

# A Geospatial Analysis of Psychiatric Mental Health Nurses

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# Outline

- Mental Health
- Access to PMH-APRNs
- Objectives
- Data
- Methodology
- Results
- Summary and Implications

# Mental Health

- **26%** of all adults have mental illness or substance use disorders (NIMH, 2009).
- **6%** constitute serious disorders (Kessler, Chiu et al. 2005) that pose a profound and long term effect on the quality of life.
- Vulnerable to other illnesses resulting in a life span that is approximately **9 years** shorter than the general population (Cournos et al, 2005).
- Potential for chronic disability. In the National Comorbidity Survey Replication, Kessler, Berglund and colleagues found that the **50%** of all mental and/or substance use disorders started by **age 14** and **75%** by **age 24**.

# Access to PMH-APRNs

- Despite the high prevalence and impact of mental and substance use disorders, there are significant problems accessing treatment.
- Average delays in accessing mental health treatment are **over a decade** (Wang et al., 2005).
  - Stigma of mental illness.
  - Stymied by long wait lists and/or travel to find a provider due to an inadequate supply of mental health professionals (Thomas et al., 2009).
  - Uneven geographic distribution of providers.

# Objectives

- Understand the pattern of geographic distribution of Psychiatric Mental Health Advanced Practice Nurses (PMH APRNs)
  - One of the two mental health professional groups who can provide both **psychotherapy** and **prescriptive services**
- Describe rural-urban differences in the distribution of PMH-APRNs
- Discuss implications of the uneven geographic distribution of PMH-APRNs

# Data Sources

- American Nurses Credentialing Center's (ANCC) complete listing of employment zip codes of certified PMH APRNs in the year 2007
  - **n = 10452**
- In the same year, task force of the American Psychiatric Nurses Association (APNA) and the International Society of Psychiatric- Mental Health Nurses (ISPN) surveyed certified PMH-APRNs who provided e-mail addresses to the ANCC (Drew & Delaney, 2009).
  - **n = 1899**

# Data Sources

- Survey Data
  - Certification levels of PMH-APRNs
    - **Adult PMH Nurse Practitioner**
    - **Adult PMH Clinical Nurse Specialist**
    - **Child and Adolescent PMH Clinical Nurse Specialist**
    - **Family PMH Nurse Practitioner**
  - Information about employment (zip codes)
  - Demographic characteristics of PMH-APRNs
  - Treatment type
  - Types of patient treated



# Data Sources

- Geographic Information Science (GIS)  
**boundary files** from ESRI's TIGER Line data
  - Zip Codes
  - County
  - State
- **Rural-Urban** classification for counties from National Center for Health Statistics (NCHS).

# Methodology

- Joining the datasets

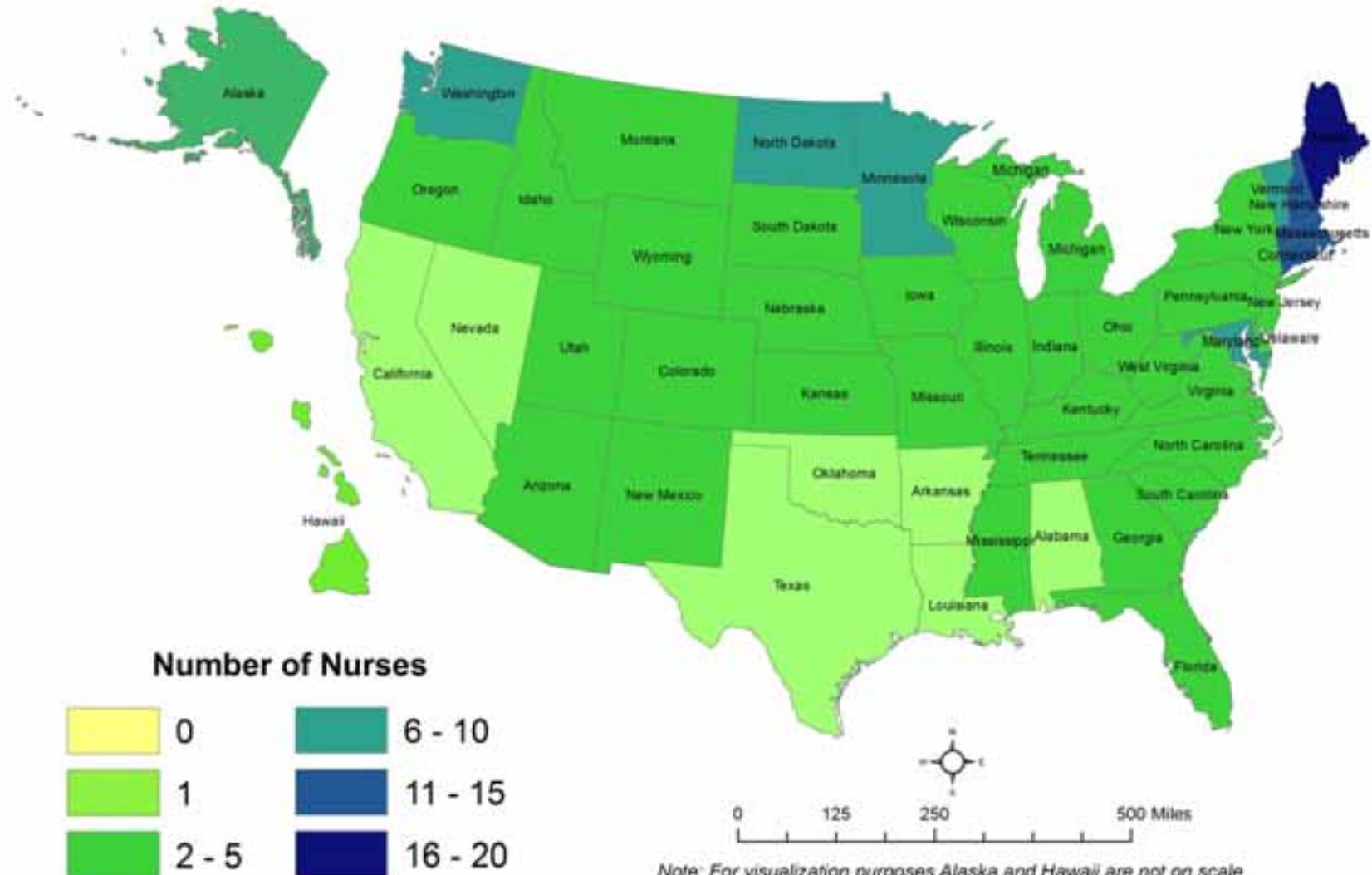


# Methodology

- Spatial Exploratory Data Analysis (ESDA)
  - Using ESRI's ArcGIS 9.3.1 mapping the distribution of PMH-APRNs at **state** and **county** level
  - Rural-Urban distribution of PMH-APRNs using the **hot-spot cluster analysis** technique of ArcGIS and R statistical software package
- Demographic analysis of PMH-APRNs using the R statistical software package

