Current and future demographics of the Veteran population, 2014–2024

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VA health care assessment

- The Department of Veterans Affairs (VA) provides health care to eligible Veterans
- The Veterans Access, Choice, and Accountability Act of 2014 aimed to improve access to high-quality health care
  - It called for an independent assessment of VA's health care delivery systems and management processes
  - One of the requirements was to estimate current and projected demographics of Veterans

Objectives

- Project the Veteran population from 2014 to 2024 and their geographic distribution
  - Surveys collect information on Veterans, but no full national accounting since 2000 Census
- Describe the demographic characteristics of Veterans
  - Age, sex, race/ethnicity, service era, geographic distribution (PUMA level)

Projections for each service era

- Pre-1950
- Korean War: July 1950–January 1955
- Pre-Vietnam: February 1955–July 1964
- Vietnam: August 1964–April 1975
- Post-Vietnam: May 1975–July 1990
- Gulf War: August 1990–August 2001
- Post-9/11: September 2001 or later

Data

- 2000 Census is used as the baseline Veteran population
  - Age, sex, race/ethnicity, service era
- U.S. Defense Manpower Data Center (DMDC)
  - Age, sex, race/ethnicity, location of accession, anticipated loss date
- American Community Survey (ACS)
  - 5-year estimates: 2005–09, 2009–13
  - American FactFinder (U.S. Census Bureau)
  - Prior to 2005, no information about residence in previous year (migration)

ACS specificities

- Undercounts number of Veterans
  - We used 2000 Census and estimated Veterans who would be alive in 2013
  - Number is equivalent to 2013 ACS estimates
  - ACS undercounts new Veterans who entered the population from 2000 to 2013
- Captures distribution of Veterans by age, sex, race/ethnicity, service era, location
- Determines Veteran geographic distribution and migration patterns

Population projection

- Standard cohort component model
  - U.S. Census Bureau's Rural and Urban Projection software
  - 2000 Census provides counts of Veterans
- "Births" and mortality
  - New Veterans (DMDC): 2000–24
  - Apply mortality rates (VA, CDC): 2000–24
  - Estimate national Veteran population: 2005–24
- Distribute national projections into PUMAs (ACS)
- Adjust initial projections by migration (ACS)

Mortality rates

- 2014 Veteran population mortality rates
  - Department of Veterans Affairs (VA)
  - By age, sex, but not race/ethnicity
- 2011 rates by race/ethnicity
  - Centers for Disease Control and Prevention (CDC)
- Derive race/ethnicity rates based on CDC that reflect overall VA rates

Steps to estimate mortality rates (1/3)

- Calculate the proportion of Veterans by race/ethnicity in each age group
- Multiply this proportion by national rates:

Proportions of Veterans * CDC mortality rates

  - These are standardized rates for Veterans if they had the same rates as civilians by age-sex-race/ethnicity

- Aggregate standardized rates by age-sex:

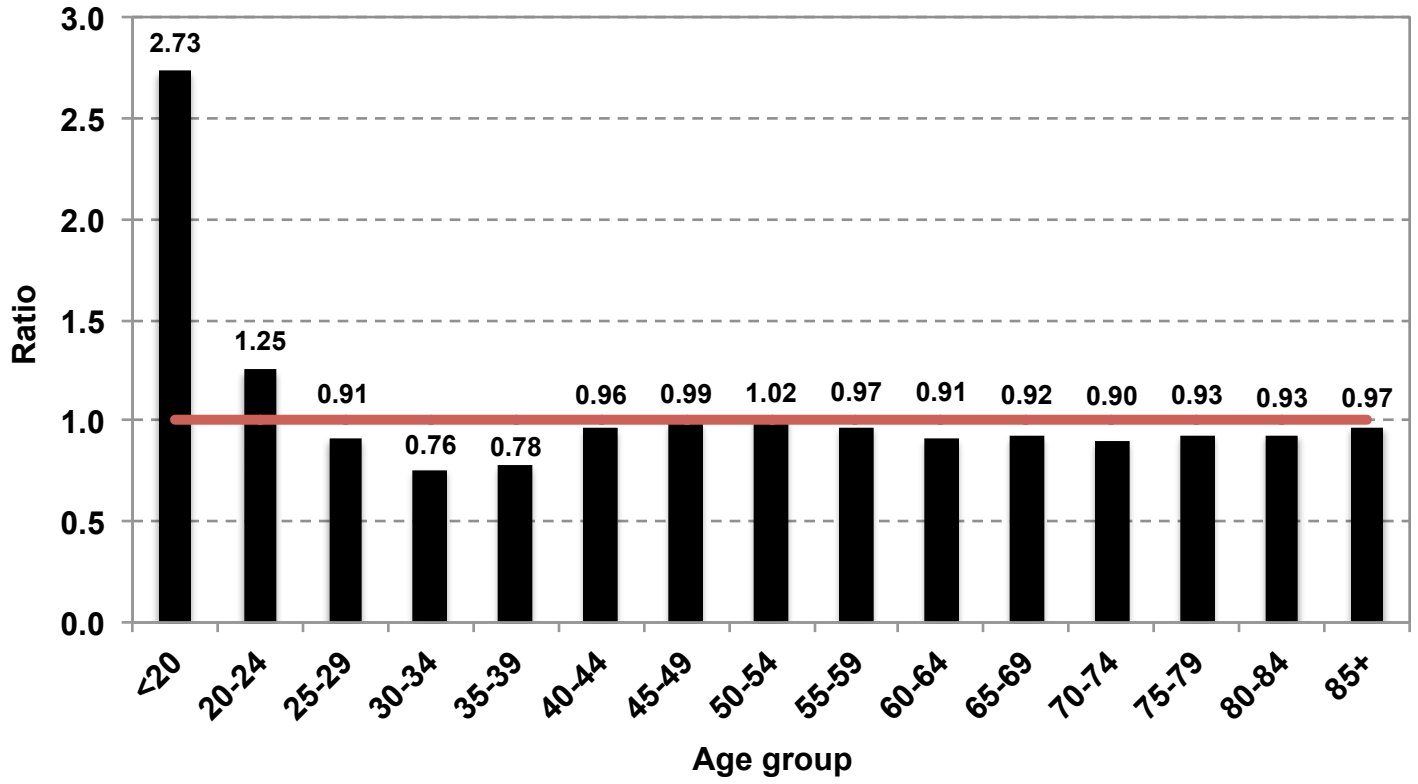
sum within each age-sex (Proportions of Veterans * CDC rates)

- Compare VA rates to standardized rates:

VA rates / standardized rates

Steps to estimate mortality rates (2/3)

- Ratio of observed Veteran mortality rate to the standardized rate



Steps to estimate mortality rates (3/3)

- Multiply the civilian race/ethnicity rates by this ratio at each age-sex
- We assume that the inflation/deflation factor by age-sex is the same for each race/ethnicity

