initially, FastStart offered two math and two reading compressed course combinations. For example, a traditional sequence in math might consist of two semesters of classes, MATH 030: Fundamentals of Math and MATH 060: Pre-Algebra, each meeting for 75 minutes twice per week. In the compressed FastStart semester, students take a combined course MATH 030/060 which meets for two hours and 45 minutes

twice per week (Baker, Edgecombe, and Silverstein, 2011). The program has expanded to include four math and four reading accelerated developmental courses. While the costs to students are still primarily their responsibility, reducing the time needed and courses needed to achieve their goals essentially reduces dollars spent. Community College of Denver hasn't seen an enormous increase statistically, but they have noted some very positive results in a few areas. Perhaps the most significant result is the increase from 29 percent to 49 percent in the students attempting the first developmental math course using FastTrack versus the students who did not participate in the program (Bragg, Baker, and Puryear, 2010).

Though the accelerated semester method is relatively new as a mode for teaching developmental math, it has shown merit at the schools that have tested it so far. The concept shows that schools are realizing that the exorbitant cost associated with college must be dealt with head on, for several potential students often become demoralized and either walk away from their studies or not attend college at all. Other problems involve the snail's pace that many students encounter when trying to slog through developmental class after class, only to find that none of those hours count toward their degree.

### **Boot Camp Strategy**

Boot camps are a one to eight-week course (Brady, 2015; Sherer and Grunow, 2010), typically set up during the summer, and are most often intended for students who would like to evade developmental mathematics courses (Whissemore, 2014; Tarleton State University, 2016). This strategy is targeted toward incoming freshmen who are still in or have recently graduated from high school, as well as nontraditional students who have been out of high school for a number of years (Hodara, 2013; Sherer and Grunow, 2010). Located on the college's campus, these students go through an intensive process (several hours a day) with faculty refreshing them on the basics of mathematical, primarily algebraic, concepts (Brady, 2015; Sherer and Grunow, 2010; Sinclair College, 2016). Boot camp programs vary dependent upon the college, but there are some colleges that require students to take a diagnostic test on their first day of the program (Atlantic Cape Community College, 2014). These students only work on the math skills they were assessed on needing improvement, which allows for superior efficiency in the program. There are some mathematical boot camps that are not designed for those wishing to forgo developmental courses. Instead, these boot camps are specifically created for engineering students who wish to skip the pre-requisites (foundations of mathematics and pre-calculus

courses) for higher mathematics in their field of study (Borgaonkar et al., 2015).

### **Boot Camp History**

While many colleges did not incorporate the boot camp strategy for several years, its popularity has been particularly increasing over the last five years. Hodara (2013) reports, "According to recent national scans of 'math intensives' and developmental education innovations, bridges and boot camps are relatively common at colleges across the country," (p.12). This is especially the case in Western and New England states. A major reason New England became a popular area for developmental math boot camps is due to the New England Board of Higher Education being awarded a \$356,200 grant from the Lumina Foundation to assist in a developmental mathematics project (New England Board of Education, 2015). According to Sherer and Grunow (2010), boot camp programs actually date back to as early as the 1960s and 1970s. These boot camps started off by preparing students for college in more areas than mathematics (Sherer and Grunow, 2010). Constructed on a cohort model to improve team building and provide support, boot camps originally focused on particular subject matters that students needed, in addition to helping students develop motivational goals (Sherer and Grunow, 2010). Boot camps were particularly useful for returning soldiers attending college through the GI Bill during the 1960s (Sherer and Grunow, 2010).

### **Boot Camp Credit and Costs**

A few colleges (e.g. Sinclair College) offer one credit hour for students who complete boot camp; however, the majority of colleges offer no credits for boot camp. Instead of offering the boot camp as a course for credit, most colleges have the students take a placement test at the end of this intense program in order to skip remedial courses like intermediate algebra and go straight into a class like college algebra that would count towards a diploma (Brady, 2015; Sherer and Grunow, 2010; Whissemore, 2014).

Costs for boot camps vary dependent upon the college and state. Many of these programs are paid for through grants or the institution itself, and may or may not charge the student with book costs and the placement test at the end of the course (Brady, 2015; Hodara, 2013; Sherer and Grunow, 2010; Whissemore, 2014). Some boot camps actually offer incentives for students to complete the course (iPad giveaway, free laptops and software, etc.), in addition to no tuition costs (Sherer and Grunow, 2010). However, various colleges charge students full or discounted tuition for enrolling in boot camps (Sherer and

Grunow, 2010; Tarleton State University, 2016). For example, Tarleton State University charges students \$275 for a weeklong boot camp, including a placement test charge.

### **Effectiveness of Boot Camps**

According to Hodara (2013), boot camps, as well as summer bridge programs, may have short-term effects on student learning. Assessment on the effectiveness for boot camps has essentially been overlooked and under-researched. Boot camps are often compared to summer bridge programs; therefore, it can be assumed that effectiveness of boot camps would be similar to the effectiveness of summer bridge programs. According to Barnett et al. (2012), there is evidence suggesting summer bridge programs have positive short-term effects on students; however, long-term effects have yet to be found.

### **Summer Bridge Programs**

Summer bridge programs are developmental interventions geared to aid students in their transition from high school to college. The programs often range from four to six weeks, although some are known to be anywhere from two to eight weeks. Because of the extended time, students are more likely to learn math in bridge programs than in boot camps. Many colleges offer summer bridge programs across a wide variety of developmental needs, including English, math, and reading. Goals of these bridge programs include achieving the necessary skills to score high enough on placement tests to be placed into college level math courses; acquiring mathematical knowledge for future success; developing the necessary college study skills; forming relationships with peers, faculty, and mentors; and getting the needed information to be successful in progressing toward college goals (Sherer and Grunow, 2010).

Although summer bridge programs are similar to boot camps, bridge programs typically focus on a smaller number of students who are often high-risk high school graduates. For many reasons, this group may not be reached by the targeting program: some students choose/need to work during the summer months before college, some students do not wish to spend the summer attending courses that do not give credits toward college degree, some students needing this program do not learn about its existence until it is too late. To ensure that students learn about the program in time to enroll, many colleges test students while they are still in high school; this requires an ongoing relationship with local high schools (Sherer and Grunow, 2010).



