

# IS MEDICINE BARKING UP THE WRONG TREE?

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# Introduction

- What goals should healthcare accomplish?
  - *Extend lifespan*
  - *Improve quality of life*
  - *Support personal development*
  - *Improve the quality of end-of-life care*
  - *Foster longitudinal healing relationships*
  - *Relieve pain and suffering*
  - *Promote health and prevention of disease*
  - *Many others...*
- Is the current healthcare system delivering on these goals?

# Research Question:

- Is there a significant difference between what patients desire from their health care (extending their life span and/or improving their function and quality of life) and the usual care they are receiving in the current health care system?
- Essentially, are patients getting what they want and need from the current model of healthcare delivery?

# Background

# Background: The Problem-Oriented Model

- Main assumptions (Mold et al. 1991)
  - *There exists an “ideal” state of health*
  - *Each problem has one or more causes and the correction of these causes will lead to elimination of the problem*
  - *Physicians are the best judges of health and how to maintain/achieve it*
  - *Diseases/problems can be addressed one at a time (based on single-disease guidelines)*
  - *Patients should comply with physician assessment and advice*
  - *Physicians’ success should be measured by how accurately and efficiently they identify and treat problems*

# Background: The Problem-Oriented Model

## ■ Advantages

- Useful for acute and curable illnesses
- Fits into traditional clinical research

## ■ Disadvantages

- What happens when the “problem” is normal physiology?
- Harmful diagnosis
- Is there a problem at all?
- Disagreement on a particular solution
- Chronic or terminal illnesses (complex patients)
- Patient responsibility for the problem
- Solving one problem may create other problems
- A never-ending list of potential problems (the battle is already lost)

# Background: The Goal-Directed Healthcare (GDHC) Model

## ■ Main Assumptions (Mold et al. 1991)

- *Health is defined by the individual*
- *Health goals can be elucidated in the framework of the unique physician-patient relationship*
- *In addition to identifying problems, setting goals may require the assessment of other, less tangible factors*
- *Goals should be determined by the patient before diagnosis or therapy is initiated*
- *Success is measured by how well the goals are achieved*
- *Patient-centered prioritization of healthcare options is possible which can address the “long list” problem*

# Background: The Goal-Directed Healthcare (GDHC) Model

- Within this framework:
  - *Goals can relate directly to extending lifespan and improving quality of life (in addition to other main end-points)*
  - *Problem solving is not excluded (disease-specific care)*
  - *Goal-attainment can be quantified and measured*
  - *Care is patient-centered & patient autonomy is supported*
- Requires:
  - *Accurate determination of risk factors that relate to goals*
  - *Rigorous assessment of other less discrete factors- strengths, resources, expectations, values, beliefs, etc.*



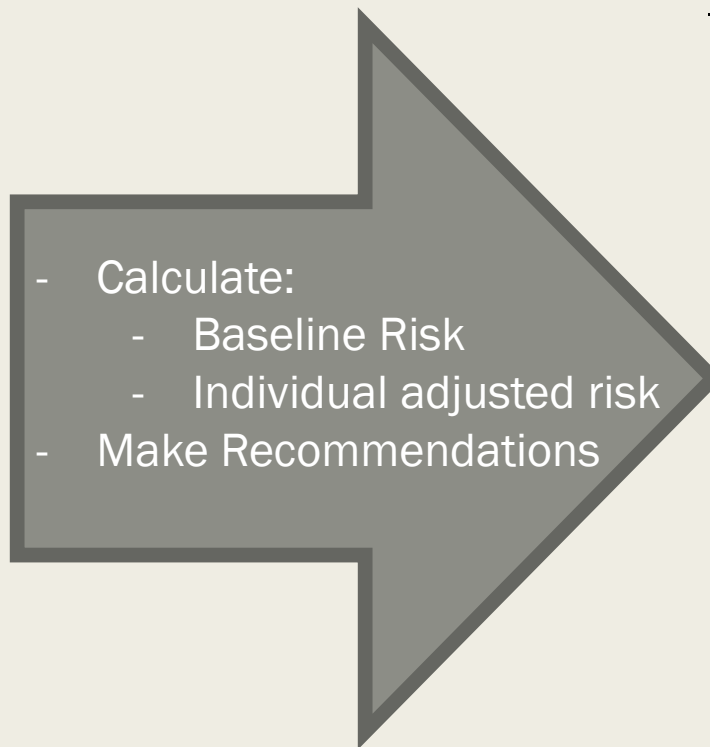
# Methods

# Methods

- Patients were asked to complete a web-based Health Risk Assessment (HRA) / 360° Health Planner administered through an online Wellness Portal.
- Health Risk Appraisal
  - *200+ risk factors could be collected spanning over 13 health domains*

