

# Population Aging and Increasing Chronic Disease Burden among Unauthorized Agricultural Workers

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## Introduction

- In the U.S., the undocumented Latino population is aging because of changing migration policies, shifting migrant flows, and population aging in host and receiving countries
- Farmworkers in the U.S. are twice as likely than the general population to live under the federal poverty line, they are exposed to harsh working conditions including long hours of physically demanding work and exposure to pesticides, and face barriers to healthcare
- About 44% of U.S. farmworkers are undocumented
- Undocumented farmworkers experience greater marginalization than agricultural workers with U.S. citizenship or immigrants receiving H-2A work visas
- Undocumented farmworkers face several social and economic challenges which could lead to negative health outcomes

## Research questions:

- Has the average age of undocumented farmworkers increased over time?
- How is health among older farmworkers, specifically the number and type of chronic conditions, changing over time?

## Methods

### Data

- Observations from 19,434 undocumented agricultural workers were drawn from the from 2001 – 2018 **National Agricultural Worker Survey (NAWS)**
- Chronic disease burden was examined among 1,463 undocumented agricultural workers aged 50 and older

### Outcome variables

#### Age

- Self-reported age was used to examine trends in population aging

#### Chronic conditions

- Self-reported doctor diagnosed conditions included asthma, diabetes, hypertension, and heart disease