### Targeted Group

In the last forty-plus years, support programs such as summer bridge programs have become necessary to meet the needs of non-English speaking, international, disabled, and others students; the programs serve as an aid to help students gain an equal footing with their peers. It is then necessary to maintain this new population in higher education institutions (Kezar, 2000). An article by McGlynn (2012) published in *Hispanic Outlook in Higher Education* addresses the issue of whether summer bridge program improve first-year success. McGlynn's (2012) research did not show that summer bridge programs boost enrollment; however, it did show that students completing summer bridge programs attempted college-level math courses at a higher rate and a higher percentage of these students passed the course (McGlynn, 2012).

### Cost and Funding

Barnett et al. (2012) determined that the cost for the 2009 developmental summer bridge programs for eight colleges ranged from \$62,633 to \$296,033. The cost per student ranged from \$835 to \$2,349; the average cost per student was \$1,319, this included the stipend of up to \$400 for each participant. Specifically, Chicago State University offers a five-week summer bridge program for incoming freshmen. The cost is \$250 for instruction in math, English, and reading; this is an over \$2000 savings over taking these courses in developmental classes which would cost an estimated \$2,940-before fees (Chicago State University, 2016).

Because Summer Bridge programs last longer than boot camps, they require more resources and faculty/staff. Funding for summer bridge programs vary from program to program. Some are funded by grants, institution and grants, high school programs and internal grants, student tuitions. There are also many incentives for students to enroll in these summer programs: free tuition and books, stipends, required by high school, lunch, travel vouchers, school supplies, and opportunity to retake placement exam and place in higher math course.

### Conclusion for Summer Bridge Programs

Summer bridge program have become a popular alternative to move students out of developmental education courses and into college-level ones. According to an article published in 2012, it has been found that an estimated 13 percent of four-year colleges offer bridge programs (Times Staff, 2012).

### Self-Paced Computer Instruction

According to Robinson (1995), "Proper utilization of technology in courses can spark student interest and involvement" (p. 3). Self-paced learning involves enrolled students having scheduled times to work on their assignments in a computer lab. Students are encouraged to work outside of class times at their discretion. Before or at the beginning of class, students take an assessment from a computer program designed to assess what skills individual students need to master. Broward Community College uses a program named "Math Redesign," which condenses entire semester length (16 weeks) developmental math courses in half (8 weeks) (Fong, and Visher, 2013). This allows students to complete two levels of developmental math in a single semester, which is almost identical to an accelerated method. The self-paced program allows students to "accelerate their developmental process or spend more time on certain competencies" (Ariovich and Walker, 2014, p. 46). This type of learning makes the student assume responsibility for building their math knowledge (Ariovich and Walker, 2014).

### Student views

Ariovich and Walker (2014) found that it can be difficult for faculty and students to adapt to different class responsibilities than they are used to. In addition, "Older students with weaker technological skills find it hard to navigate computer-aided instruction, and many students do not fully understand the new expectations about performance, workload, and homework" (Ariovich and Walker, 2013, p. 14). Some students notice that more time is required for self-paced classes than for traditional classes, and there is "no room for procrastinating or fooling around" (Ariovich and Walker, 2014, p. 53). However, some students enjoy self-paced learning because they can revisit sections or spend additional time on concepts that they either struggle to understand or would like to master (Fong, Visher, and MDRC, 2013). According to one student, being in a non-lecture class is like "memorizing steps rather than learning concepts" (Fong and Visher, 2013, p. 32). Students understand that they will learn the majority of what they need by using the computer. Classroom facilitators can assist students who need additional instruction.

### Teacher views

As students are completing their computer work, teachers are available to take role, grade assignments or tests, and assist students if needed. In a ModMath classroom at Tarrant County College in Fort Worth, Texas,



teachers report that it is difficult to lecture while students are using the self-paced program (Fong, Visher, and MDRC, 2013). There is a concern that “computer instruction by itself may not provide students with all the learning opportunities they need to become proficient in math” (Ariovich and Walker, 2014, p. 50). Not all instructors like this kind of flexible approach (Fong and Visher, 2013). Teachers need further training in dealing with the classroom setup, which Fong and Visher (2013) calls a “one-room schoolhouse” (p. 36).

### **Conclusion for Self-Paced Method**

Self-paced instruction appears to work best for motivated students. Booth et al. (2014) report that either partial or complete self-paced instructional courses “helped accelerate student completion or transition to credit bearing courses for the motivated students” (p. 2). If students are not highly self-motivated, lecture-based courses may work better for their learning style.

### **SREB Math Ready**

#### **Financial Motivations to Create a Change**

Many community colleges across the country are scrambling to find ways to save money due to cuts in state appropriations. These cuts have led to increased tuition. In 2000 it was estimated that community college cost 3.1 percent of the median home income, while in 2013 that number has jumped to 5.7 percent (Amy, 2015). This increase has led to more financial aid need among students and less net value in obtaining the degree. Remedial classes count against the total number of hours that are allotted under student loans. One remedy to this problem is to relegate remedial classes to the K-12 level. This has caused the creation of a new twelfth grade math class known as SREB Math Ready.

#### **What is SREB Math Ready and Why is it Needed?**

In 1948 the Southern Regional Education Board was formed, creating the first interstate compact for education. SREB has a history of focusing on problem areas that teachers and legislatures identify. More recently SREB has tried to bridge the gap between high school and college. The funding for SREB comes from a grant named Advancing Common Core Standards, Educator Effectiveness, and College Readiness in SREB States. The Bill and Melinda Gates foundation has been large supporter of the SREB program (SREB College and Career Readiness Courses, 2013).