## Questionnaire

➔ <b>Personal Profile</b>
<b>Vital Signs &amp; Labs</b>
<b>Behavioral Health</b>
<b>Environmental Health</b>
<b>Self-Health History</b>
<b>Family Health History</b>
<b>Healthcare Utilization</b>
<b>Allergies &amp; Misc. Risks</b>
<b>Personal Safety</b>
<b>Sexual Health</b>
<b>Mental Health</b>
<b>Prevention History</b>
<b>Personal Life Goals</b>
<b>Run HRA Report</b>



## Report

- Adjusted Life Expectancy
- Adjusted Health Expectancy
- Real Age
- Wellness Score
- Quality of Life and Health Score
- Health Strengths
- Health Challenges
- Maximum Health Benefit
- Health Recommendations

# How does the HRA calculate risk? (Nagykaldi et al. 2013)

- Baseline life expectancy (average person in age, gender, and ethnicity specific group)
  - Information from NCHS for 15 leading causes of death and sum of all others as 16<sup>th</sup> cause for all ages, both genders, and several races  
→ probability of death in each year taking into account each cause
- Adjusted life expectancy
  - Baseline probabilities of death converted into cumulative hazard values
  - Cumulative hazard values adjusted based on individual risk factors and personal preferences
  - Values summed for each year to find a corresponding annual probability of death

# The HRA report

- Maximum Health Benefit
  - The number of additional life-years gained if all preventive care recommendations represented in the model are followed
- Preventive Care Recommendations
  - Generated based on USPSTF guidelines, age, gender, past history of healthcare, personal preferences, and season of the year
  - Creates a personalized list of recommendations that is ranked by estimated effects on life expectancy
- Real Age
  - Risk-matched virtual age estimate
- Wellness Score
  - Age-standardized outcome derived from life-years gained/lost compared to peers
  - Ranges from 0 to 135, with 90-100 representing “average” health (national stats)