National projection (apply “births” and mortality)

2000 Census & 2000 DMDC Population data

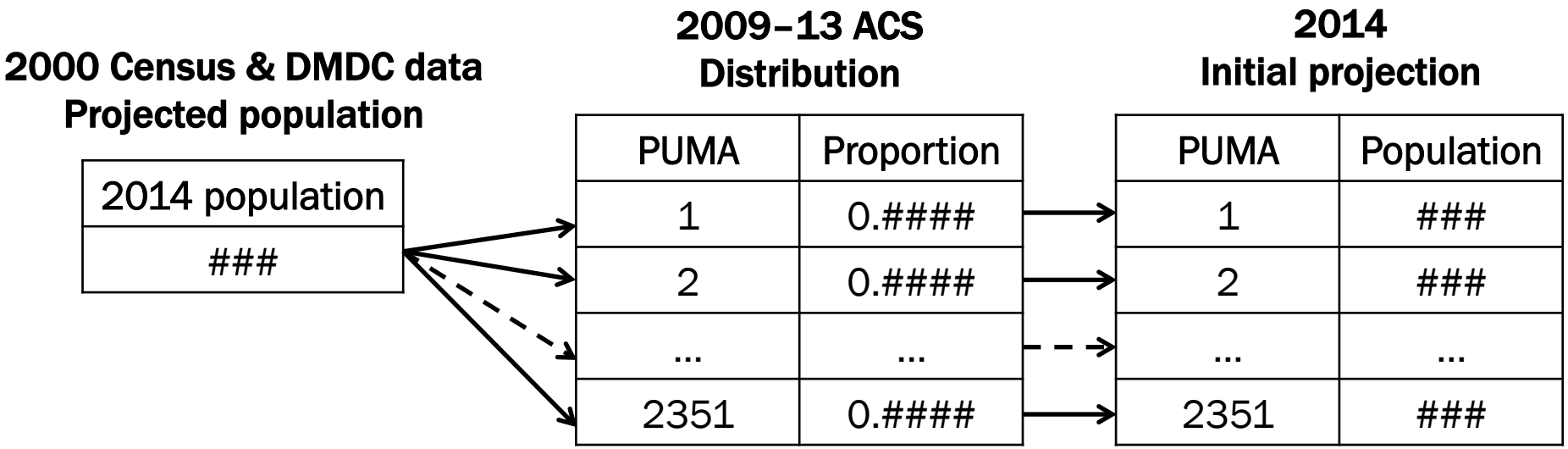
Each cell has number of Veterans by 5-year age group, sex, race/ethnicity, service era

- Apply mortality rates from 2000 to 2001
- Add DMDC data in 2001
- Apply mortality rates from 2001 to 2002
- Add DMDC data in 2002
- …

2000 population
###

2001 population	…	2014 population	…	2024 population
###	…	###	…	###

Distribute national projection into PUMAs: 2014 example



- Assumption: ACS captures geographic distribution
- By 5-year age group, sex, race/ethnicity, service era

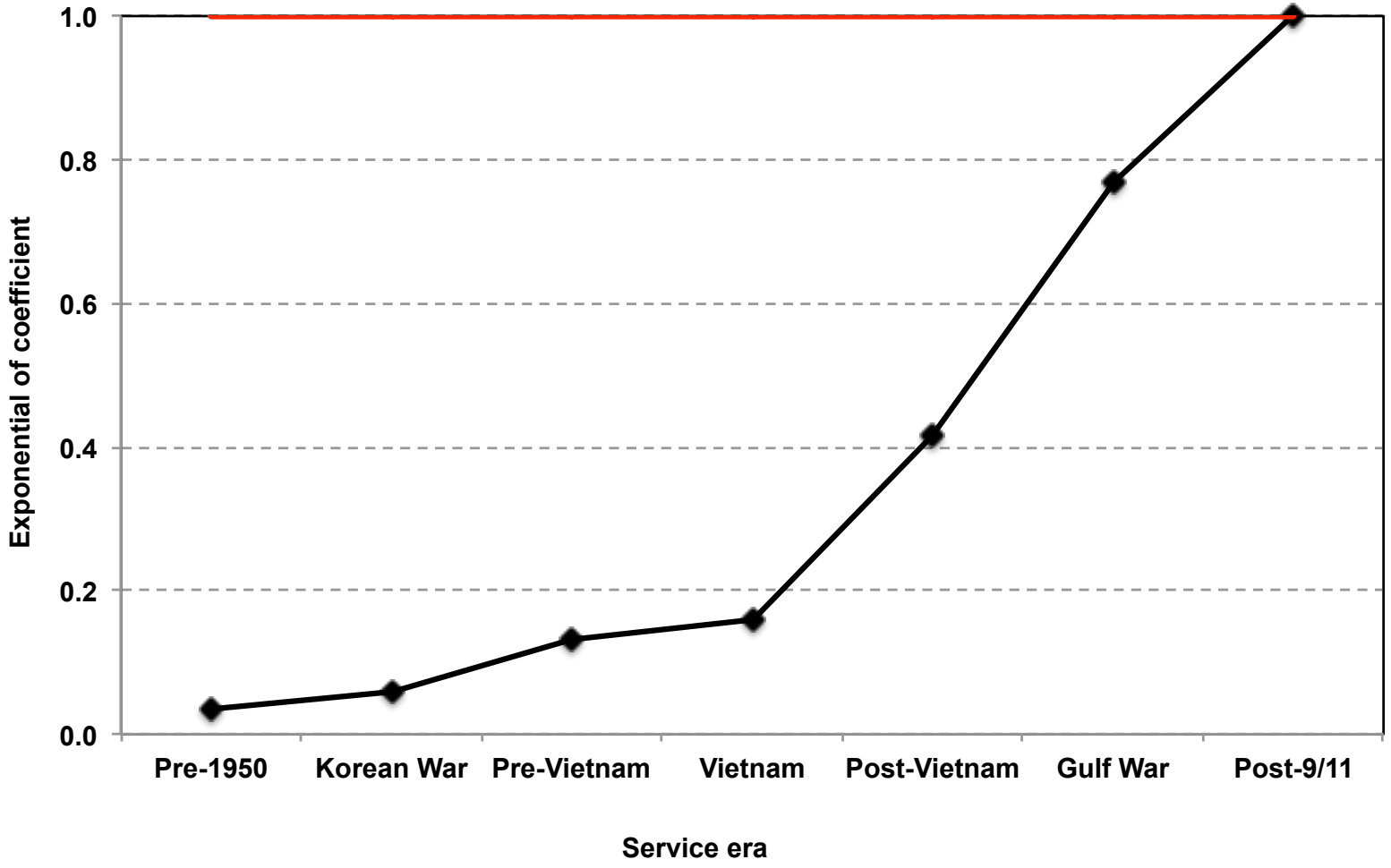
Migration procedures

- Disaggregate PUMA groups in previous year
  - Correspondence files in IPUMS-USA website
- Convert 2009-11 PUMAs into 2010 codes
  - Engine by Missouri Census Data Center
- Gravity models (2009-13)
  - Predict in- and out-migration with distance and other covariates
- Apply predicted rates to 2014 projection
  - Generate number of in- and out-migrants
  - Adjust in-migrants to generate null net migration