SREB has most recently been involved in the creation of the SREB Math Ready and Literacy Ready programs. Based on the 2014 ACT, there were only 44 percent of students

who met the college readiness benchmark in math (SREB, 2013). There are three states that SREB has partnered with (Arkansas, Mississippi, and North Carolina) to make major changes in implementing the SREB Readiness Courses (Are Your Students Ready, 2015). Eighty-nine percent of high school teachers state that their students are ready for college math, while only 26 percent of postsecondary mathematics instructors feel the same students were ready (SREB College and Career Readiness Courses, 2013). Another concern that SREB focuses on is the future of these students who are falling into the gaps. The SREB Math Ready program was fully implemented in the 2015-2016 school year and was intended to accomplish several goals. SREB created twelve elements dealing with standards, readiness assessments, and traditional course implementation. These cover topics such as alignment with common core standards, having students tested no later than their junior year, and having the classes count for a high school credit like a traditional class (Root, 2013).

The overall purpose of the class is to bridge the gap between their high school and college math classes (Are Your Students Ready, 2015). The major goal of the Math Ready program is to help students who are unprepared for college before they graduate high school. SREB hopes to prevent the often used postsecondary remediation that students and colleges must pay (SREB College and Career Readiness Courses, 2013). The major key to the SREB Math Ready class is allowing any student who scores an average of 80 or above to be allowed to skip the remedial classes in college and be placed directly in College Algebra. This placement happens regardless of ACT, Accuplacer, or any other test scores.

#### **The Structure of the SREB Math Ready Class**

The SREB Math Ready class is divided into eight units. These units include algebraic expressions, equations, measurement and proportional reasoning, linear functions, linear systems of equations, quadratic functions, exponential functions, and statistics. Within each unit is a F.A.L. also known as a Formative Lesson Assessment. The teacher is instructed on many of the assignments to not give the student a grade. This philosophy is supposed to put the emphasis on learning and not the grade. The teacher encourages the students to “struggle productively” to discover the answers. Not only do the students find the answer, they must develop and explain their method (Ready for College Level Math, 2013).

#### **Results**

After completing the SREB Readiness courses 67 percent of students improved their ACT composite scores. After

completing the SREB Math Ready program 76 percent of students showed improvement on their ACT math scores. Fifty-seven percent of the students who completed the SREB Readiness courses increased their science ACT score (Ready for College Level Math, 2013).

### Conclusion for SREB Math Ready

There will always be a difference between high school curriculum and a college or university curriculum, but SREB Math Ready can close that gap. It is frustrating to students and teachers because it places the students in a state of a “productive struggle.” It forces students to learn concepts instead of procedures. It will also create more of a cost for states in the K-12 educational system. However, these costs should be saved at the college and university level if the remedial classes are avoided (Root, 2013). It is important to remember that the future of the job market and economy is based on the student’s ability to function on a post-secondary level. Improving a student’s ability to successfully navigate through any math problem will not only be beneficial to the student’s increased learning but also to society.

### Conclusion

Everyone is searching for the single “magic bullet” that can fix all the remedial math problems. Unfortunately, that “magic bullet” does not exist. Many higher education institutions have discontinued or will discontinue developmental education courses; therefore, accelerated, boot camps, summer bridge, self-paced, and SREB Math Ready programs are necessary to help unprepared students succeed in an ever-growing academic world. All of the programs we examined can be used and tailored to different groups and circumstances. Research shows consistently that there will always be students who struggle with mathematics, but those struggles can be overcome with creative planning.

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# Bridging the Gap: Improving Mental Health Services for Children and Adolescents in Mississippi Schools\*

Amy Henderson

Faculty Advisor: Laura Richard\*\*

## Executive Summary

The mental health system in the United States is notably broken, as demonstrated by the reality that less than a third of children and adolescents with a mental health need are not receiving any type of treatment, with less than 10 percent of youth actually receiving effective care (U.S. Public Health Service, 2000). The school setting is a natural setting for providing children and adolescents with mental health services because not only do youth spend the majority of their time there, they also serve as a "de facto" provider (Weist et al., 2003). The purpose of this study was to determine if schools in the southern region of Mississippi have accessible and effective mental health services for students to utilize ( $n = 121$ ). Results of the analysis determined a significant disconnect between school personnel and parents/guardians regarding availability and accessibility of mental health services for students, along with perceptions of what school mental health entails. These findings will allow others to identify the importance of incorporating mental health education into a school setting, help identify steps to pinpointing mental health needs in the school setting, and will also relate positive outcomes of school mental health provision to education outcomes such as, attendance, discipline, and academic performance.

*Key Words:* mental health, school mental health, school social work

## Background

There is currently a severe shortage of mental health services on a local, state, and national level. This is an immensely critical issue to address since one out of five adolescents have a mental health diagnosis, yet sixty to ninety percent are unable to receive treatment (Child Trends, 2013). Mississippi in particular has the second highest prevalence rate of mental illness with the second lowest rate of access to proper care (Mental Health America, 2015). According to the National Survey of Children's Health (NSCH, 2013), 47 percent of children ages 2-17 in Mississippi need mental health services, but do not receive them, compared to 39 percent nationally. Although there is a significant need to enhance the policies and practices that affect mental health service utilization, there is limited research on how Mississippi is addressing these needs. By identifying and treating individuals with a mental illness at an early age there is the potential to decrease suicide rates, high school dropout rates, and the number of adolescents in the juvenile justice system (Schwarz, 2009). Fifty percent of lifetime cases of mental illness begin by age 14, and 90 percent of individuals who die by suicide have a

diagnosable and treatable mental illness (National Alliance on Mental Illness, n.d).

The idea of incorporating mental health services into the school system has developed over the years, and by the 1990s has become coined as "expanded school mental health." The basic framework of expanded school mental health entails utilizing programs that emphasizes collaboration between the school, families, and community agencies (Weist, 1997). Expanded school mental health programs are crucial to integrate into the school system since it allows youth who may be unable to access services to receive them in a convenient manner. Additionally, children and adolescents are more likely to utilize expanded school mental health programs and have higher reports of positive impacts than youth who receive mental health services in more traditional settings such as hospitals, outpatient facilities, or psychiatric centers (Flaherty and Weist, 1999; Jennings et al., 2000). As the mental health needs of children and adolescents continues to grow, the need to expand and reform comprehensive and coordinated school mental health services and resources is critical.