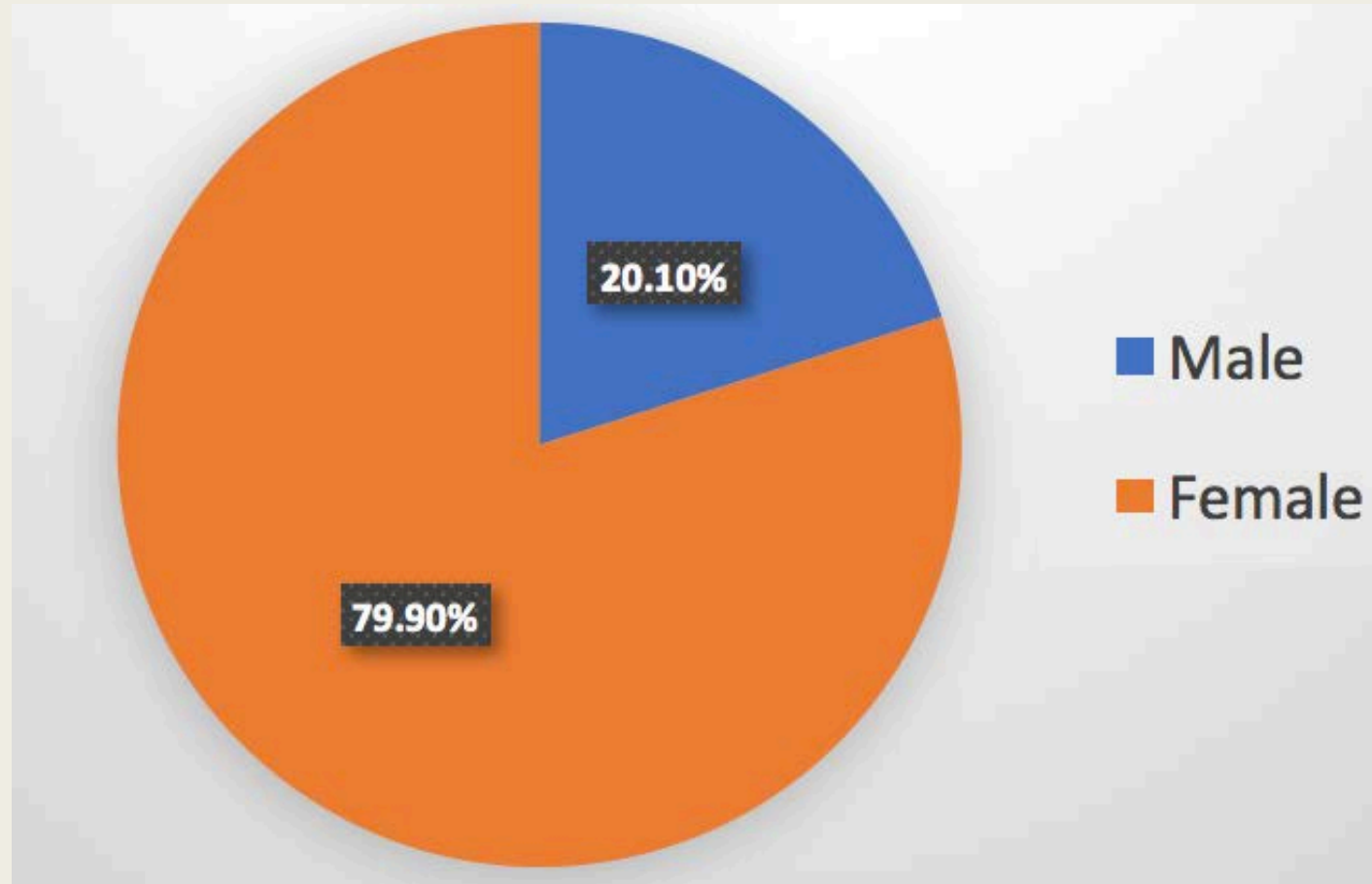
# Data and Discussion

# Sample

- 3,248 Patients with Demographics, HRA Records, and HRA Reports (n=3248)
- HRA Data Collected From 3 Sources in OK Over 4 Years
  - *Insurance-based Wellness Program (51.2%)*
  - *Employer-based Wellness Program (11.2%)*
  - *Community Primary Care Practices (37.6%)*