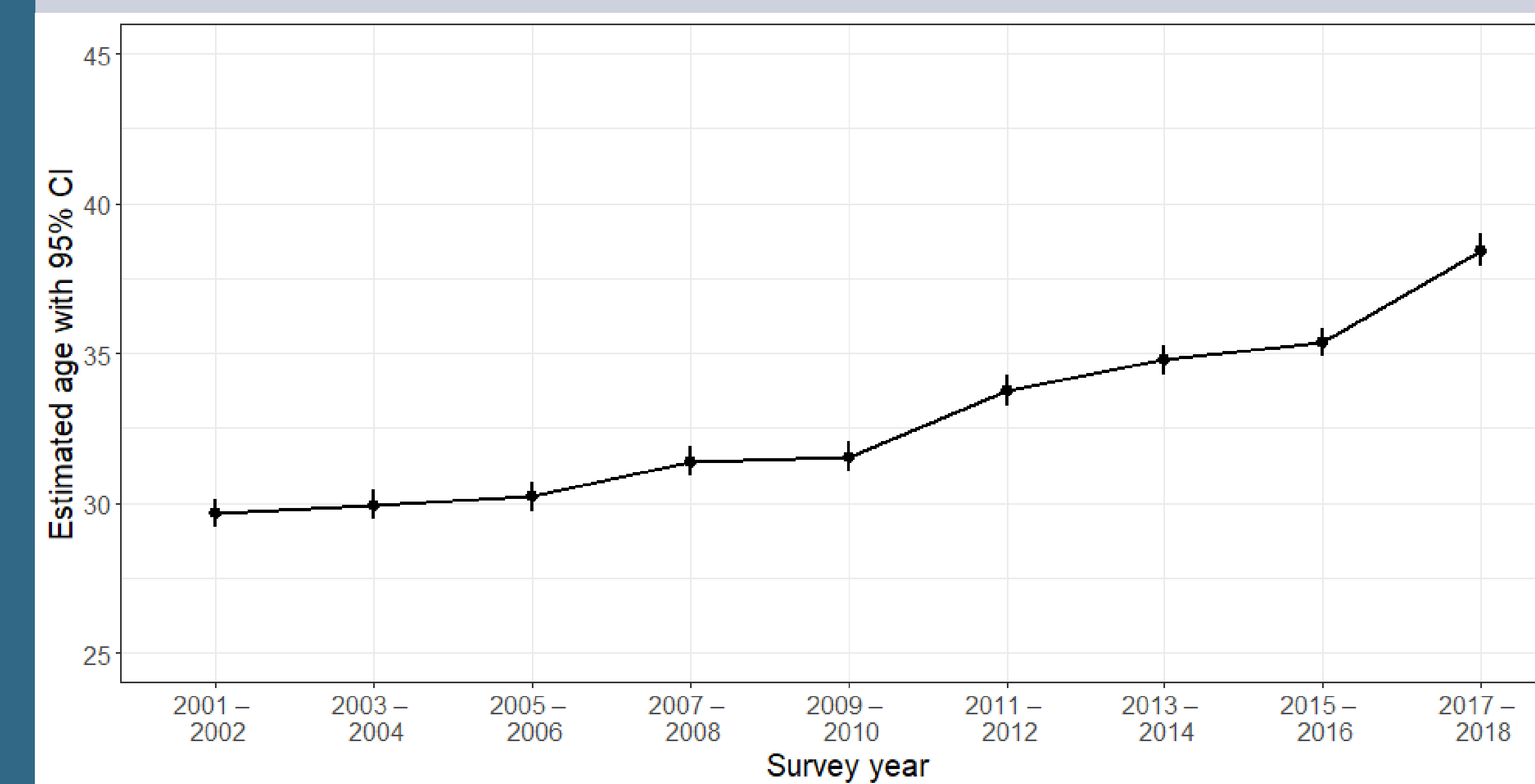
#### Covariates

- Models were adjusted for sex (female/male), migrant type (settled, shuttle, follow the crop, newcomer), use of foreign health services (no/yes), use of health services in the