# Results ~ ESDA

Spatial Distribution of Certified Psychiatric Mental Health Nurses per 100,000 population

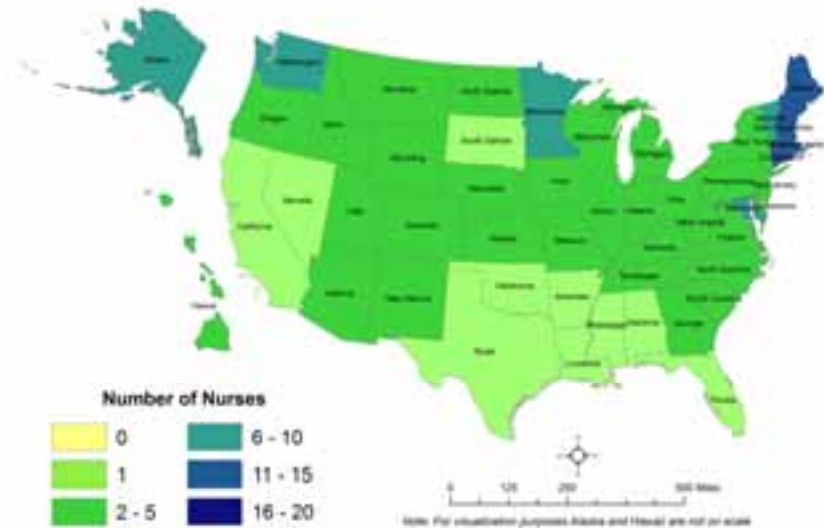


# Results ~ ESDA

**Spatial Distribution of Psychiatric Mental Health (PMH) Nurses**  
 Certification Level: Adult PMH Nurse Practitioner per 100,000 population of 13 years and older



**Spatial Distribution of Psychiatric Mental Health (PMH) Nurses**  
 Certification Level: Adult PMH Clinical Nurse Specialist per 100,000 population of 18 years and older



**Spatial Distribution of Psychiatric Mental Health (PMH) Nurses**  
 Certification Level: Child and Adolescent PMH Clinical Nurse Specialist per 100,000 population of 17 years and younger

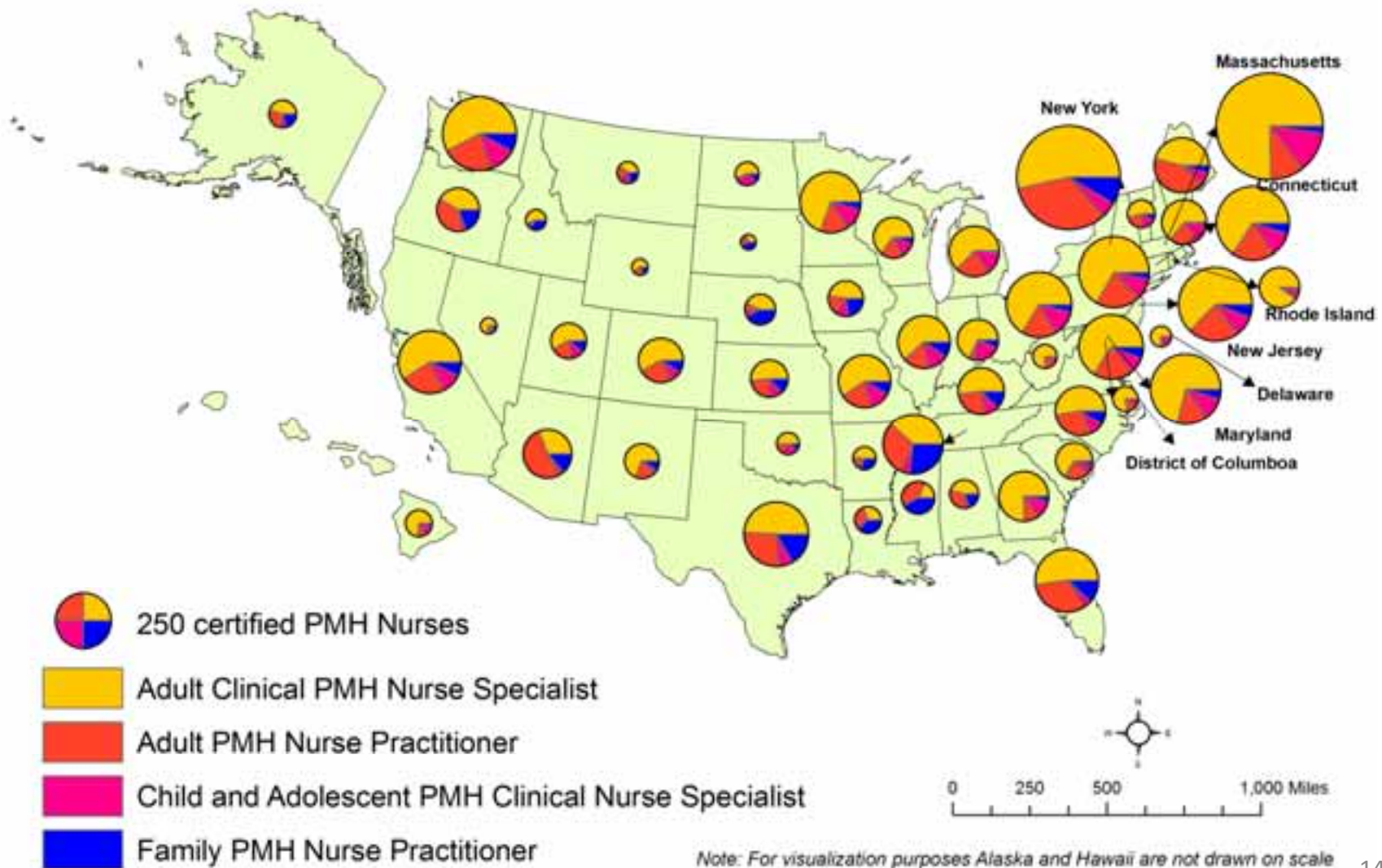


**Spatial Distribution of Psychiatric Mental Health (PMH) Nurses**  
 Certification Level: Family PMH Nurse Practitioner per 100,000 population