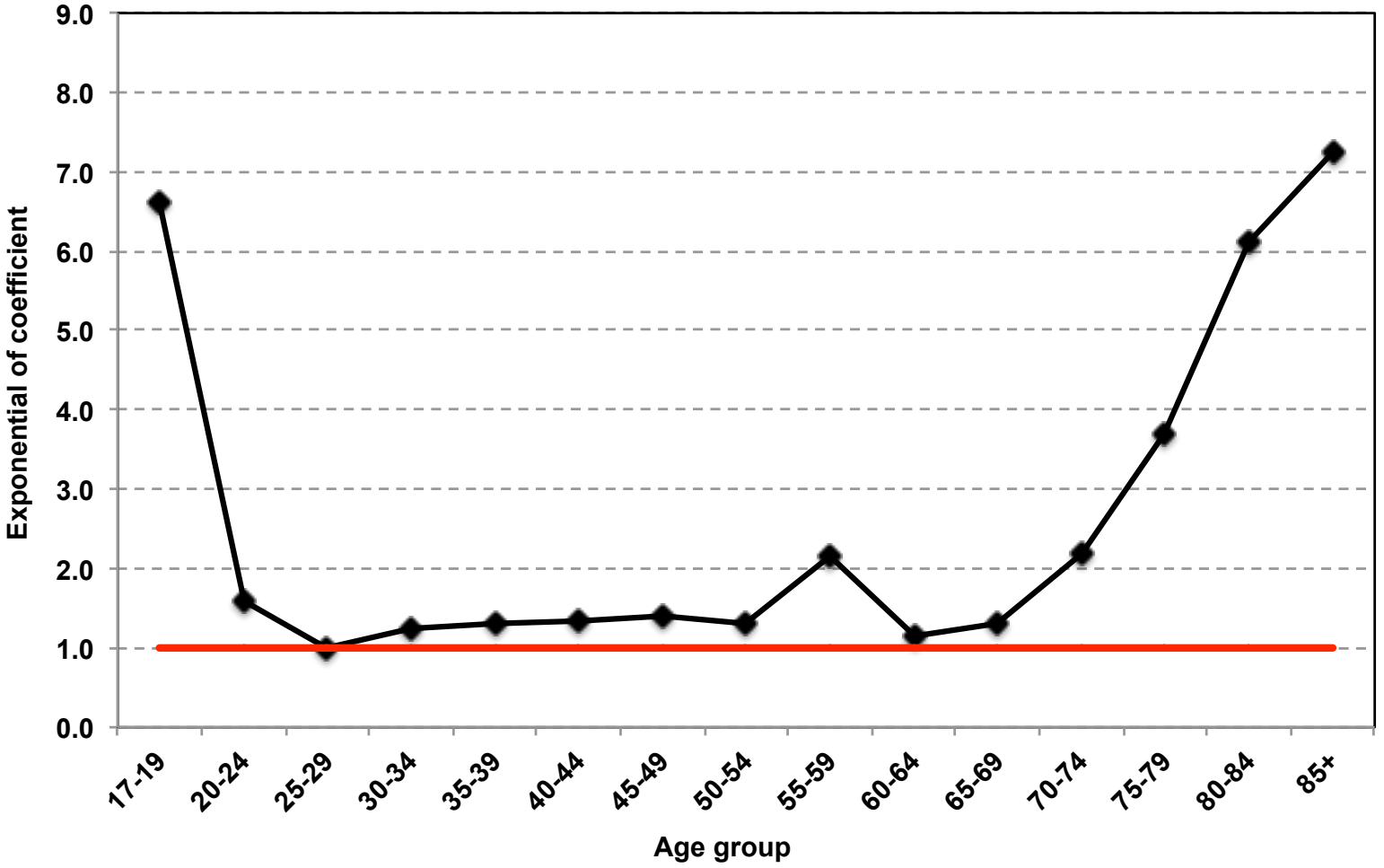
Gravity models

- These models predict in- and out-migration
  - Distance is expected to play an intervening role on the levels of population flows
- Zero-inflated Poisson regressions (2009-13)
  - Migration as a function of squared distance, sex, service era, age, race/ethnicity
  - Dummy indicates whether cell has zero migrants to control for high prevalence of cells with zero counts of migrants
  - Populations of origin/destination as exposure

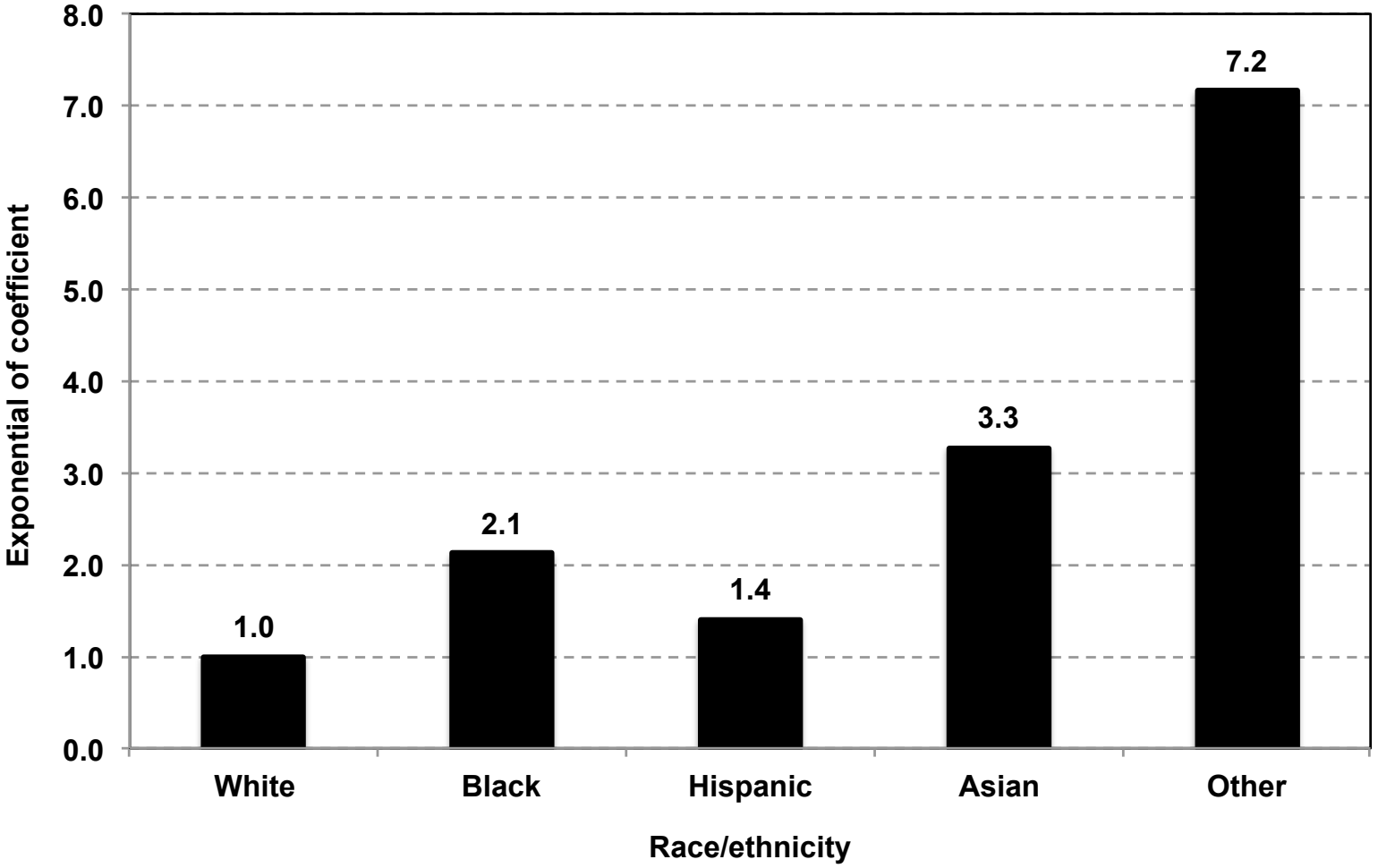
Results of service era for out-migration