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\* Student papers.

\*\* Laura Richard, PhD is an Assistant Professor in the School of Social Work at The University of Southern Mississippi.

## **Method and Procedures**

### **Participants and Sample**

For this study, south Mississippi was selected as the geographical region from which to collect data. Through the Mississippi Department of Education all school districts that belonged to this region were identified in order to obtain a convenience sample. Within this region three school districts were selected through a convenience sampling: Hattiesburg Public School District, Harrison County School District, and Gulfport School District. All faculty/staff and parents/guardians from every school with grade levels K-12 within these three school districts were invited to participate in a survey that was distributed in two ways. The first group of surveys was distributed to faculty/staff electronically through email addresses provided by the participant's employing school districts. Of the school personnel receiving the email, 104 participated in the online survey.

In order to also seek feedback from parents/guardians, one school from each of the three school districts was randomly selected to gather participants from a parent-teacher association (PTA) meeting. At these PTA meetings, parents/guardians interact with school personnel to promote the welfare of their students and strengthen the relationship between school personnel and parents/guardians. Like the faculty/staff who participated in this study, parents/guardians of students in the three school districts were given a survey, but in the form of a hard copy. Seventeen parents/guardians participated in this survey. Between the two groups of respondents a total of 121 participants were involved in this study.

### **Instrumentation**

Based on the national and state descriptions of school mental health practice, along with previously conducted state surveys, a 26-item survey was purposefully designed to assess the effectiveness and accessibility of mental health services, general perspectives on mental health, and demographic information of respondents involved with K – 12 schools was used. The items in the survey were closed-ended, with some following the form of a Likert scale. The survey given to school faculty and staff was distributed electronically through email using a Survey Monkey link that inquired about the types of mental health information, prevention, and screening offered in the school, what major mental health illness/disorders needed to be addressed, and what participants felt the major risk factors for developing a mental health illness/disorder were.

### **Data Collection Procedures**

The survey instrument for the school faculty/staff respondents was emailed to all possible respondents beginning January 4, 2016. The body of the email contained an introductory letter with information regarding the central purpose the study, confidentiality, and the right of the individual to not participate in the survey. Once the participant clicked on the Survey Monkey link embedded in the email, the respondent then was able to agree to participate and begin the 26-item survey.

Prior to sending out the survey to participants, the survey was first approved by The University of Southern Mississippi's Institutional Review Board before being sent to each school district's superintendent to receive written approval to distribute surveys to every school in their district. After obtaining permission from the superintendent, principals were then emailed an explanation of the study, along with an embedded link to the survey. Principals who agreed to participate then emailed the original message with the survey link enclosed to their entire faculty/staff.

The survey instrument for the parents/guardians was distributed in person at a PTA meeting for each of the three schools who agreed to participate. Like the first survey, prior to beginning the survey an introductory letter with information regarding the central purpose of the study, confidentiality, and the right of the individual to not participate in the survey was attached to the survey. Completed surveys were then collected and answers were put into the same Survey Monkey software used for the faculty/staff survey.

### **Data Analysis**

Data analysis procedures used were descriptive in nature utilizing the Excel spreadsheet generated by Survey Monkey. Univariate analyses were used to summarize data and address the objectives of the study. Descriptive analyses were used to describe the study participants according to race, age, gender, school district location, role within school district (teachers), employment status (parents), and education level (parents). The analyses also described what major mental illness/disorders needed to be addressed, the major risk factors for developing a mental health illness/disorder, and the level of prevention and screening offered to address the mental health needs of the students.

Descriptive statistics provided data for summary tables, frequencies, and percentages which were important in providing a picture of school mental health services in south Mississippi. The questions on the survey were at the nominal level of measurement.

## Results

### School Faculty/Staff Responses

Of the 104 school personnel participants, 81 percent were female, 72 percent were Caucasian, 33 percent were between the ages of 45-55 years old, and 65 percent were teachers who on average had been working for their school between 1-5 years. When asked if addressing mental health needs would increase academic performance, 98 percent of the respondents agreed, and 81 percent felt that truancy and dropout rates would also decrease. Respondents also reported that 65 percent of schools don't screen students through an early-identification program, and 45 percent of schools never provide students with information regarding mental health. Additionally, 97 percent know a student in grades K-12 who could benefit from services, while 75 percent feel there is a stigma attached to mental health services.

### Parents/Guardians Responses

The parents/guardians who participated agreed 100 percent that there should be a licensed mental health professional in every school, that academic performance would improve by incorporating school mental health resources, and that they would allow their child to utilize school mental health services if offered. Despite this, 73 percent have never had a child screened through an early-identification program, even though 83 percent know someone in grades K-12 who could benefit from mental health services. Additionally, 53 percent of respondents have never received information from their child's school regarding options for students with a mental health need.

## Discussion

When comparing the two participant groups there were some notable similarities and differences. For instance, when asked to mark the three major mental illness/disorders that need to be addressed in the school they were involved with, both groups marked Attention Deficit Hyperactivity Disorder (ADHD) as the top concern, followed by conduct disorder, then mood disorders. A summary of the various illness/disorders that need to be addressed is found in Figure 1. When participants were asked what they feel the three main risk factors for developing a mental illness/disorder were, both groups agreed that stressful life events was the top risk factor, followed by being abused or neglected, then level of relationship with family and friends. A summary of the main risk factors for developing a mental illness/disorder is found in Figure 2.

Although both groups are in agreement on what the main mental health illness/disorders and risk factors are, there does appear to be a disconnect between who is providing service and what information is being relayed to parents/guardians. For instance, 39 percent of school personnel respondents reported that the school they work in conducts mental health screenings one or more times a year, but 80 percent of the parents/guardian respondents say that their child has never been screened. There appears to be confusion within both groups on what an early-identification mental health screening is, and if it's actually being offered and conducted. Also, when asked if the school's curriculum covers how to seek help for mental illness/disorder, 34 percent of faculty/staff said yes, whereas only 25 percent of parents/guardians also said yes. Again, there seems to be a gap of communication between both groups on what all the school actually provides to meet the mental health needs of their students.