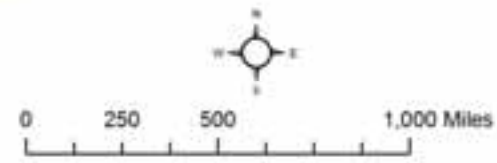
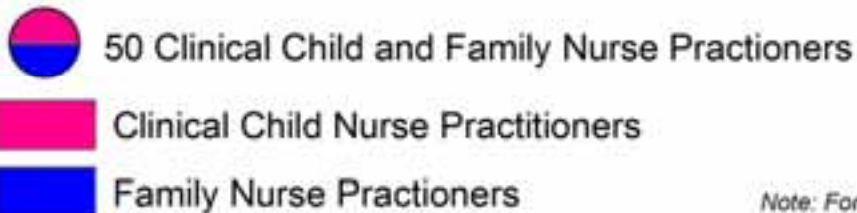
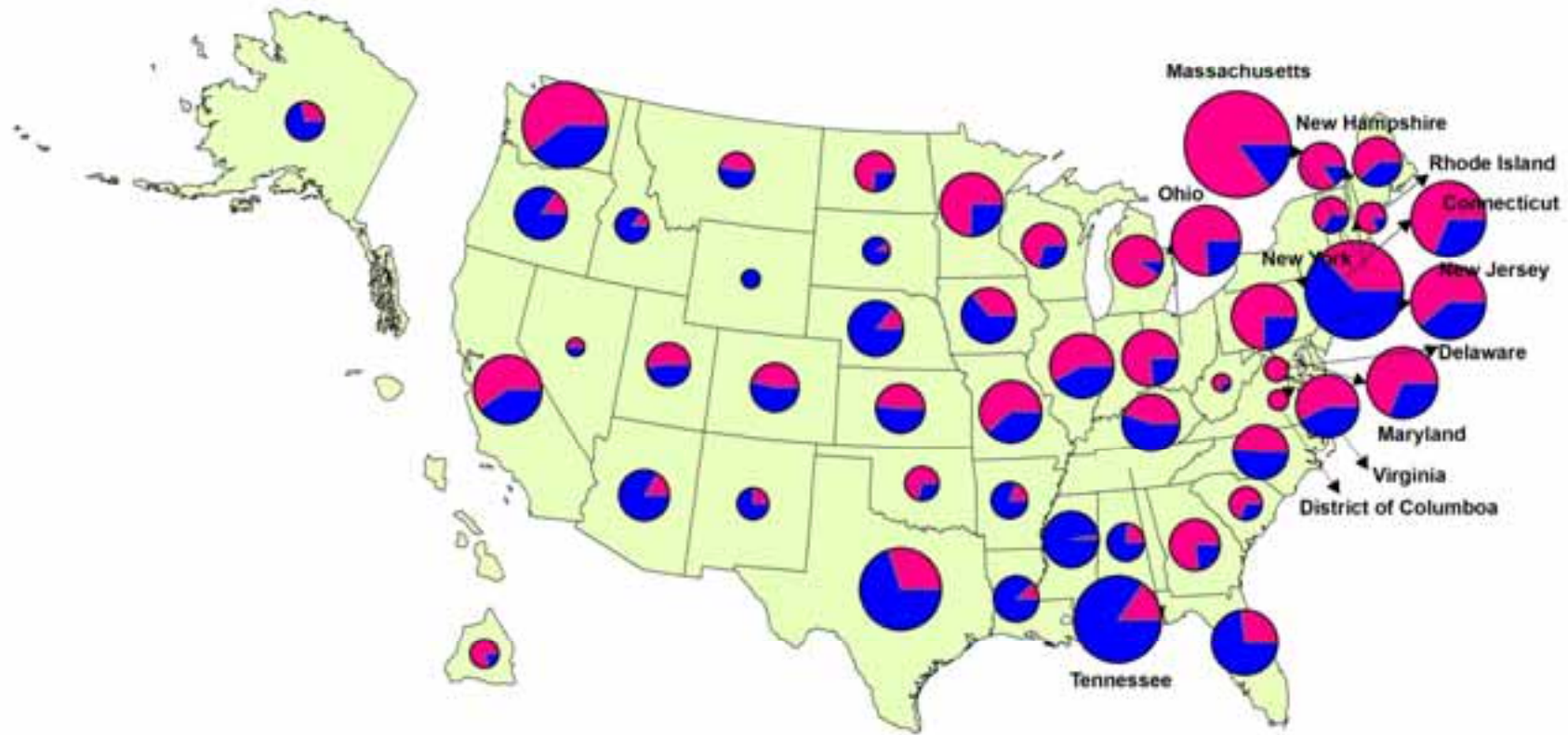
# Results ~ ESDA

Proportion of Four Certification levels of Psychiatric Mental Health (PMH) Nurses to the total number of certified PMH Nurses



# Results ~ ESDA

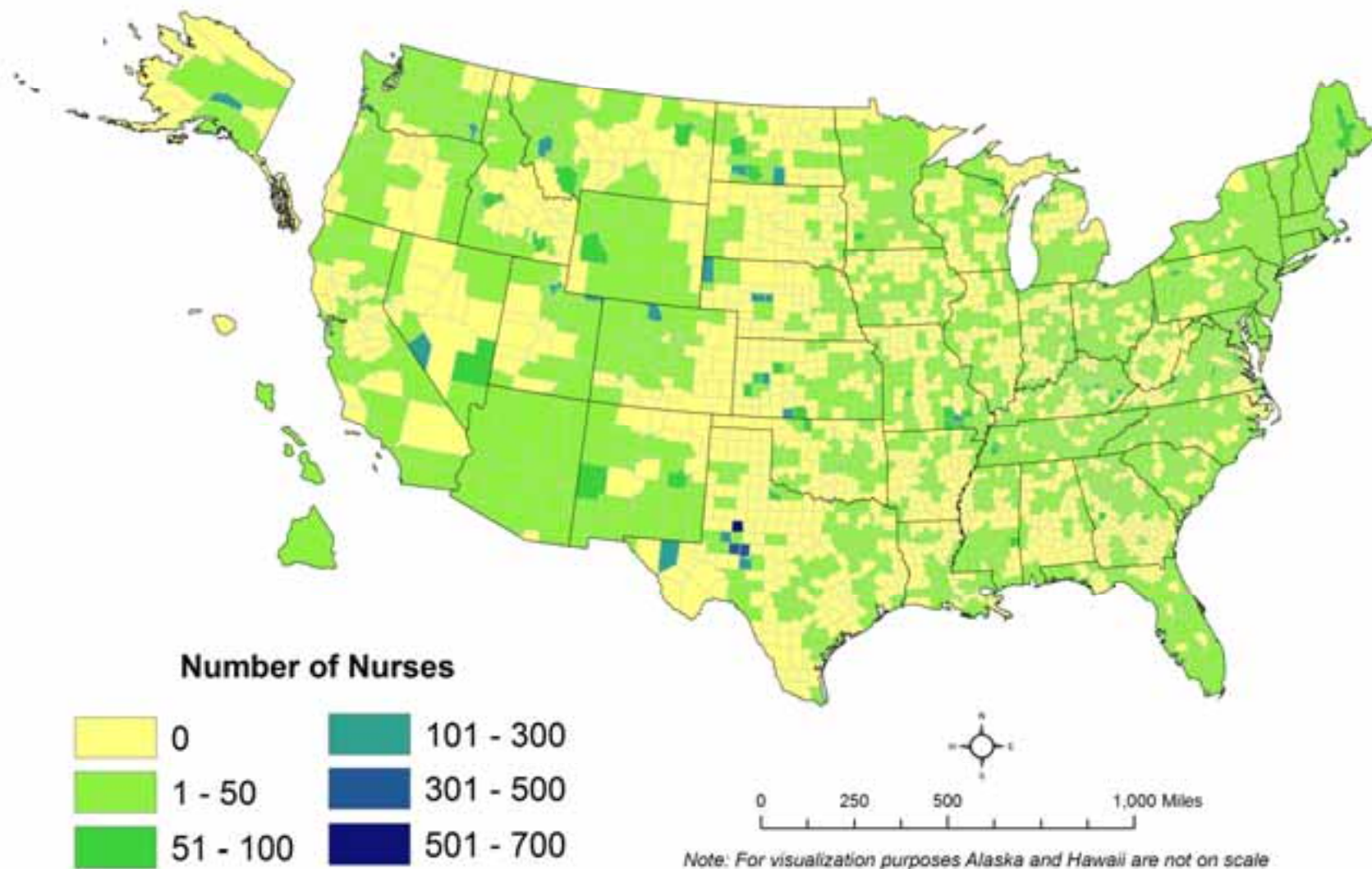
Proportion of Two Certification levels of Psychiatric Mental Health Nurses  
Levels: Clinical Child and Family Nurse Practitioners