Results of age group for out-migration



Results of race/ethnicity for out-migration



Number of in- and out-migrants

- Apply predicted rates from previous models to 2014 projection
- Generate number of in- and out-migrants
- Adjust in-migrants…

Adjust in-migrants

- Net migration equals zero in each year

Adjusted In-mig = In-mig * Sum out-mig / Sum in-mig

- Assumption: out-migration counts are more accurate than in-migration counts
  - Out-migration based on residence in previous year (PUMA group)
    - We allocated migrants at the beginning of period into PUMAs within group
    - This gives higher chance of all cells having migrants
  - In-migration based on information at PUMA level
    - This might generate more cells with small counts

Migration: final projection

2014
Number of in-migrants
(estimated with ACS rates and initial projection)

PUMA	Number of in-migrants
1	###
2	###
…	…
2351	###

2014
Number of out-migrants
(estimated with ACS rates and initial projection)

PUMA 1-year ago	Number of out-migrants
1	###
2	###
…	…
2351	###

2014
Initial projection

PUMA	Population
1	###
2	###
…	…
2351	###

2014
Final projection
(after migration)

PUMA	Population	Net migration	Population after mig.
1	###	+/- ###	###
2	###	+/- ###	###
…	…	…	…
2351	###	+/- ###	###

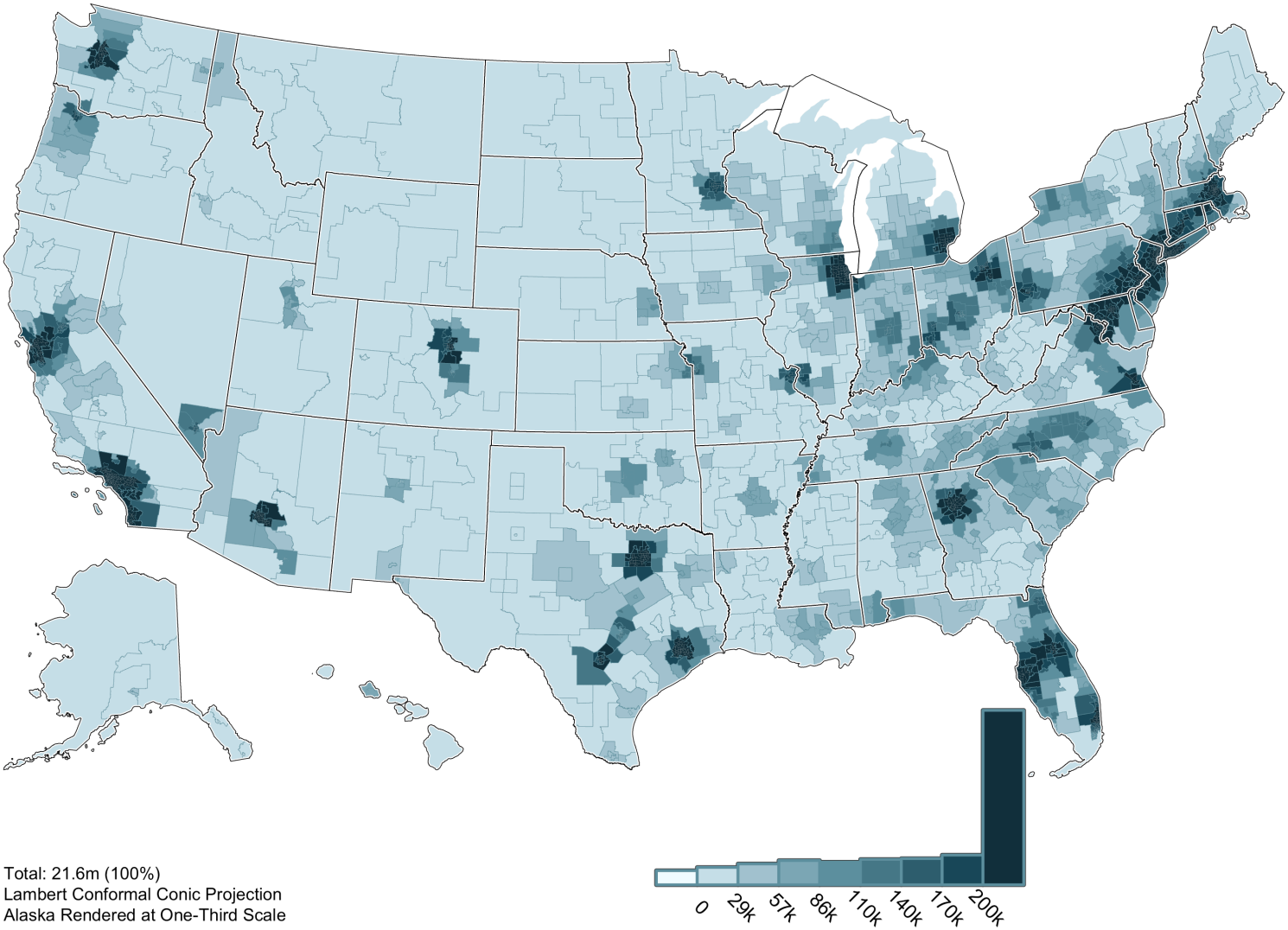
Migration for 2015–24

- Iterate this process for subsequent years
- Use final 2014 projection as baseline for 2015 national projection
- Apply migration rates to get final 2015 distribution
- Adjust marginal counts with weight calibration to keep national totals
  - Iterative proportional fitting (raking)
- Process continues through 2024