U.S. (no/yes), having health insurance (no/yes), and age (in models predicting health outcomes)

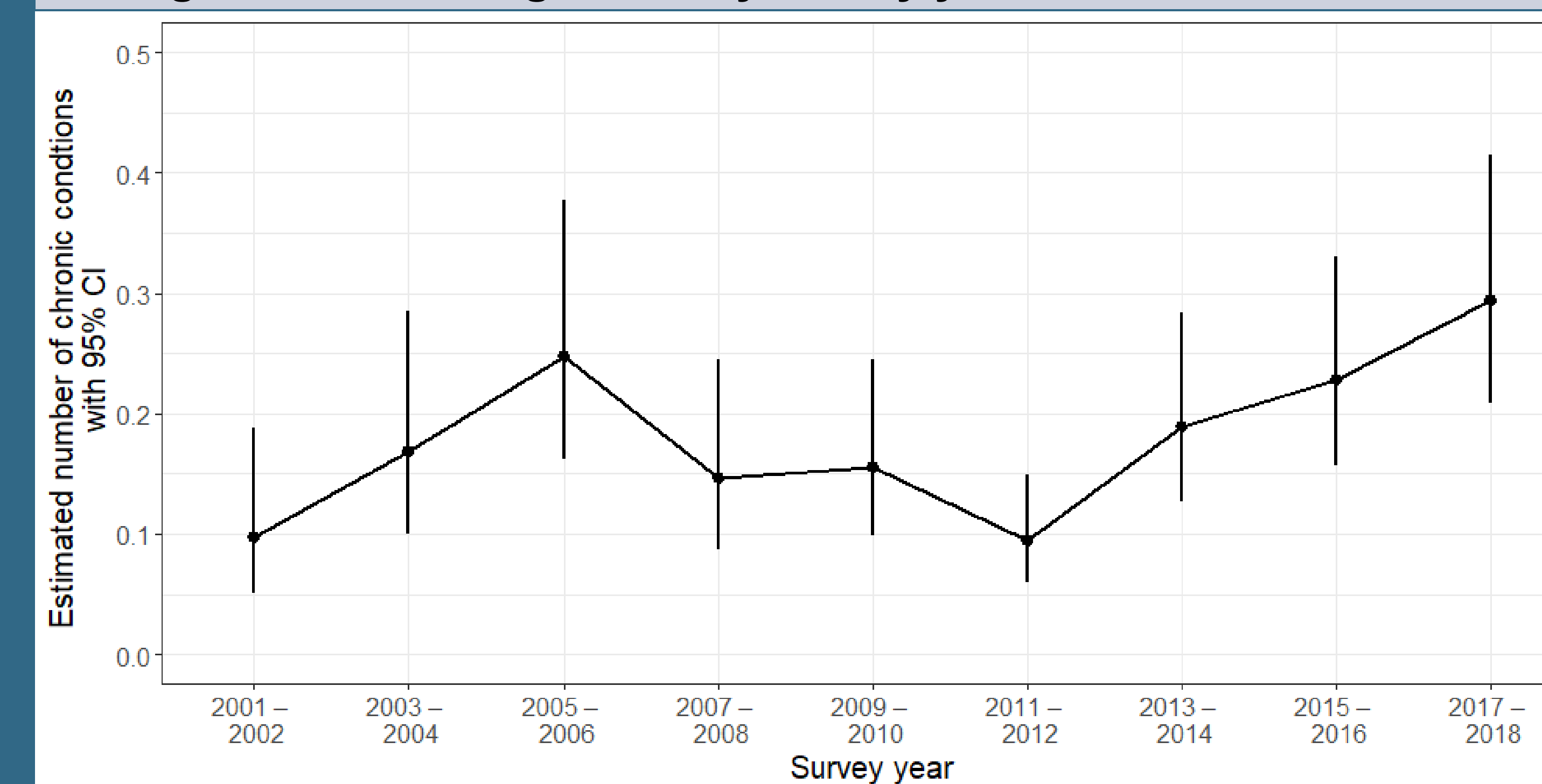
# Among undocumented migrant farmworkers in the U.S. responding to the National Agricultural Workers Survey (NAWS)