Note: For visualization purposes Alaska and Hawaii are not drawn on scale

# Results ~ ESDA

**Spatial Distribution of Certified Psychiatric Mental Health Nurses per 100,000 population**



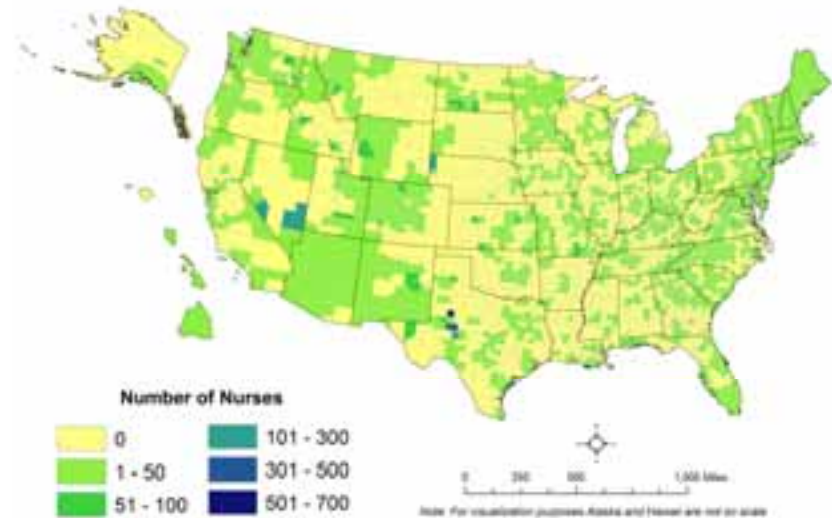


# Results ~ ESDA

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 Certification Level: Child and Adolescent PMH Clinical Nurse Specialist per 100,000 population of 17 years and younger



**Spatial Distribution of Psychiatric Mental Health (PMH) Nurses**  
 Certification Level: Family PMH Nurse Practitioner per 100,000 population

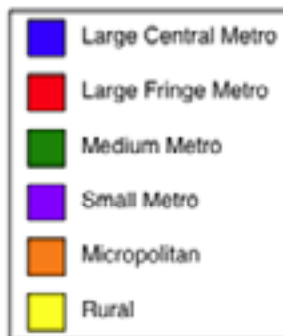
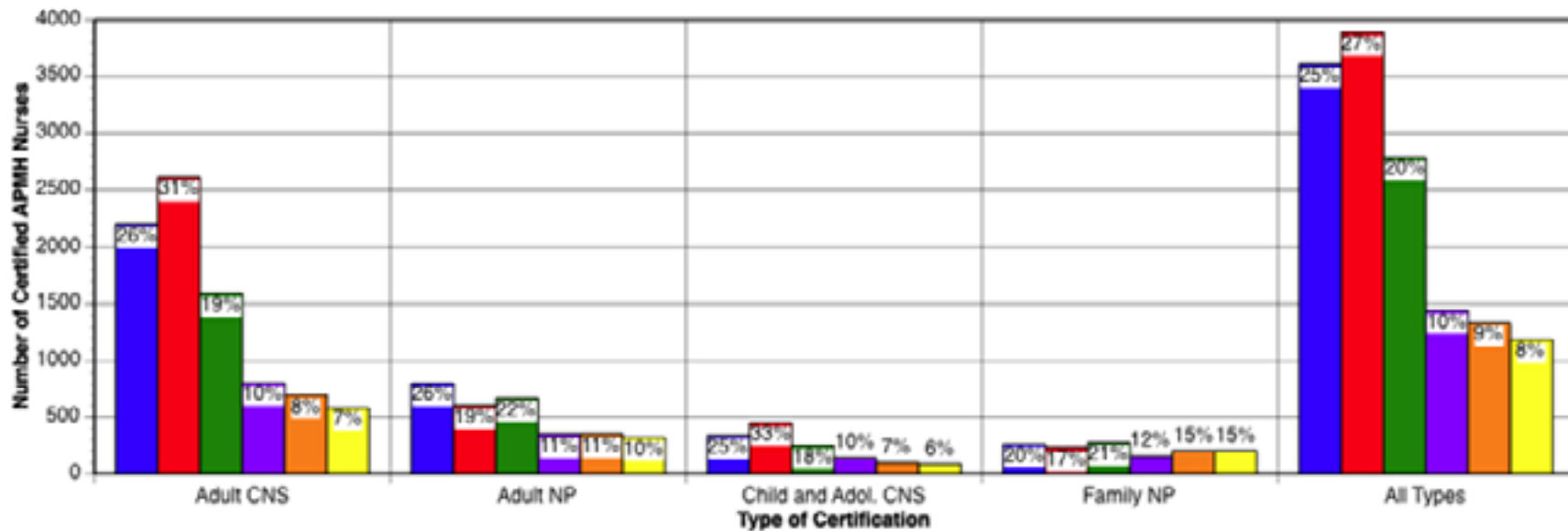