Main results

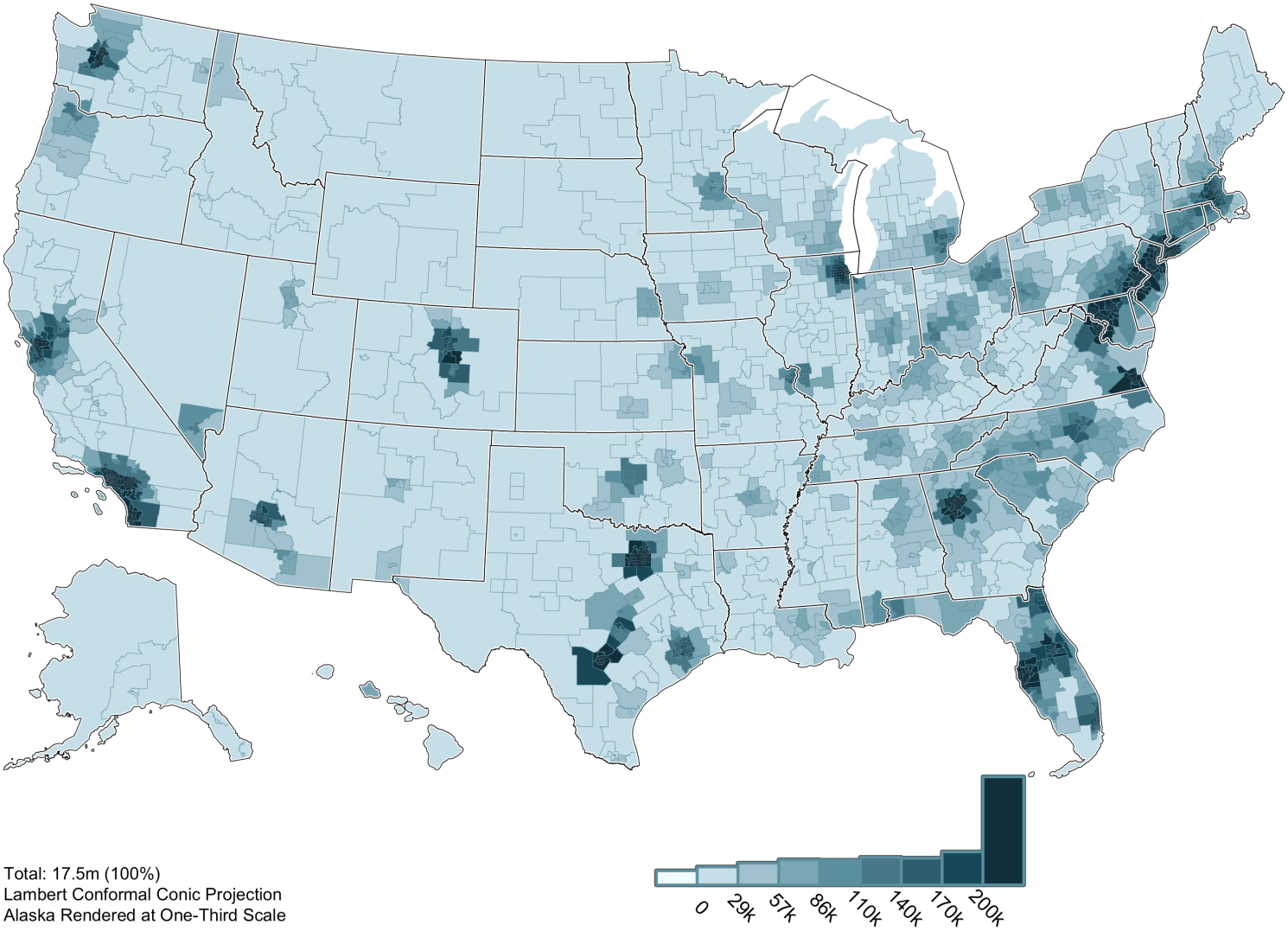
- Veterans will decrease by 19%
  - 21.6 million (2014), 17.5 million (2024)
- Mean age will increase slightly
  - 65+ years: 49% (2014), 52% (2024)
- Modest changes by sex and race/ethnicity
  - Males: 92% (2014), 89% (2024)
  - White: 80% (2014), 76% (2024)
- Service era composition will change
  - Vietnam: 31% (2014), 29% (2024)
  - Gulf War, Post-9/11: 27% (2014), 42% (2024)

Total Veteran population, 2014



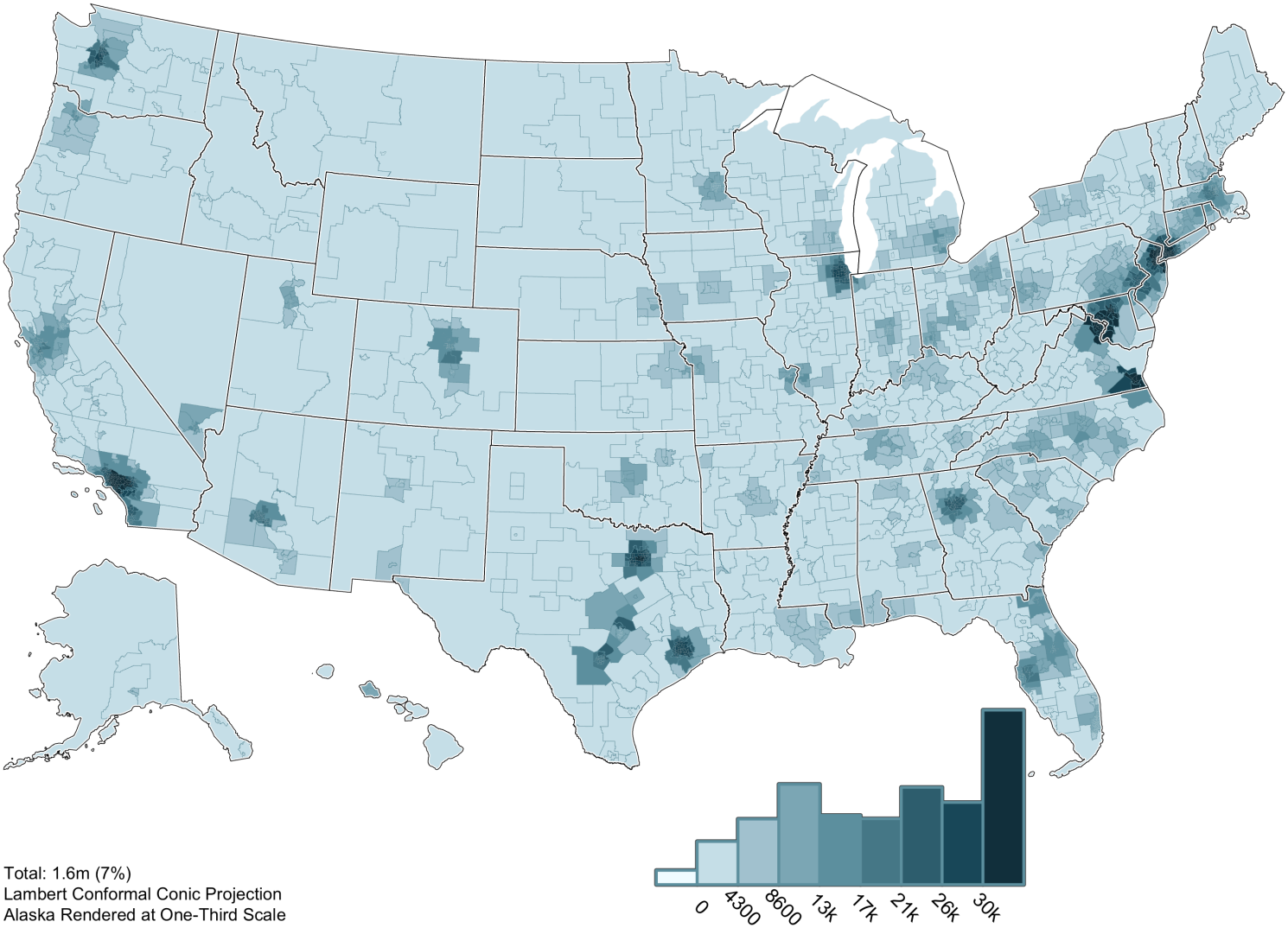
Total: 21.6m (100%)
Lambert Conformal Conic Projection
Alaska Rendered at One-Third Scale