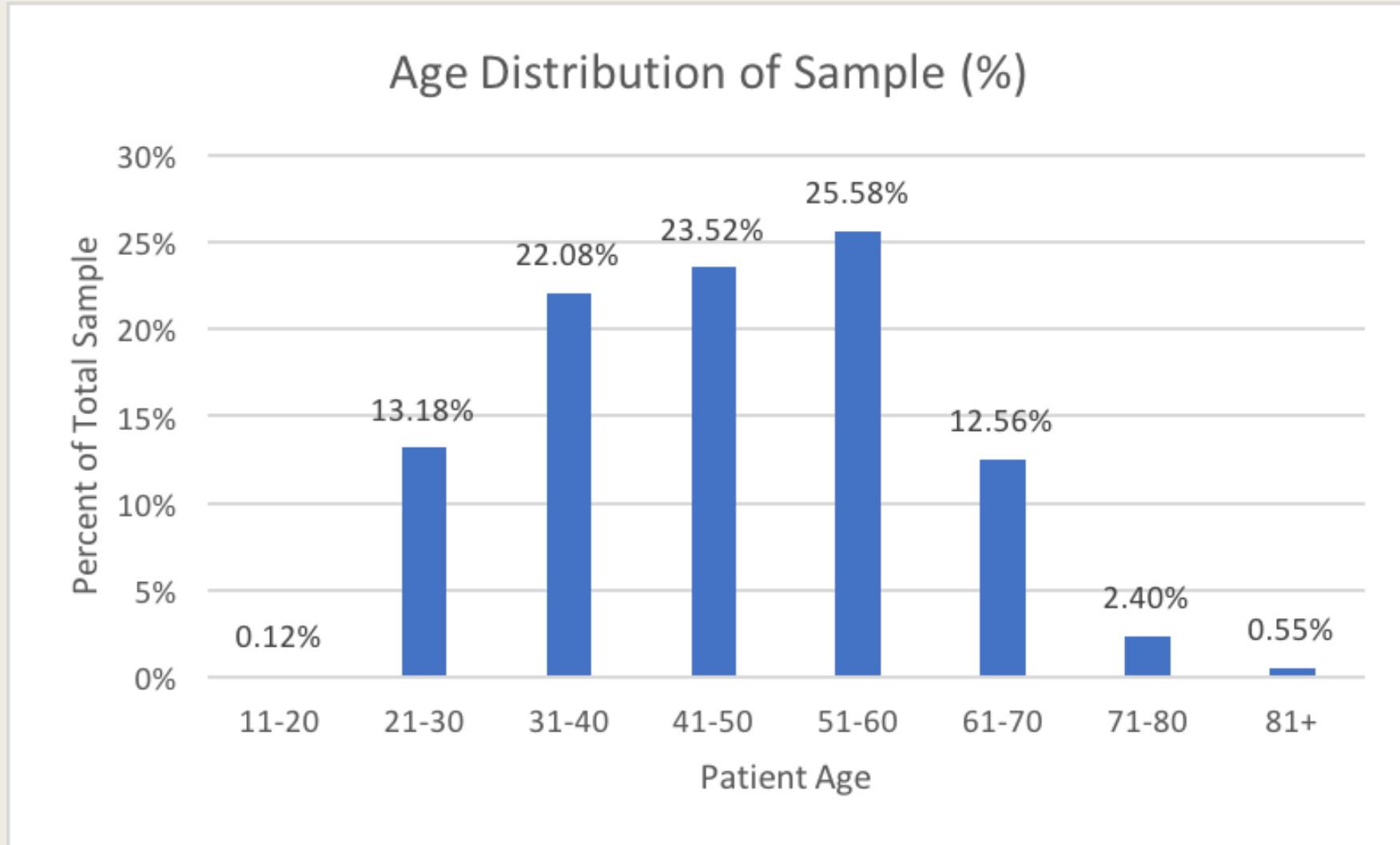


# Demographics: Gender





# Demographics: Age