# Results ~ Urban-Rural

Urban-Rural Category	Description
<b>Urban</b>	
<b>Large Central Metro</b>	Counties in a metropolitan statistical area of 1 million or more population: 1) that contain the entire population of the largest principal city of the metropolitan statistical area, or 2) whose entire population resides in the largest principal city of the metropolitan statistical area, or 3) that contain at least 250,000 of the population of any principal city in the metropolitan statistical area
<b>Large Fringe Metro</b>	Counties in a metropolitan statistical area of 1 million or more population that do not qualify as large central
<b>Medium Metro</b>	Counties in a metropolitan statistical area of 250,000 to 999,999 population
<b>Small Metro</b>	Counties in a metropolitan statistical area of 50,000 to 249,999 population
<b>Rural</b>	
<b>Micropolitan</b>	Counties in a micropolitan statistical area
<b>Noncore</b>	Counties that are neither metropolitan nor micropolitan

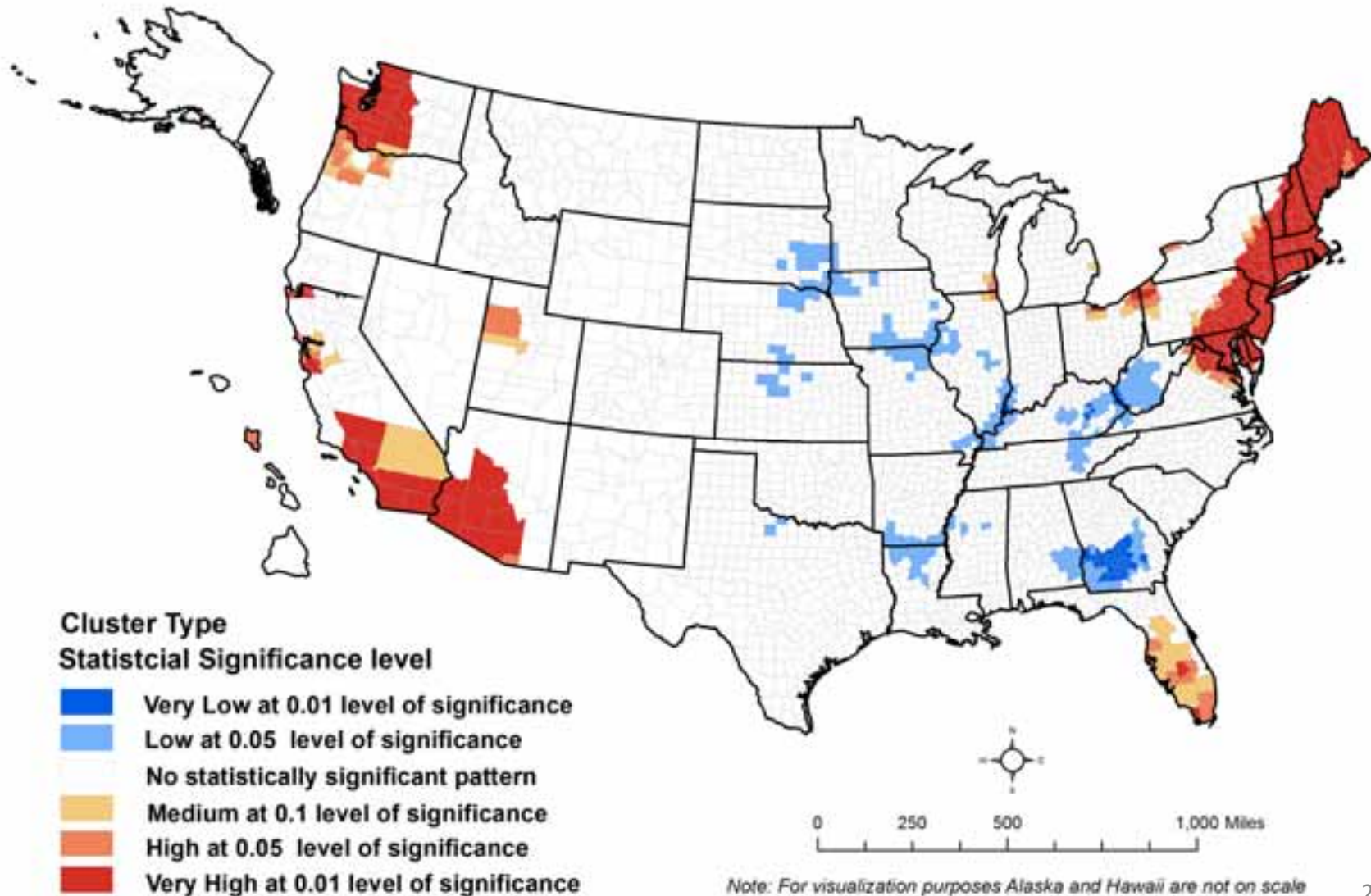
# Results ~ Urban-Rural Distribution

## Urban-Rural Distribution of PMH-APRNs

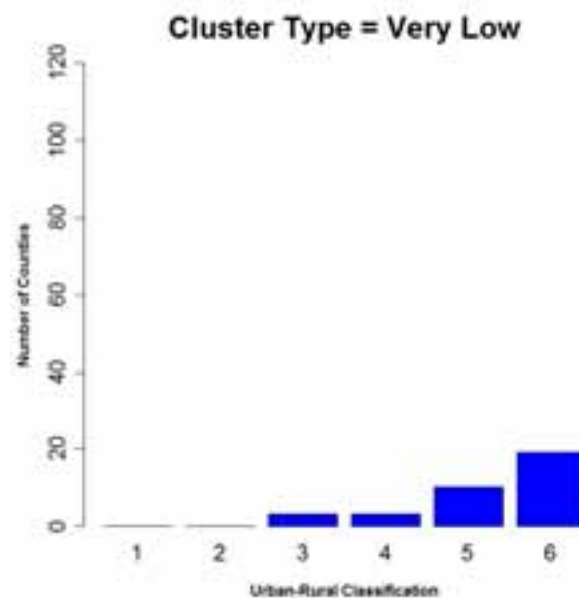
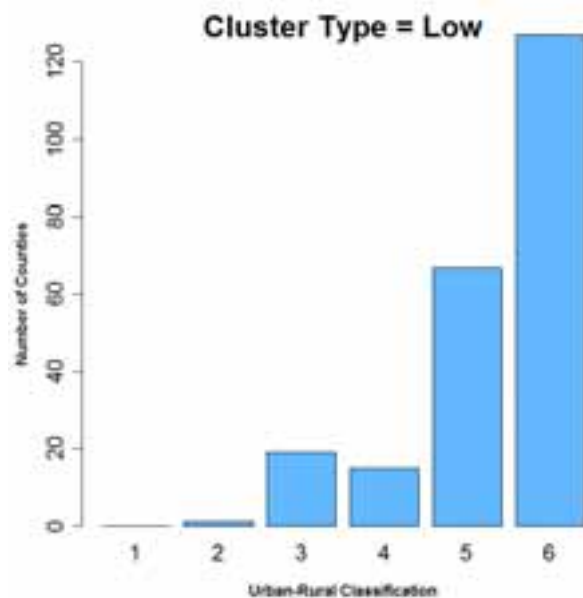
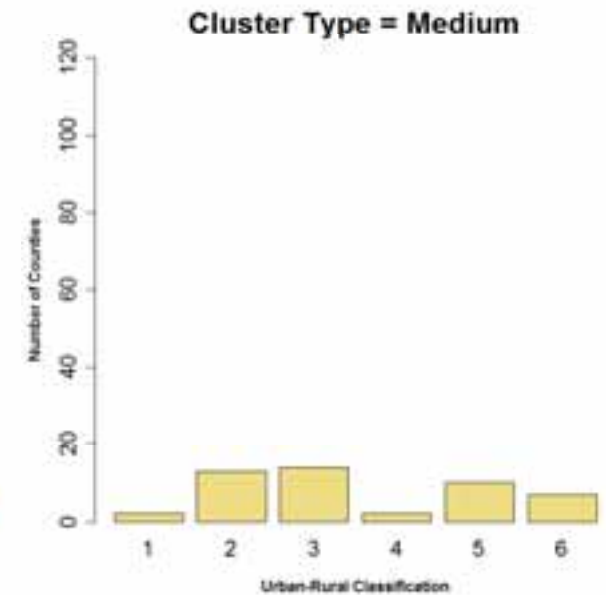
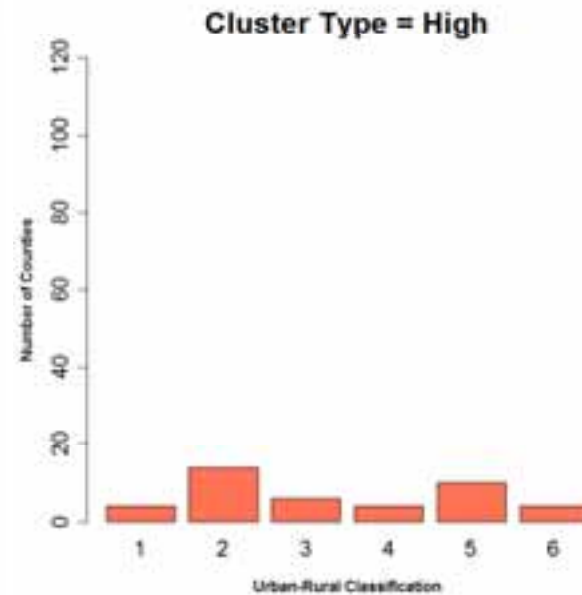
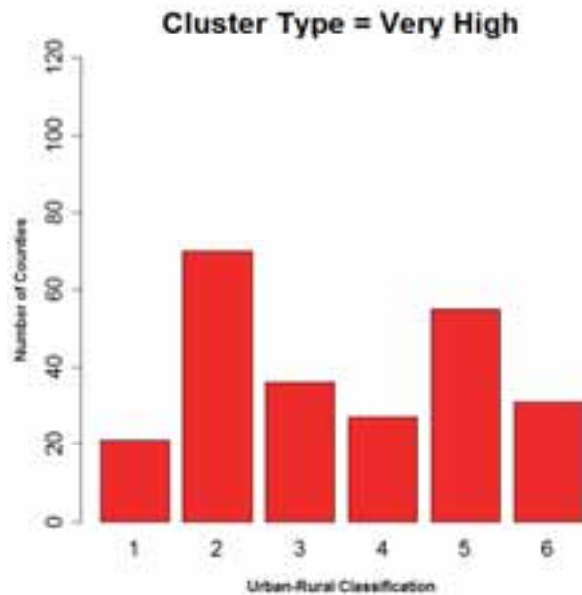