Total Veteran population, 2024



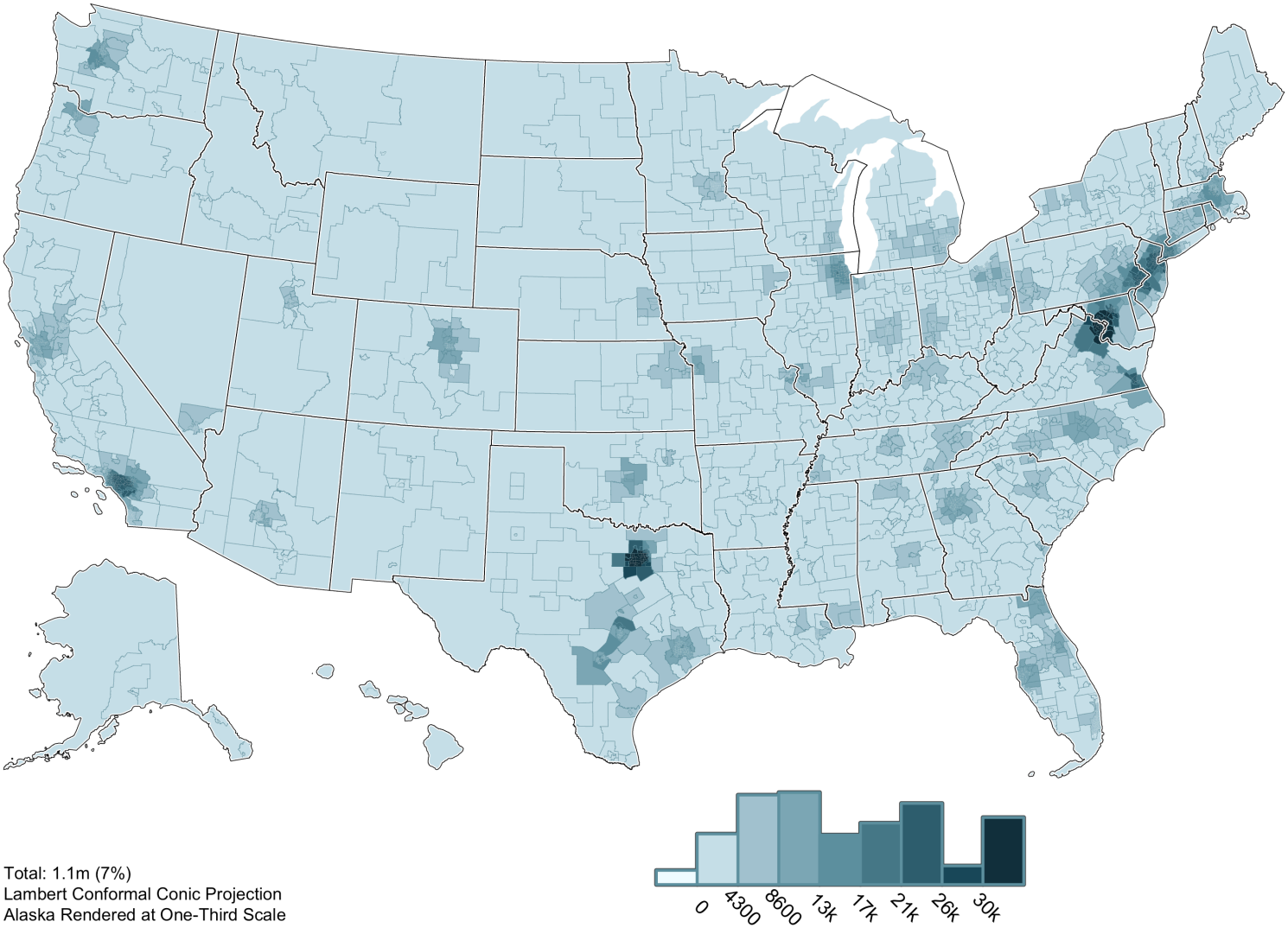
Total: 17.5m (100%)
Lambert Conformal Conic Projection
Alaska Rendered at One-Third Scale