Figure 1. Main Mental Health Illness/Disorders that Need to be Addressed

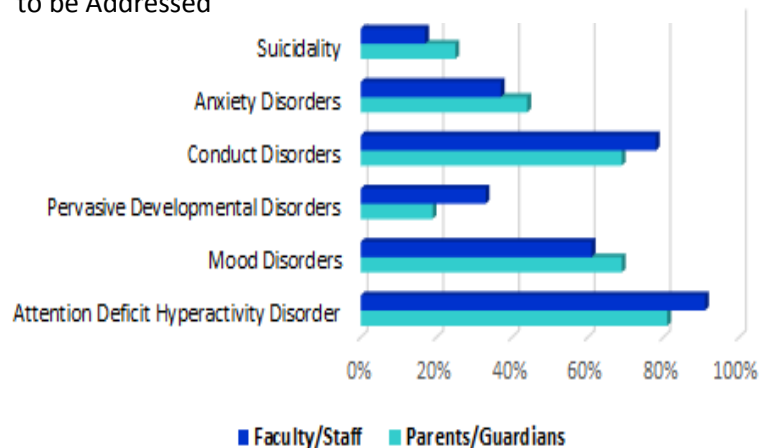
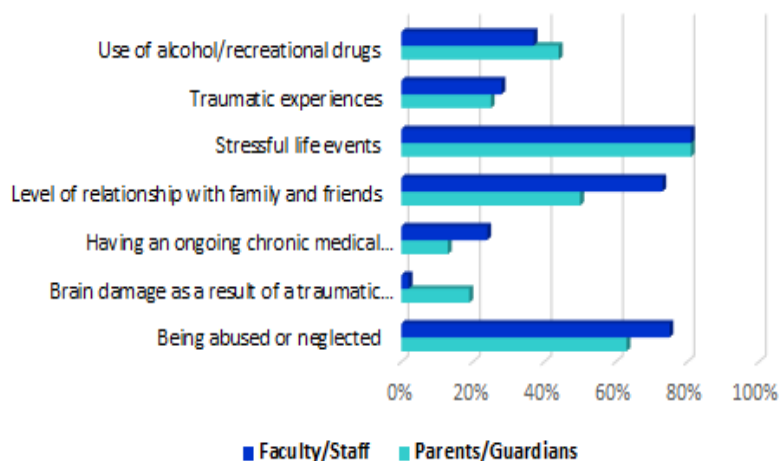


Figure 2. Risk Factors for Developing a Mental Illness





## Limitations

There are a few limitations to the current study, mainly as a result of possible errors regarding external validity and representativeness. Although the survey used in this study appeared to have face and content validity, criterion-related and construct validity could not be determined. It was not possible to know if the participants completing the survey fully understood the meaning of the questions being asked. Also, the sample size was limited by the number of faculty/staff and parents/guardians who were willing to participate, therefore equal representation of the southern region of Mississippi may not have been achieved. Additionally, this study used data from one region of Mississippi and as such cannot be entirely generalized to the larger population of the entire state. Further research is recommended to expand on this study's results in order to make substantive conclusions about school mental health across the entire state of Mississippi.

## Policy and Practice Implications

In order to improve the mental health services in schools there are several areas that need to be addressed both in Mississippi and nationally. By implementing new policies to promote and enhance school mental health services, the extremely high rates of children and adolescents needing services will ideally dramatically decrease. A new set of standards regarding how to reinforce training and practice needs to be solidified in order to create a strong foundation for mental health services in the school setting to form. Based on this study's findings, there are four main areas that need to be addressed in order to increase the effectiveness and accessibility of school mental health programs in Mississippi.

First, there needs to be an increase in federal funding to allow schools to access resources that are currently limited. It's not unheard of for schools to have a limited number of resources, such as, technology, office space, or professionals. As a result budgets for these areas are generally unmet and pushed to the side. By increasing funding to schools, this will allow licensed professionals to be hired to conduct mental health prevention and treatment services for students. If more funding is allocated towards school mental health services than licensed professionals will also be able to purchase materials such as therapeutic toys and games, along with training manuals that can aid in the delivery of services (Weist et al., 2012).

Next, each school needs to have at least one hired licensed professional who faculty and staff can refer students to if in need of mental health services. Currently, the average ratio of recommended personnel to students is

extremely insufficient to meet the needs of the entire student body. The National Association of School Psychologists, the School Social Work Association of America, and the American School Counselor Association recommend that there should be 250 students per counselor, 400 students per social worker, and 1,000 students per psychologist (American Counseling Association, et al., 2006). Unfortunately schools are typically constricted by financial resources and as a result are not hiring enough professionals to meet the needs of their student body and are instead forced to make referrals to community-based providers when available.

Additionally, the school system also needs to build the capacity of faculty and staff members by providing mandatory workshop and professional development training that educates school personnel on how to identify the symptoms of mental health disorders, how to interact with these students, and how to aid them in acquiring proper services. By addressing these topics school personnel can become more confident and comfortable with recognizing the emotional and behavioral needs of their students, while simultaneously building positive interactions.

After educating school personnel, parents and guardians need to be provided information on how to recognize when their child might have a mental health disorder and how to seek services through the school. In this study, 100 percent of parents/guardians who participated said they would allow their child to utilize mental health programs through their school, so the desire to have more services and information is present. In order to close the communication gap between school personnel and parents/guardians there needs to be information continuously passed on in forms such as e-mails, flyers, newsletters, and PTA meeting announcements.

Finally, there needs to be regularly conducted mental health screening opportunities for all students continually throughout the academic year. These assessments can be administered both informally and formally. After being trained through professional workshops, school personnel will have the capability to informally assessing their students through daily observations and listening to how their students interact with others before reporting their concerns to licensed professionals within the school. Formal methods of screening are equally important and can include collecting data on multiple variables such as intensity and duration of misconduct and the level of class participation in order to monitor potential risk factors of mental illness/disorders (Skalski and Smith, 2006). Other formal methods can include utilizing surveys such as the

Youth Risk Behavior survey or collecting student satisfaction data to analyze.