# Results ~ Cluster Analysis

## Clustering pattern of Certified Psychiatric Mental Health Nurses



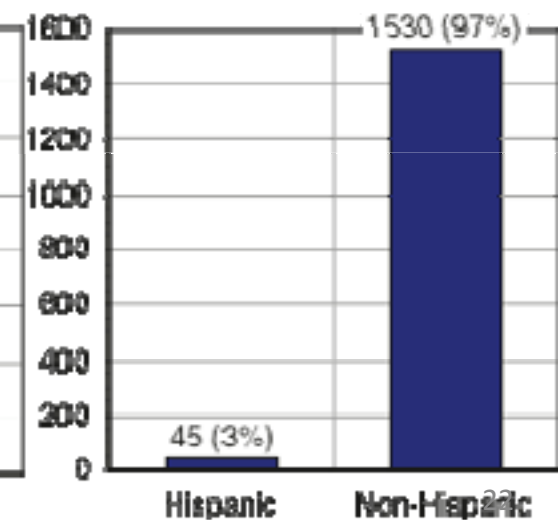
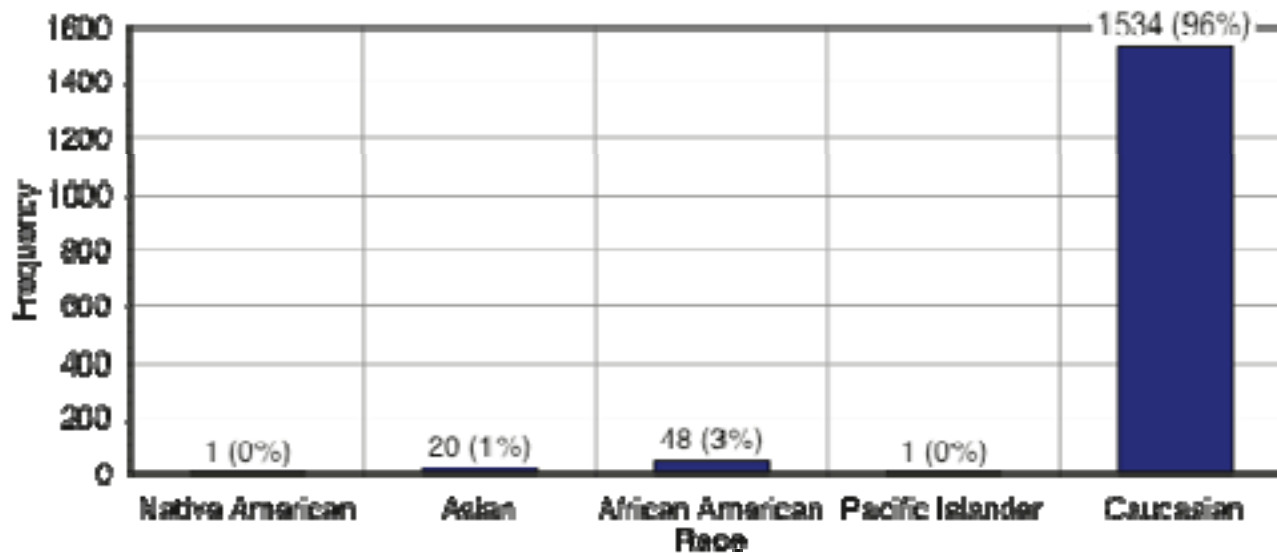
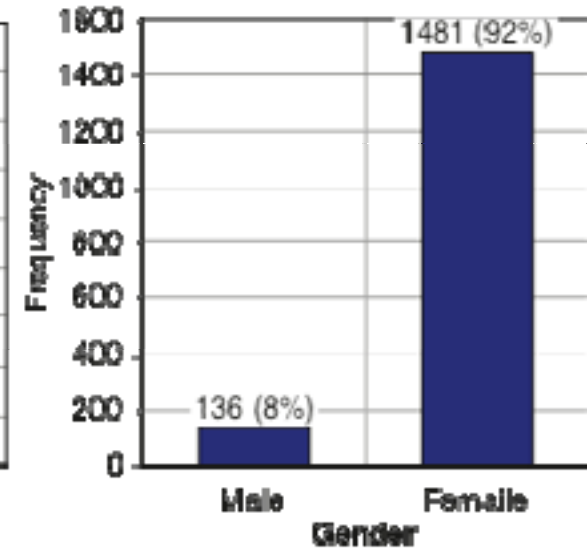
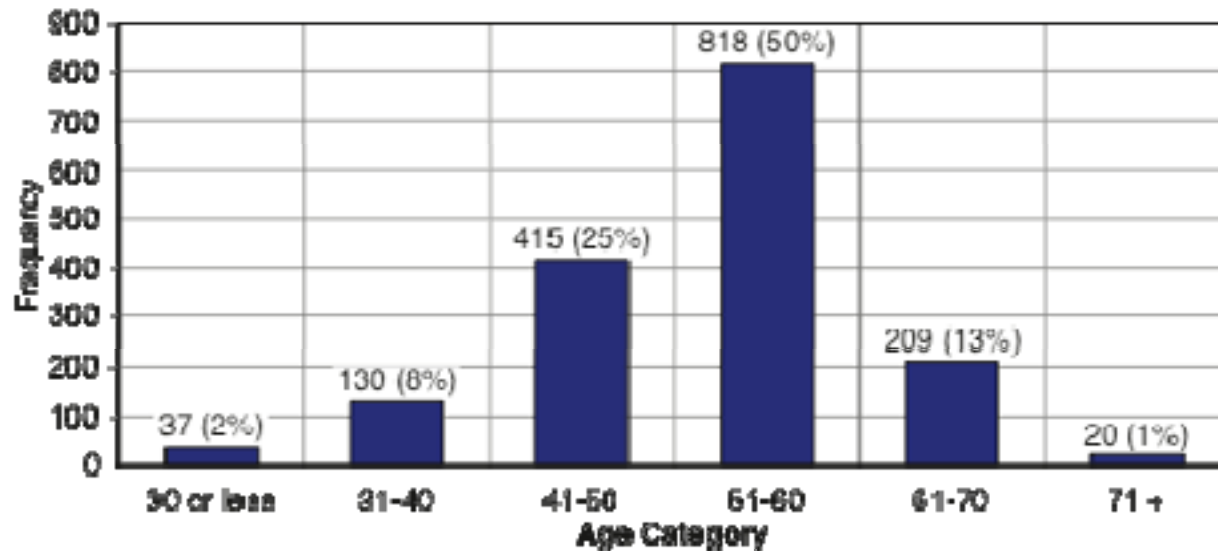
# Results ~ Cluster Analysis



- 1 – Large Central Metro
- 2 – Large Fringe Metro
- 3 – Medium Metro
- 4 – Small Metro
- 5 – Micropolitan (Rural)
- 6 – Rural