- The age of undocumented farmworkers has increased from 2001–2018
- Chronic disease burden has increased among undocumented farmworkers aged 50+ from 2001–2018
- Diabetes appears to be driving increased chronic disease burden

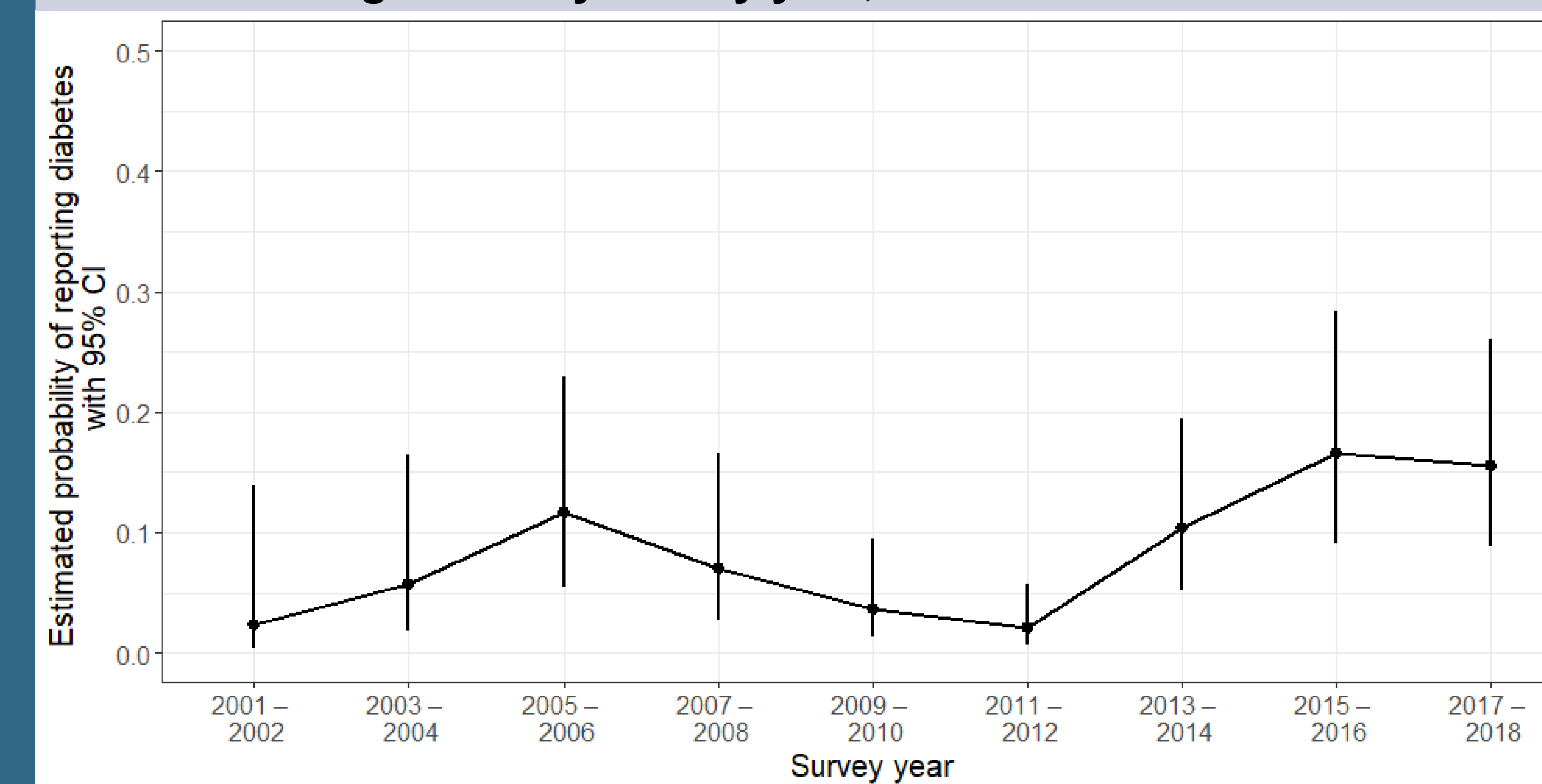
**Figure 1. Estimated marginal mean age by survey year, NAWS 2001–2018**