### Future Research

The current study should be replicated in other states in order to collect a more diverse and representative sample of school mental health services, along with how different regions throughout Mississippi are addressing the mental health needs of their students. By gathering additional research the implications of incorporating mental health services into the school system can be clarified. Although this was not explored in this study, researching the number of school social workers in each school district, along with their role could create an interesting study on the differences between regions.

Further research in other states is also recommended in order to incorporate findings into national policies and legislature that will reform and enhance school mental health nationwide. The establishment of a nationwide set of standards for practice and policies regarding training, the role and expectations of school mental health services can be reinforced in every state. By creating a solid framework for school mental health, accountability can be required in all schools nationwide.

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# Blueprint Health: A Social Solution to Obesity in the Workforce and Communities of Mississippi\*

Molly Chaffin, Timothy S. King, Cecilia Snyder, and Brian Street

Faculty Advisors: Jennifer Lemacks and Jerome Kolbo\*\*

## Executive Summary

Mississippi's above average rates of obesity, poverty, and related chronic disease have led to excessive healthcare expenditures for both employers and the state government. In addition to increased healthcare costs, obesity is further impacting employer costs through absenteeism, presenteeism, and subsequent losses in productivity. By investing in a comprehensive, sustainable, and individualized employee health program, employers have the potential to decrease healthcare expenditures at a return on investment (ROI) of \$6 for every \$1 spent. Although nearly 74 percent of all firms in the United States providing employees with health insurance offer some type of wellness program, only 13 percent of programs are considered to be comprehensive, and in Mississippi, only 32 percent of programs have a formal wellness policy. A comprehensive literature review was conducted using online databases in order to determine employee health best practices. Based on the literature reviewed, a low-cost, comprehensive employee health program model offering services to create healthy work environments and communities, combat obesity rates, and improve the health and quality of health of Mississippians is recommended. The blueprint for the model includes six key strategies: (1) expert advisory board, (2) disease management, (3) health champion model, (4) workplace environment, (5) community outreach, and (6) program evaluation. It is also recommended that policy promoting participation in such programs be instated. If successfully implemented across the state's largest industries, the model has potential to decrease average body weight by 5 to 10 percent statewide, decrease employer healthcare costs by 33 percent, and to increase the health and productivity of the Mississippi workforce.

*Key Words:* health, obesity, workforce development, health solutions; social solutions; health strategies

## The Problem in Mississippi

At 35.5 percent, Mississippi exceeds the national obesity average with the highest rates of obesity among non-Hispanic black adults (43 percent) followed by non-Hispanic whites (31 percent) and Hispanics (21 percent) (Centers for Disease Control and Prevention, 2015a). Furthermore, as many as 70 percent of the state's adult population was classified as being either overweight or obese in 2014 (Levi et al. 2015). In addition to having the third highest obesity rate in the nation, Mississippi also held the highest rate of physical inactivity (31.6 percent), the second highest rate of diabetes (13.0 percent), and the third highest rate of hypertension (40.2 percent) in 2014 (Levi et al. 2015). Although chronic disease was once thought to be a problem

of older age groups, the number of working-age U. S. adults with a chronic condition has grown by 25 percent in ten years (Hoffman and Schwartz, 2008). This shift toward earlier onset adds to the economic burden of chronic disease due to illness-related loss of productivity resulting from absence from work (absenteeism) and reduced performance while at work (presenteeism).

Obesity-related conditions such as heart disease, stroke, type 2 diabetes, hypertension, end-stage renal disease, and certain types of cancer negatively impact worksite revenue, insurance costs, and productivity, and account for over 86 percent of national health expenditures (Centers for Disease Control and Prevention, 2016). In addition to the 93 billion dollars per year that employers pay in obesity-

\* Student papers.

\*\* Jennifer Lemacks, PhD, RD is an Assistant Professor in the Department of Nutrition and Food Systems at The University of Southern Mississippi.

Jerome Kolbo, PhD is the MSW Program Coordinator and a Professor at The University of Southern Mississippi.

related health insurance claims, productivity losses related to personal and family health problems cost U.S. employers an additional approximately \$1,685 per employee per year, or \$225.8 billion annually (Centers for Disease Control and Prevention, 2013). The probability of disability, workers' compensation claims, and number of days missed are greater in individuals with a body mass index (BMI) greater than 25 kg/m<sup>2</sup>, which is positively associated with employer costs (Van Nuys et al., 2014). The probability of a short-term disability claim increases faster for employees with hypertension, hyperlipidemia, or diabetes, and morbidly obese employees cost more than twice the amount of normal weight employees (Van Nuys et al., 2014). In Mississippi, employers pay an average of \$4,289 per year, approximately \$357 per month, for each single employee covered by the employer's health insurance plan (The Henry J. Kaiser Foundation, 2016). For family coverage, employers pay an average of \$867 per month for a total of \$10,414 per year (The Henry J. Kaiser Foundation, 2016). It is estimated that for every \$1 spent on wellness programs, medical costs fall by \$3.27 and absenteeism costs fall by \$2.73 (Baicker, Cutler, and Song, 2010). Therefore, if an employer invests \$250 more per employee per year, there is potential to prevent increased healthcare costs of up to \$1750 per employee per year, seeing an average return on investment (ROI) of \$6.

Employee health programs take advantage of employers' access to employees at an age when interventions can still impact employees' long-term health trajectories (Hoffman and Schwartz, 2008). Such programs may also serve as an opportunity to reach low-income populations that might not otherwise have the necessary knowledge, access, or resources for improving health. The link between poverty and obesity has been demonstrated repeatedly. This relationship is not isolated to Mississippi as six of the state's ranking in the top ten for obesity rates also had some of the highest poverty rates in the nation, according to 2011 data; however, in Mississippi, it is the most pronounced (Levi et al., 2011). In 2014 Mississippi not only had one of the highest obesity rates in the nation, but also the highest poverty rate at 21.9 percent (United States Department of Agriculture Economic Research Service, 2016). In order to significantly address obesity rates in Mississippi, it is crucial to reach those low-income populations that have been most affected. Obesity is most prevalent in Mississippians ages 45 to 54, with less than a high school diploma, making less than \$15,000 per year (Mississippi State Department of Health, 2014). Employee health programs have the potential to overreach barriers preventing access to health education and promotion by reaching individuals at the

workplace, and therefore, not requiring employees to devote much more time, money, or resources than they normally would simply to get to work.