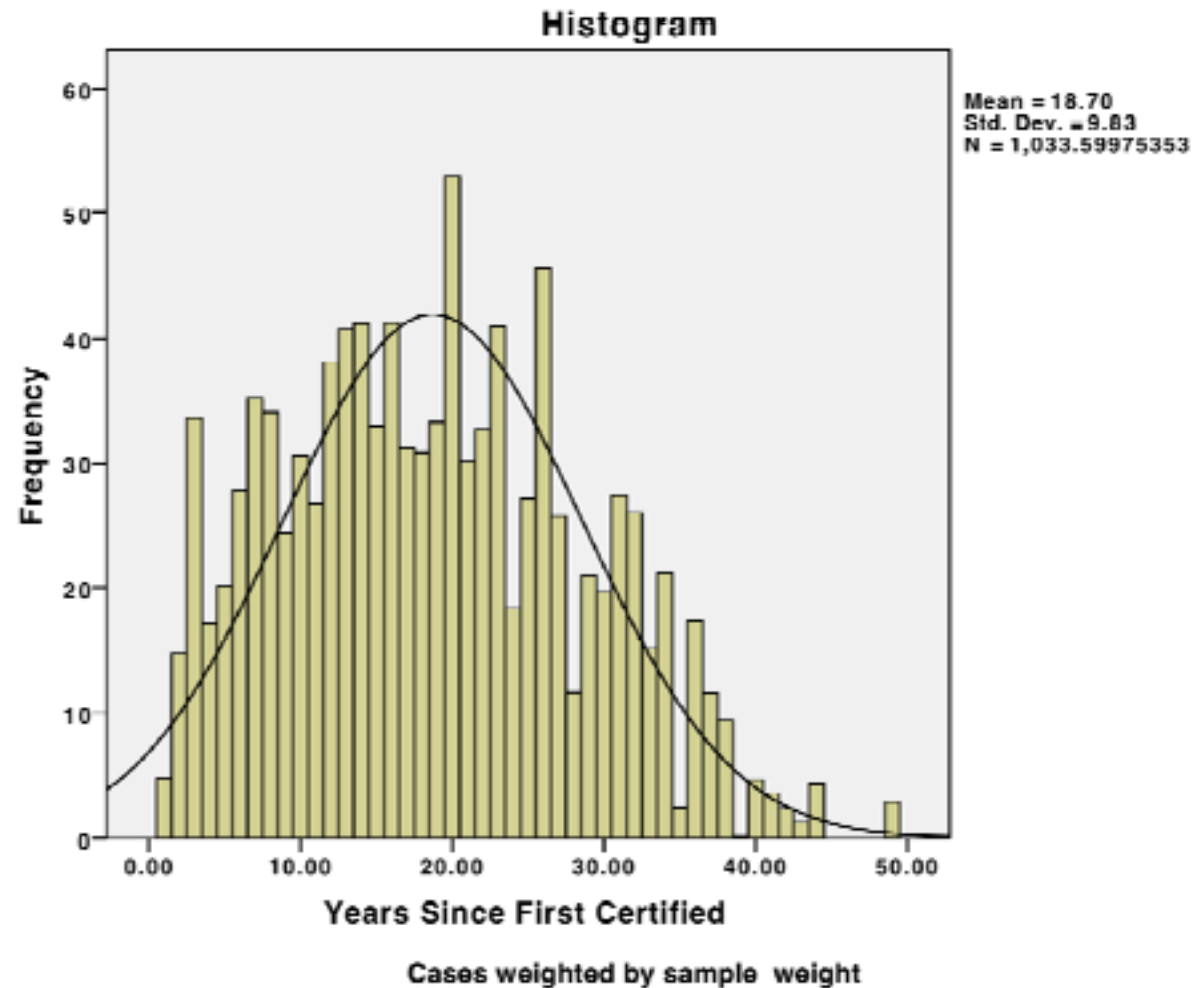
# Results ~ Demographics of PMH-APRNs

## Age, Gender, and Race/Ethnicity (from Task Force survey)



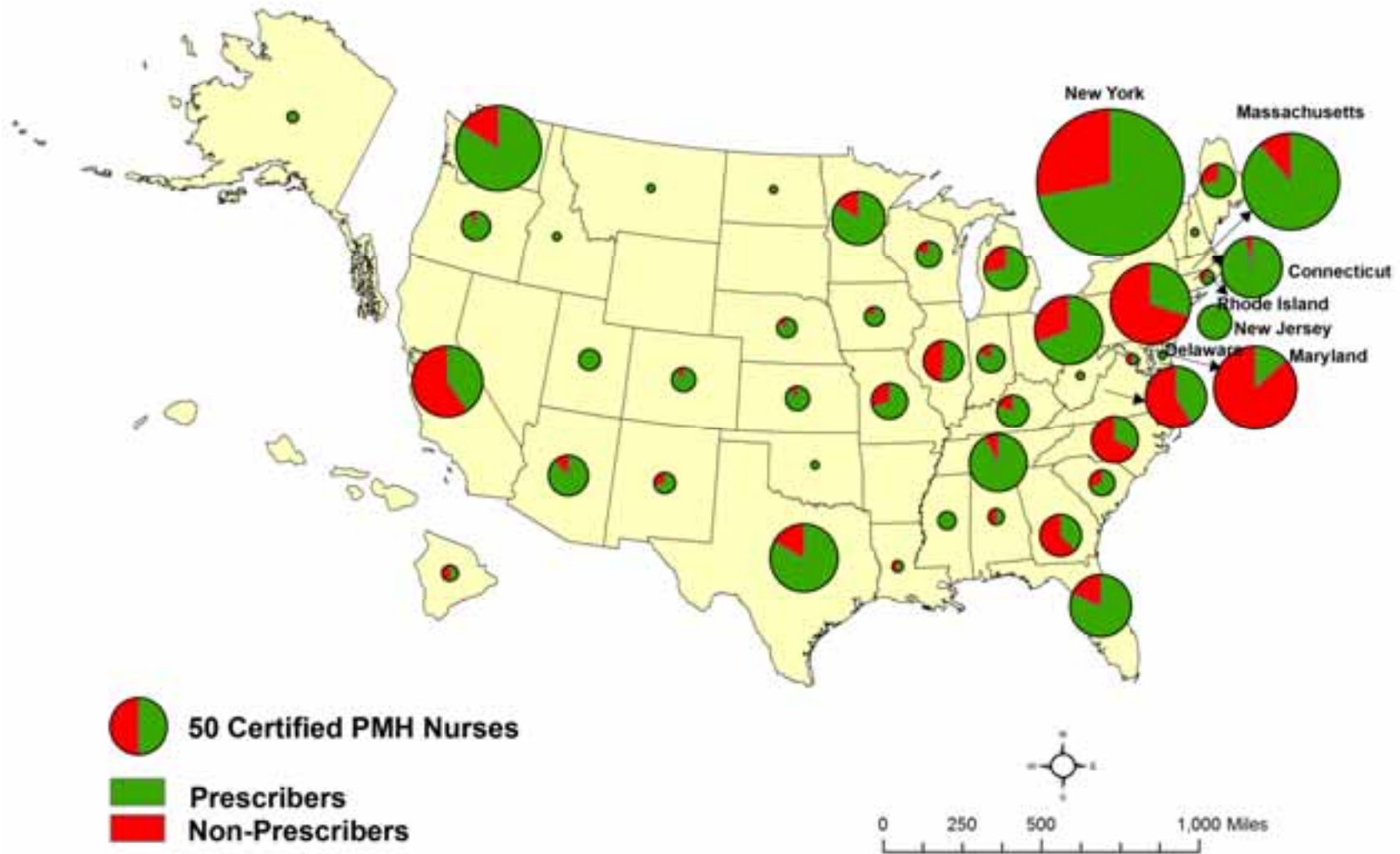
# Results ~ Demographics of PMH-APRNs

## Years Since First Certified PMH APRN (from Task Force survey)



# Results ~ Treatment

Proportion of Prescriber Vs Non-Prescriber Psychiatric Mental Health Nurses  
Data: Weighted Results from the Task Force Survey



Note: For visualization purposes Alaska and Hawaii are not drawn on scale 24



# Summary

- **Uneven geographic distribution** of PMH-APRNs:
  - Significantly higher proportion of workforce in the northeastern United States
  - Very low numbers in the states of Alabama, Oklahoma, Louisiana, and the Appalachian region.
- Rural-urban differences in the distribution are illustrated with **significantly fewer** PMH-APRNs employed in **rural** versus urban areas.
- Based on the survey data
  - more than **50%** of PMH-APRNs are in the age group of **51-60 years**
  - **90%** of the workforce are **white**
  - PMH-APRNs who **prescribe** are also **unevenly distributed** across the states

# Implications

- Disparities in access to mental health services can, in part, be addressed
  - Increasing the number of applicants to PMH APRN educational programs
  - Development of additional graduate programs, extension of program offerings into rural areas, and/or collaboration of universities to share resources
  - Intensification of recruitment of RNs into PMH graduate programs
  - Increased financial support to graduate students

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