**Figure 2. Estimated marginal mean number of chronic conditions among farmworkers aged 50+ by survey year, NAWS 2001–2018**



**Figure 3. Estimated probability of reporting diabetes diagnosis among farmworkers aged 50+ by survey year, NAWS 2001–2018**



## Statistical Methods

- Weighted linear regression was used to estimate adjusted marginal mean age at each wave
- Weighted Poisson regression was used to estimate adjusted marginal mean count of chronic conditions at each wave
- Weighted logistic regression was used to estimate adjusted marginal probability of reporting diabetes at each wave
- All models adjusted for sampling weights
- Missing data imputed using random forest imputation

## Descriptives

**Table 1. Weighted descriptive statistics for undocumented agricultural workers, NAWS 2001 – 2018**

|                                | 2001-2002 |      | 2003-2004 |      | 2005-2006 |       | 2007-2008 |       | 2009-2010 |      | 2011-2012 |      | 2013-2014 |      | 2015-2016 |       | 2017-2018 |       |
|--------------------------------|-----------|------|-----------|------|-----------|-------|-----------|-------|-----------|------|-----------|------|-----------|------|-----------|-------|-----------|-------|
|                                | Mean%     | SD   | Mean%     | SD   | Mean%     | SD    | Mean%     | SD    | Mean%     | SD   | Mean%     | SD   | Mean%     | SD   | Mean%     | SD    | Mean%     | SD    |
| Age                            | 28.19     | 9.72 | 28.66     | 9.30 | 29.1      | 10.09 | 30.65     | 10.19 | 32.07     | 9.79 | 34.3      | 9.99 | 35.27     | 9.94 | 35.76     | 10.33 | 39.3      | 11.14 |
| Male                           | 84.87%    |      | 79.93%    |      | 81.87%    |       | 82.84%    |       | 76.10%    |      | 69.68%    |      | 71.35%    |      | 66.66%    |       | 67.07%    |       |
| Migrant type                   |           |      |           |      |           |       |           |       |           |      |           |      |           |      |           |       |           |       |
| Settled                        | 40.58%    |      | 46.65%    |      | 51.34%    |       | 58.90%    |       | 62.13%    |      | 82.68%    |      | 81.05%    |      | 80.79%    |       | 86.44%    |       |
| Shuttle                        | 17.24%    |      | 12.24%    |      | 12.45%    |       | 12.03%    |       | 20.37%    |      | 6.52%     |      | 8.30%     |      | 4.57%     |       | 4.20%     |       |
| Follow the crop                | 9.43%     |      | 10.67%    |      | 7.28%     |       | 6.16%     |       | 11.64%    |      | 6.76%     |      | 6.79%     |      | 8.25%     |       | 6.42%     |       |
| Newcomer                       | 32.75%    |      | 30.45%    |      | 28.93%    |       | 22.92%    |       | 5.86%     |      | 4.03%     |      | 3.86%     |      | 6.39%     |       | 2.94%     |       |
| Use of foreign health services | 21.64%    |      | 25.41%    |      | 28.19%    |       | 22.90%    |       | 8.68%     |      | 4.51%     |      | 4.89%     |      | 6.25%     |       | 5.89%     |       |
| Use of U.S. health services    | 23.65%    |      | 33.32%    |      | 34.10%    |       | 39.37%    |       | 45.79%    |      | 49.26%    |      | 52.11%    |      | 52.99%    |       | 71.51%    |       |
| Has health insurance           | 9.10%     |      | 10.72%    |      | 9.71%     |       | 14.09%    |       | 15.24%    |      | 16.14%    |      | 15.76%    |      | 25.15%    |       | 30.96%    |       |
| Diabetes                       | 0.88%     |      | 0.79%     |      | 1.95%     |       | 2.46%     |       | 1.24%     |      | 3.04%     |      | 3.59%     |      | 4.28%     |       | 9.05%     |       |
| Hypertension                   | 2.10%     |      | 2.19%     |      | 3.78%     |       | 3.44%     |       | 3.99%     |      | 5.97%     |      | 4.48%     |      | 4.10%     |       | 13.15%    |       |
| Heart disease                  | 0.19%     |      | 0.75%     |      | 0.77%     |       | 0.33%     |       | 0.48%     |      | 0.41%     |      | 0.40%     |      | 0.25%     |       | 2.11%     |       |
| Asthma                         | 0.75%     |      | 1.66%     |      | 1.64%     |       | 1.46%     |       | 1.75%     |      | 1.56%     |      | 1.85%     |      | 1.78%     |       | 2.69%     |       |
| Number of chronic conditions   | 0.04      | 0.20 | 0.05      | 0.25 | 0.08      | 0.31  | 0.08      | 0.31  | 0.07      | 0.28 | 0.11      | 0.36 | 0.10      | 0.35 | 0.10      | 0.35  | 0.27      | 0.56  |
| n                              | 3,285     |      | 3,200     |      | 1,863     |       | 1,856     |       | 1,881     |      | 1,521     |      | 2,064     |      | 2,584     |       | 1,089     |       |