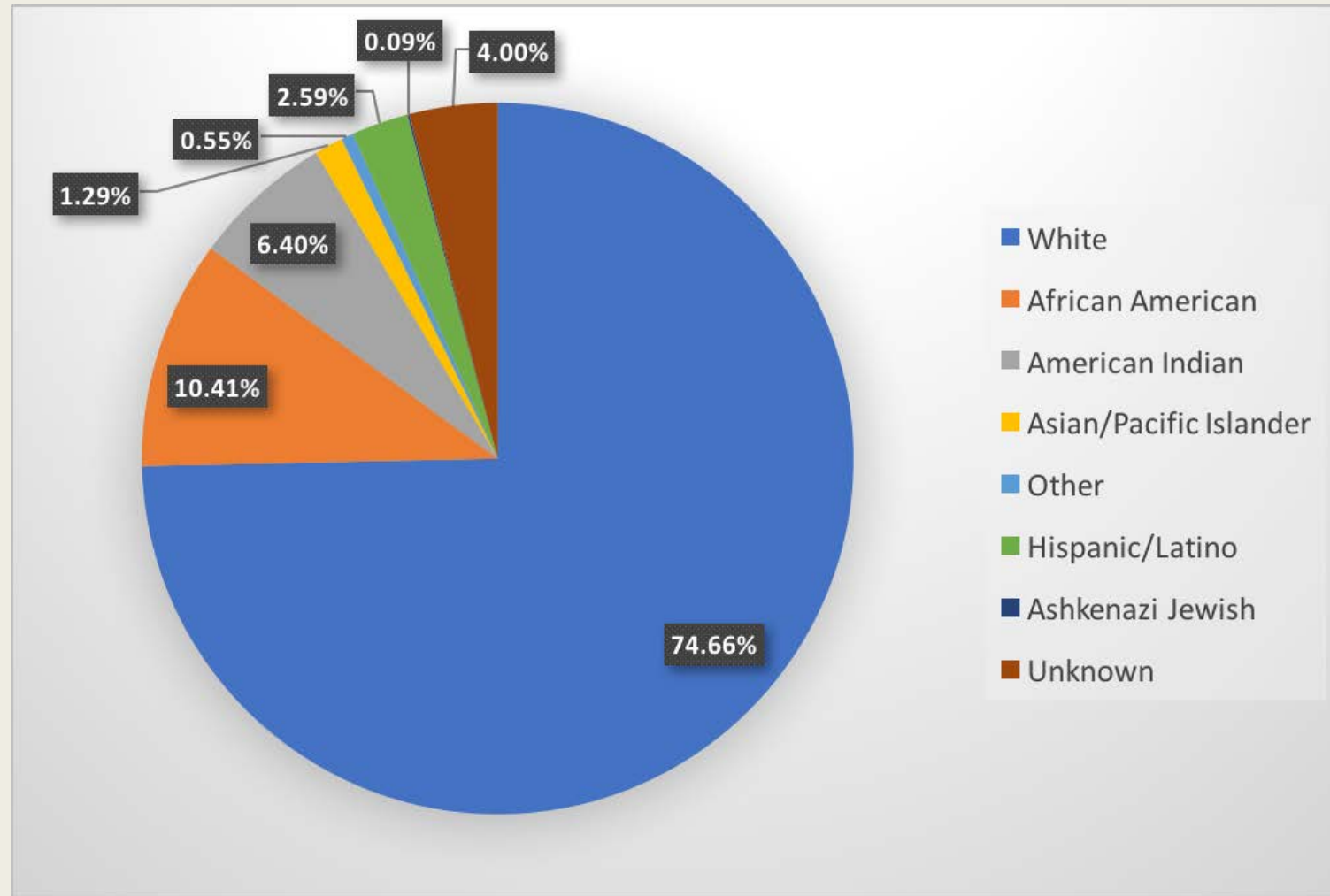


Average:  
46.6 ± 13.1 years

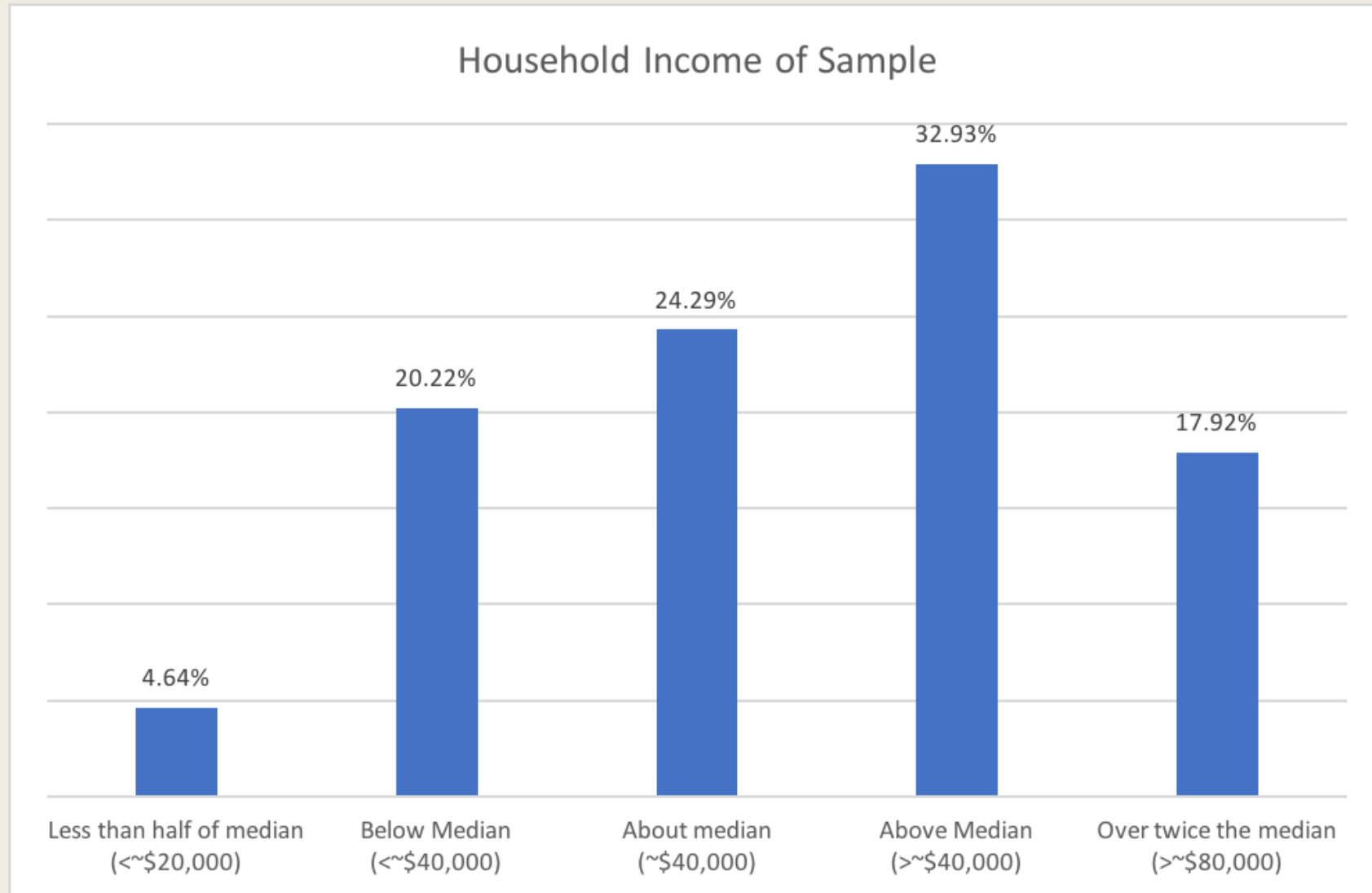
Maximum:  