With nearly 74 percent of all firms that provide health benefits to employees offering some type of wellness program, employee health in the United States is currently estimated to be an 8 billion dollar per year industry (Pollitz and Rae, 2015). Over the past five years, the employee health market grew at an average rate of 3.6 percent per year, which is forecast to continue growing over the next five years as companies attempt to lower healthcare costs (IBISWorld, 2015). The industry is currently characterized as being highly fragmented with a low level of market share and the top four companies making up only 14 percent of industry revenue in 2015 (IBISWorld, 2015).

Increasing demands for employee health programs in combination with the fragmented nature of the market suggests few barriers to entry. The greatest competitors include existing health insurance companies and businesses self-managing their own employee health programs.

Organizations such as the Mississippi Business Group on Health and the Mississippi Association of Self Insurers are viewed as potential partners rather than competitors. With each representing a coalition of employers who are either self-insured or interested in improving employee health practices, partnering with these types of organizations offers potential to leverage resources and provide additional services to coalition members at a potentially discounted rate.

Although employee health programs have steadily risen in popularity, implementation of programs has been extremely variable across the workforce, and therefore, the actual health outcomes and potential savings that result from employee health programs have been questioned repeatedly. In Mississippi, nearly 67 percent of worksites conduct wellness or health promotion activities; however, only 32 percent have a formal wellness policy (Mississippi Business Group on Health, 2015). Although many large employers are offering employee health programs, many models are limited in the scope and nature of program offerings. For example, approximately 20 percent of current employee health programs focus primarily on health screening while only 13 percent of programs are considered to be comprehensive (Pollitz and Rae, 2015). In addition, many programs are being terminated after facing barriers including a lack of financial resources to maintain their programs, regulatory burdens, and ineffective plan designs (Mattke et al., 2013). Lastly, only half of employers are conducting formal evaluations of their programs

making progress difficult to track (Mattke et al., 2013). Thus, the purpose of this comprehensive literature review was to determine employee health program best practices to maximize outcome and benefit potential and to propose an employee health program model for implementation in employers and communities throughout the state.

## Methods

The following databases were utilized to search and access relevant article: EBSCOhost, Academic Search Premier, JSTOR, and Google Scholar. Search terms used included “employee health,” “workplace wellness,” “employee health promotion,” “lay health advisor,” and “workplace health.” In addition, comprehensive reports that have been compiled on employee health, such as the *Workplace Wellness Programs Study* published in 2013 by the RAND Corporation and sponsored by the U.S. Departments of Labor and Health and Human Services, were reviewed and analyzed in depth. The findings of the literature review were used to identify current gaps within employee health programs and to develop and recommend employee health program strategies that are evidence-based and may prove crucial to employee health program success in Mississippi.

## Results

### A Social Solution

Based on existing research on employee health programs, a low-cost, comprehensive employee health program offering services to create healthy work environments and communities, combat obesity rates, and improve the health and quality of health of Mississippians is recommended. Establishment of this program as a blueprint-type model to be implemented in various employers throughout the state would provide an opportunity to expand employee health programs throughout Mississippi using an evidence-based model offered at a low cost. To achieve the greatest reduction in chronic disease rates and employer healthcare costs, this program, “Blueprint Health,” should provide a standardized model for implementation while using individual employer and employee data to customize the program to each employer’s specific needs.

Each program implemented from this model would aim to decrease the rate of preventable, obesity-related chronic diseases within the state workforce, creating a more robust and health-conscious environment throughout workplaces and communities. To accomplish these goals, Blueprint Health would personalize an extensive and sustainable employee health program to

employers and identify workplace “Health Champions” to be used as lay health advisors (LHA). Each program would be designed to provide (1) nutrition, physical activity, substance cessation, and behavioral change interventions in the workplace and (2) community partnerships to foster an environment of health within the community.

With approximately 64 percent of Mississippians holding self-insured health plans in 2011, the recommended target market includes self-insured employers in the three largest and most obese industry sectors in the state—healthcare and social assistance, manufacturing, and retail trade (Fronstin, 2015). Combined, these three sectors employ a total of 430,948 Mississippians accounting for 40 percent of the current labor force and nearly 15 percent of the entire state population (State Workforce Investment Board, 2015). The following six strategies are recommended as pillars of the Blueprint Health program model designed to combat obesity rates in Mississippi:

### Strategy 1: Expert Advisory Board

Program development should incorporate an expert advisory board of health professionals, community members, and other key informants relevant to the program to provide guidance in developing an evidence-based model that can be implemented in employers of various sizes and intensities. Program development should be theory-based, as previous interventions have shown greater success in using theory-based models (Abram et al., 2015).

According to the research, programs guided by the Social Cognitive Theory (SCT) have shown long-term and sustainable success in previous wellness programs (Anderson, Winett, and Wojcik, 2007). An employee health program using the SCT model should address the personal, behavioral, and environmental factors related to the main health behaviors contributing to chronic disease: nutrition, physical activity, and substance cessation (Anderko et al., 2012).

### Strategy 2: Disease Management

Utilizing theories of population health management (PHM), employee health programs should first aggregate patient data and conduct a comprehensive claim review to determine current and potential health costs for employers. Further, the health risk of individual employees should be stratified using a health risk assessment (HRA) to determine how employers can best utilize their current health insurance policies and incentives to align at-risk, willing employees with substance cessation, behavior change, and disease management programs. Offering

individualized disease management in a one-on-one counseling setting with employees determined to be at the highest risk was found to be a component of successful employee health programs in previous research findings (Goetzel and Ozminkowski, 2008). Successful employee health programs incorporating various disease management strategies can produce sustainable behavior change and decreased risk of chronic disease (Goetzel and Ozminkowski, 2008).