Veterans under age 35, 2014



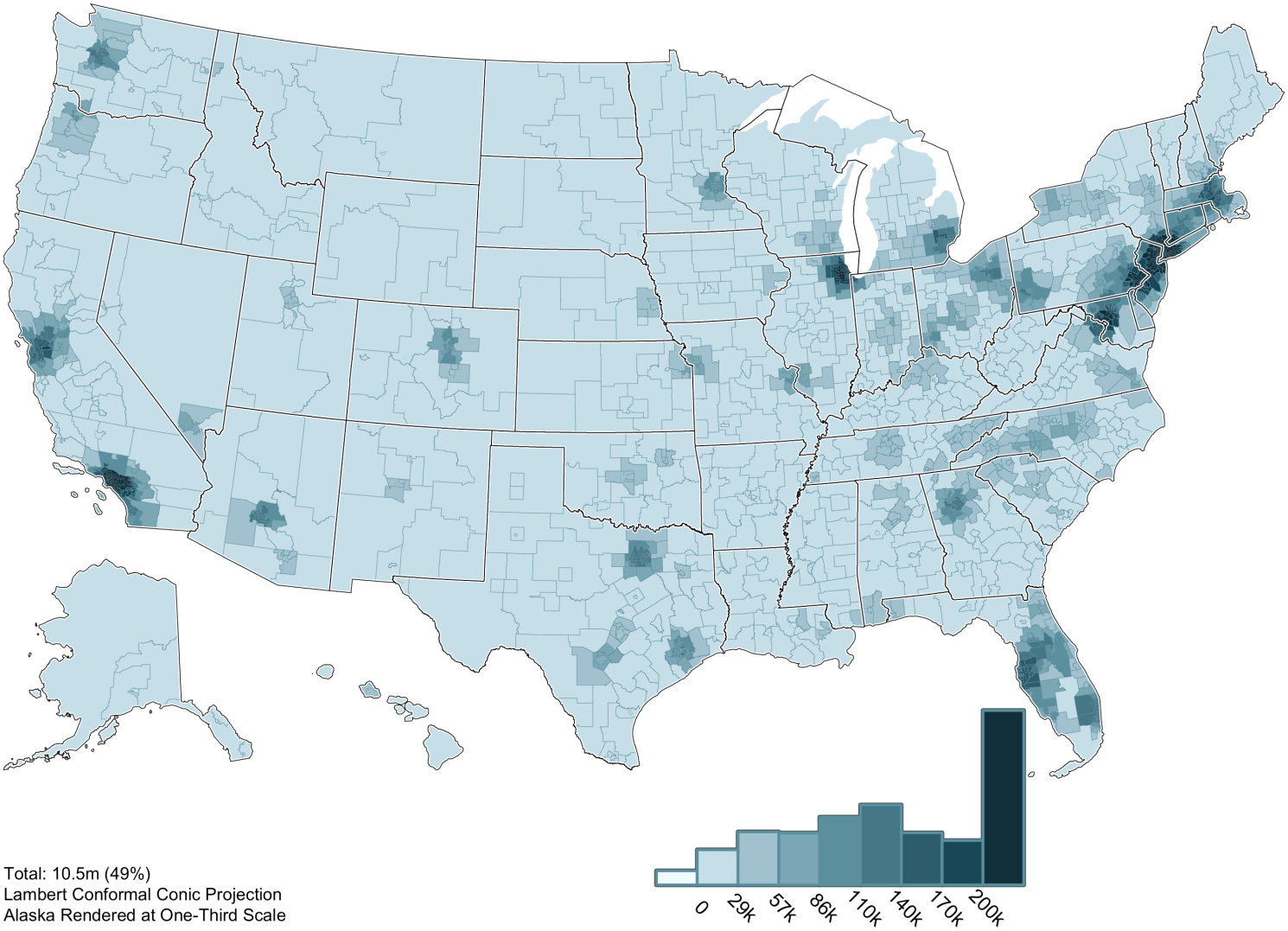
Total: 1.6m (7%)
Lambert Conformal Conic Projection
Alaska Rendered at One-Third Scale

Veterans under age 35, 2024



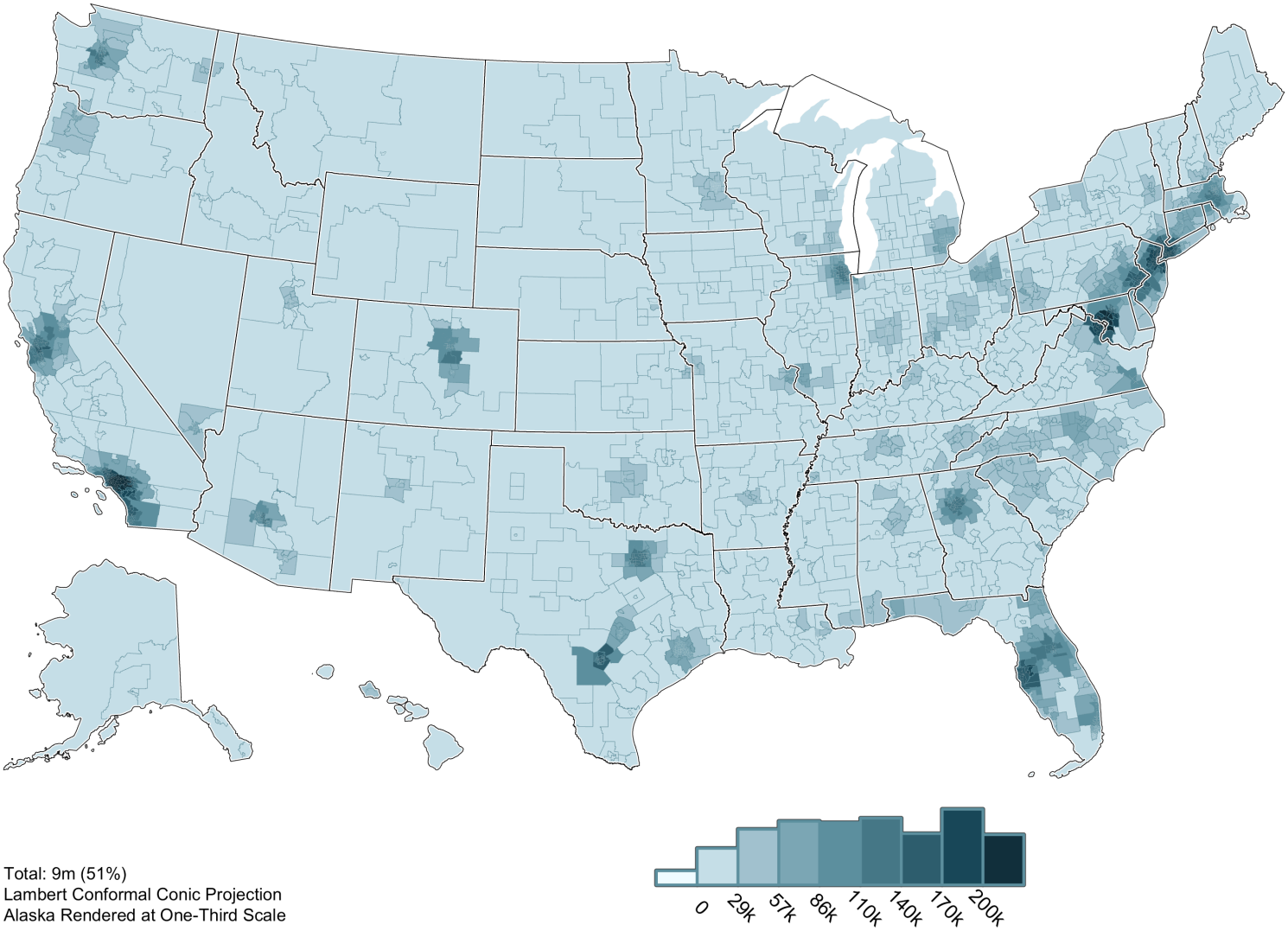
Total: 1.1m (7%)
Lambert Conformal Conic Projection
Alaska Rendered at One-Third Scale