**Table 2. Weighted descriptive statistics for undocumented agricultural workers aged 50+, NAWS 2001 – 2018**

|                                | 2001-2002 |      | 2003-2004 |      | 2005-2006 |      | 2007-2008 |      | 2009-2010 |      | 2011-2012 |      | 2013-2014 |      | 2015-2016 |      | 2017-2018 |      |
|--------------------------------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|
|                                | Mean%     | SD   | Mean%     | SD   | Mean%     | SD   | Mean%     | SD   | Mean%     | SD   | Mean%     | SD   | Mean%     | SD   | Mean%     | SD   | Mean%     | SD   |
| Age                            | 57.07     | 4.85 | 55.79     | 4.31 | 55.63     | 4.49 | 55.71     | 4.75 | 54.75     | 4.44 | 56.05     | 5.27 | 55.31     | 5.45 | 56.30     | 5.44 | 56.52     | 6.55 |
| Male                           | 88.91%    |      | 84.25%    |      | 81.48%    |      | 89.68%    |      | 70.95%    |      | 52.97%    |      | 85.18%    |      | 75.71%    |      | 65.27%    |      |
| Migrant type                   |           |      |           |      |           |      |           |      |           |      |           |      |           |      |           |      |           |      |
| Settled                        | 40.68%    |      | 58.06%    |      | 55.26%    |      | 63.93%    |      | 61.82%    |      | 92.82%    |      | 69.88%    |      | 83.52%    |      | 90.16%    |      |
| Shuttle                        | 33.75%    |      | 24.64%    |      | 23.15%    |      | 24.21%    |      | 24.59%    |      | 2.45%     |      | 21.37%    |      | 10.88%    |      | 4.82%     |      |
| Follow the crop                | 11.04%    |      | 7.20%     |      | 10.76%    |      | 4.61%     |      | 11.36%    |      | 4.73%     |      | 4.78%     |      | 5.31%     |      | 5.02%     |      |
| Newcomer                       | 14.53%    |      | 10.09%    |      | 10.83%    |      | 7.25%     |      | 2.24%     |      | 0%        |      | 3.97%     |      | 0.28%     |      | 0%        |      |
| Use of foreign health services | 19.80%    |      | 21.16%    |      | 27.27%    |      | 18.02%    |      | 14.11%    |      | 6.26%     |      | 11.01%    |      | 4.60%     |      | 3.90%     |      |
| Use of U.S. health services    | 19.15%    |      | 39.34%    |      | 42.68%    |      | 42.11%    |      | 50.62%    |      | 66.69%    |      | 42.59%    |      | 48.61%    |      | 78.50%    |      |
| Has health insurance           | 5.92%     |      | 6.71%     |      | 5.32%     |      | 16.69%    |      | 24.46%    |      | 31.02%    |      | 18.39%    |      | 28.30%    |      | 33.23%    |      |
| Diabetes                       | 1.25%     |      | 5.02%     |      | 10.26%    |      | 6.35%     |      | 4.31%     |      | 2.98%     |      | 8.38%     |      | 15.62%    |      | 21.40%    |      |
| Hypertension                   | 2.97%     |      | 8.03%     |      | 15.82%    |      | 10.88%    |      | 17.21%    |      | 12.73%    |      | 12.13%    |      | 12.13%    |      | 24.92%    |      |
| Heart disease                  | 0.00%     |      | 0.00%     |      | 1.47%     |      | 0.00%     |      | 1.14%     |      | 0.00%     |      | 0.09%     |      | 0.10%     |      | 10.03%    |      |
| Asthma                         | 2.41%     |      | 2.83%     |      | 3.52%     |      | 0.98%     |      | 0.34%     |      | 3.30%     |      | 1.42%     |      | 3.81%     |      | 2.88%     |      |
| Number of chronic conditions   | 0.07      | 0.26 | 0.16      | 0.43 | 0.31      | 0.69 | 0.18      | 0.42 | 0.23      | 0.49 | 0.19      | 0.40 | 0.22      | 0.47 | 0.32      | 0.61 | 0.59      | 0.74 |
| n                              | 148       |      | 140       |      | 109       |      | 126       |      | 116       |      | 113       |      | 204       |      | 311       |      | 196       |      |

## Discussion/Implications

- The population of undocumented migrant farmworkers in the U.S. is aging rapidly
- The number of doctor-diagnosed conditions reported by undocumented farmworkers aged 50 and older appears to have increased
- Doctor-diagnosed diabetes appears to be a primary driver of the increasing chronic disease burden reported by older undocumented farmworkers
- Increasing access to insurance and health service use in the U.S. may be contributing to the observed increases in chronic disease burden
- As farmworkers in the U.S. are becoming older and experience greater chronic disease burden, services that focus on preventing and treating chronic diseases in this population are increasingly essential

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