### Strategy 3: Health Champion Model

The LHA model employed to create workplace Health Champions (Figure 1) is research tested and includes the ability to find common ground between community health concerns and evidence-based healthcare, to adapt to changing demographics and emerging evidence, and to recruit and train new members to sustain efforts (Moore et. al, 2012).

### Strategy 4: Workplace Environment

To create successful and sustainable health practices and to complete the SCT model, the employee health program must also address the environmental factors contributing to health outcomes. Research has shown that the physical worksite environment is linked to employees' physical activity and dietary behaviors; health programs involving the company culture and environment are more likely to produce successful health outcomes than those that neglect the physical work environment (Goetzel and Ozminkowski, 2008). Upon program initiation, the workplace and community environment must be assessed to determine opportunities to improve health behaviors, such as the availability of healthy foods, opportunity for exercise, and regular access to healthcare. Organized by the health champions, plans will offer opportunities for employees and families to participate in nutrition education, workplace health challenges, and other health-related activities. Family involvement in similar employee health programs has shown positive outcomes in family physical activity, diet quality, and child and adult screen time, suggesting that employee health programs provide an opportunity to reach further into the family and home environment of employees (Sepulveda et. al, 2010).

### Strategy 5: Community Outreach

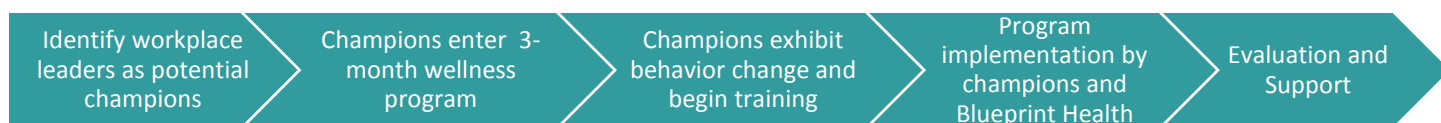
Previous research has shown that few, yet successful, health interventions involve community partnerships and address the community impact from these partnerships (Abram et al., 2015). Community resources provide a convenient and affordable means to acquiring health leaders and resources to use throughout employee health programs. These partnerships could also provide opportunities for the program and participating members to become involved in promoting a healthy community environment, a vital portion of the SCT model. Employee health programs should provide opportunities for LHAs to connect with local universities and health education programs to recruit community support and resources for additional program activities.

Community outreach and partnerships will also provide LHAs and program participants with opportunities to lobby for health-promoting environmental changes in the community and opportunities to arrange health promotion programs for community members in local churches, schools, or other community centers.

### Strategy 6: Program Evaluation

It is recommended that programs be assessed at baseline and evaluated at the end of year one based on the achievement of the three goals: (1) at least 80 percent initial participation of program employees (2) decrease of 10 percent in average employee health risk scores including a 5 percent decrease in total body weight for overweight/obese employees and (3) creation of a healthy environment measured by a score of 80 percent or higher on the CDC Worksite Health Scorecard (Centers for Disease Control and Prevention, 2014). As employees begin to reach benchmarks, based on health risk assessments and workplace environment scores, an opportunity to lower program cost per employee may be considered. High-risk employees willing to participate will be targeted for behavioral and disease management programs, while low-risk employees will have the opportunity to benefit from assessments, health promotion, and environmental changes. This pricing method should result in the greatest ROI as greater resources are directed to the employees most at risk.

Figure 1. Suggested Process to Identify and Train Workplace Champions Using a LHA Model



## Policy Recommendations

To encourage employee health programs and promote a decrease in obesity and chronic disease throughout the Mississippi workforce, certain policy changes are recommended. By requiring employers of 100 or more employees to either 1) implement an employee health program or 2) demonstrate a score of at least 80 percent on the CDC Worksite Health Scorecard, state policy could ensure that Mississippi employees are provided with a worksite environment to encourage, instead of hinder, their health. To further motivate employers to carry out employee health programs, tax incentives should also be offered for program implementation that includes key strategies such as disease management and ongoing program evaluation, saving the employer tax dollars and the state healthcare costs through improved employee health. Lastly, it is recommended that state policy encourages employers to provide employees with incentives for participation that are in adherence with the regulations that have been set forth by the Affordable Care Act, the Americans with Disabilities Act, and the United States Department of Labor.

## The Impact and Reach

Blueprint Health is strategically developed to positively impact employer healthcare costs and employee quality of life. With a successful business startup, Blueprint Health could accrue resources and staff to expand into a greater number of employers throughout the state. With program implementation in 75 percent of self-insured employers in the targeted industries throughout Mississippi, this model could reach 200,000 employees, promoting health and decreasing obesity-related chronic disease in the workforce, their families, and their communities, and potentially result in statewide healthcare savings of over \$1 billion (State Workforce Investment Board, 2015; Baicker, Cutler, and Song, 2010).

An innovative LHA model will ensure necessary long-term retention and continuation. Upon successful attainment of growth in employers throughout the state, employee health programs have the potential to promote healthcare as an economic driver in the state. Once the foundation has been laid within worksites, these programs may be further implemented into community settings, such as churches or community centers to improve health outcomes throughout the region. Community-based programming will not only support participating employees in making health-related behavior changes, but also promote health to those in the community who are economically

disadvantaged and unemployed. Following successful implementation of employee health programs reaching the majority of the Mississippi workforce and expanding into community settings, the state of Mississippi as a whole can expect an increase in healthy behaviors with the goal of a 5-10 percent decrease in body weight statewide, substantially lowering the prevalence of obesity-related chronic diseases in the state (Gregg et al., 2003). Further, implementation of this program in the majority of employers throughout the state would bring about 33% savings in employer healthcare costs, absenteeism, workers' compensation and disability management claims resulting in higher employee productivity and a more robust, educated workforce and an expanded state economy (Centers for Disease Control and Prevention, 2015b).

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