Veterans age 65+, 2014



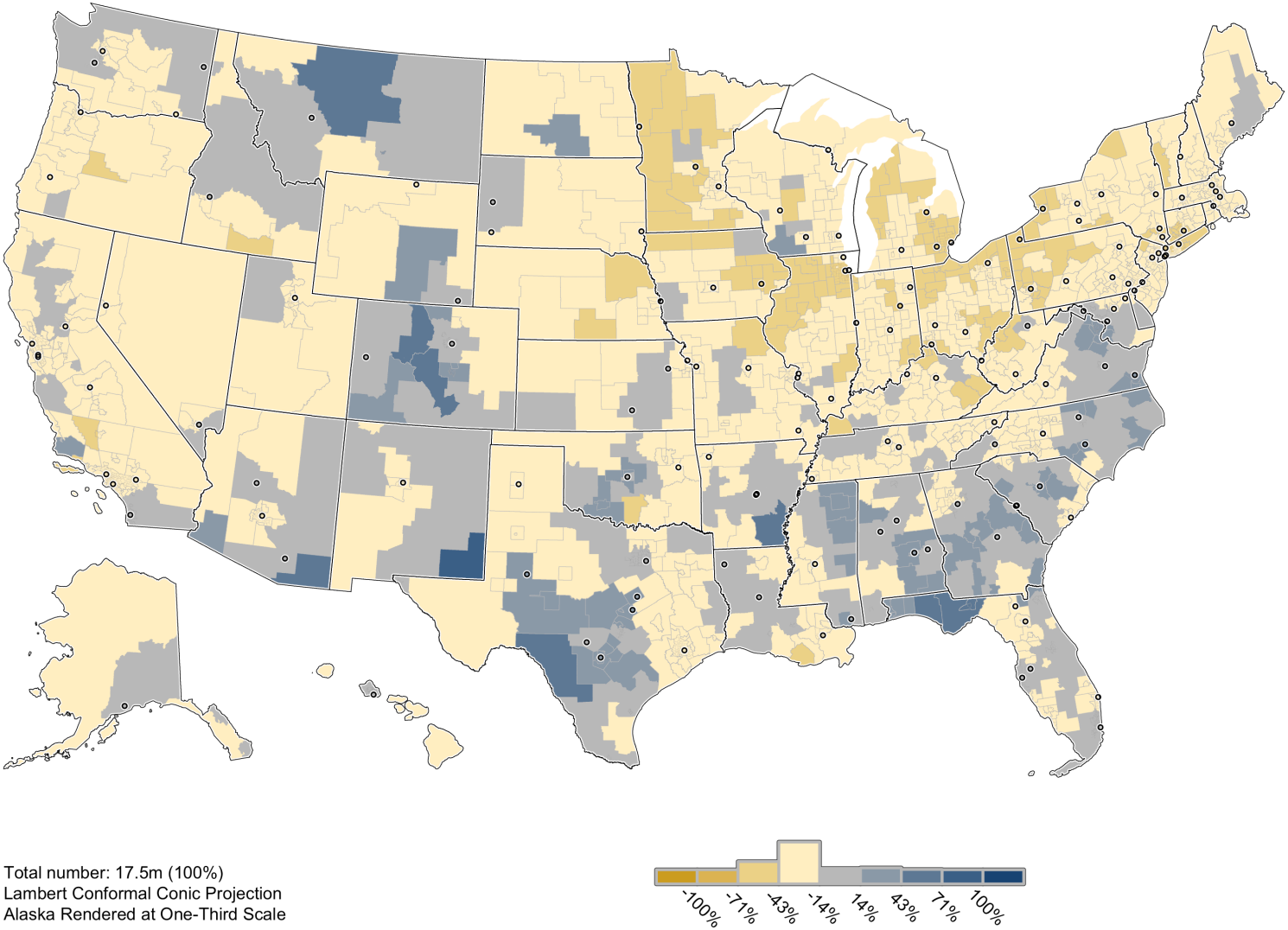
Total: 10.5m (49%)
Lambert Conformal Conic Projection
Alaska Rendered at One-Third Scale

Veterans age 65+, 2024



Total: 9m (51%)
Lambert Conformal Conic Projection
Alaska Rendered at One-Third Scale

Percent Veteran population change and VA medical centers, 2014–24



Total number: 17.5m (100%)
Lambert Conformal Conic Projection
Alaska Rendered at One-Third Scale

Final considerations

- Concentration in urban areas
  - Ohio River Valley and upper Midwest: proportion of Veterans will diminish
  - Southwest will not be supported properly by existing VA medical centers
- Migration is less frequent among Veterans than non-Veterans
  - Will not play substantial role in 2014–24 geographic distribution
- Projection methods can be applied to other contexts

VetPop model

- VetPop2014 model was developed by the Department of Veterans Affairs (VA) Office of the Actuary (OACT)
  - Veteran population projections from 2014–43
  - By age, sex, service era, race/ethnicity, county
  - It does not use race/ethnicity mortality rates
  - Documentation for this model is scarce

Comparison to VetPop model

- The projected 2024 Veteran populations are relatively similar in size (in millions) and sex composition (11% female)

Year	Our estimates	VetPop model
2014	21.6	21.9
2024	17.5	19.0

- VetPop2014 predicts higher percentages of black and Hispanic Veterans
  - In our model, white and Asian Veterans have lower mortality rates than black and Hispanic Veterans, which is consistent with national mortality

Policy recommendations: data collection

- Re-implement data collection on the Veteran population in 2020 Census
  - This allows smaller surveys to refine sampling strategies to reflect population of Veterans
- Monitor post-9/11 era (young population)
  - Needs may be different and evolve in a way that VA has not seen in several decades

Policy recommendations: plan for shrinking population

- VA should begin to plan for a shrinking population
- Consider alternative approaches to meeting the needs of its population
- E.g., purchase care from civilian sector even while patient population is growing

Policy recommendations: services for specific age groups

- Overall Veteran population will continue to age over the projection horizon
  - Health services for aging will be needed
- Younger Veterans (<35) are expected to concentrate in several areas
  - Los Angeles; Dallas; Washington, DC; northern New Jersey; northern California; central Washington state; Midwest; Wyoming; Utah
  - Provide health care services for young adults

Policy recommendations: geographic distribution

- Geographic distribution of Veterans will moderately change from 2015–24
- Areas with adequate VA health services
  - Decline of Veterans: Ohio River Valley, upper Midwest
  - Growth of Veterans: Washington, DC; Charlotte, NC; San Antonio, Austin, TX
- Areas that need more VA health services
  - Growth of Veterans: e.g., Montana, Wyoming, Colorado, Southwest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