89 years

Minimum:  
11 years

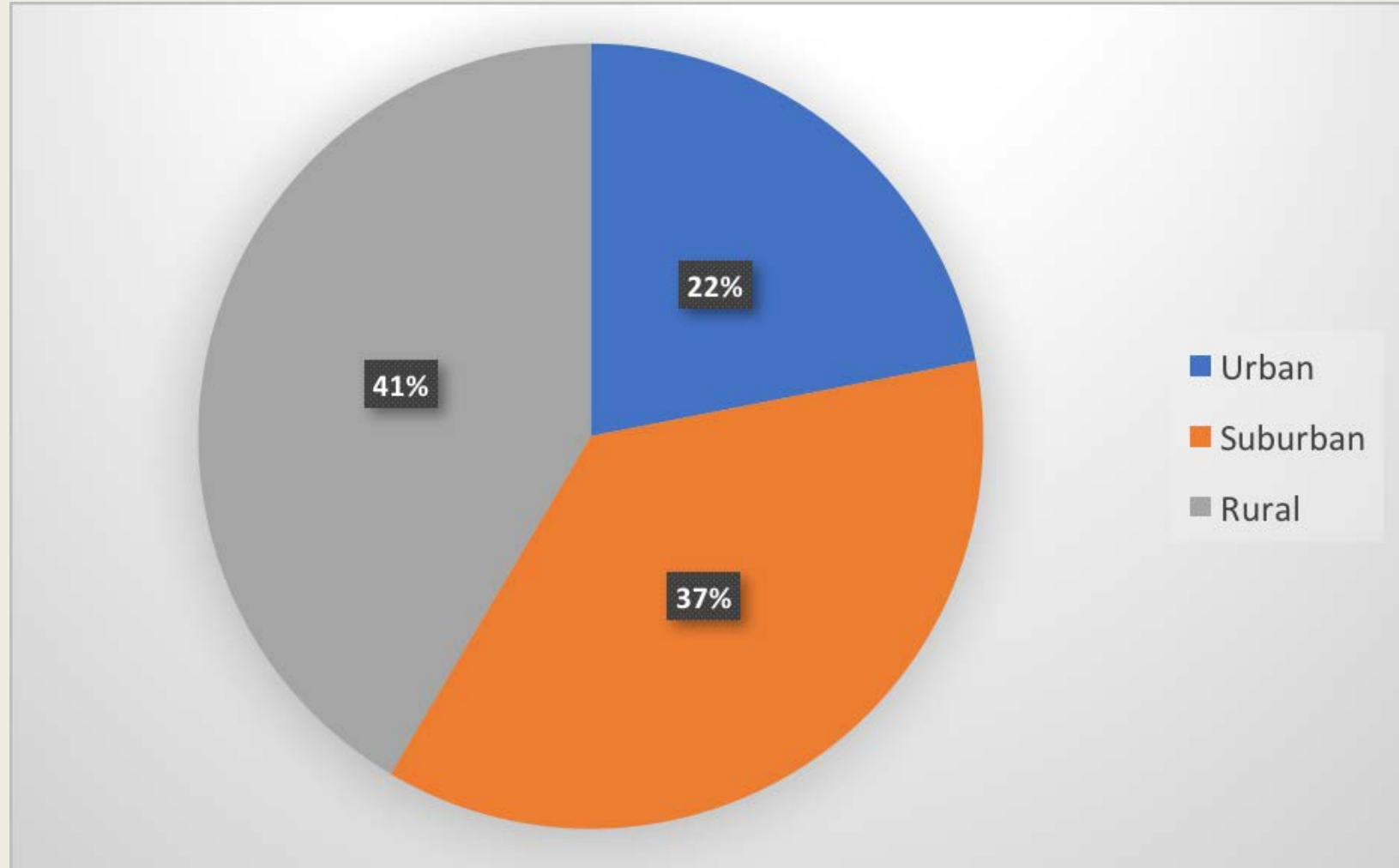
# Demographics: Race/Ethnicity



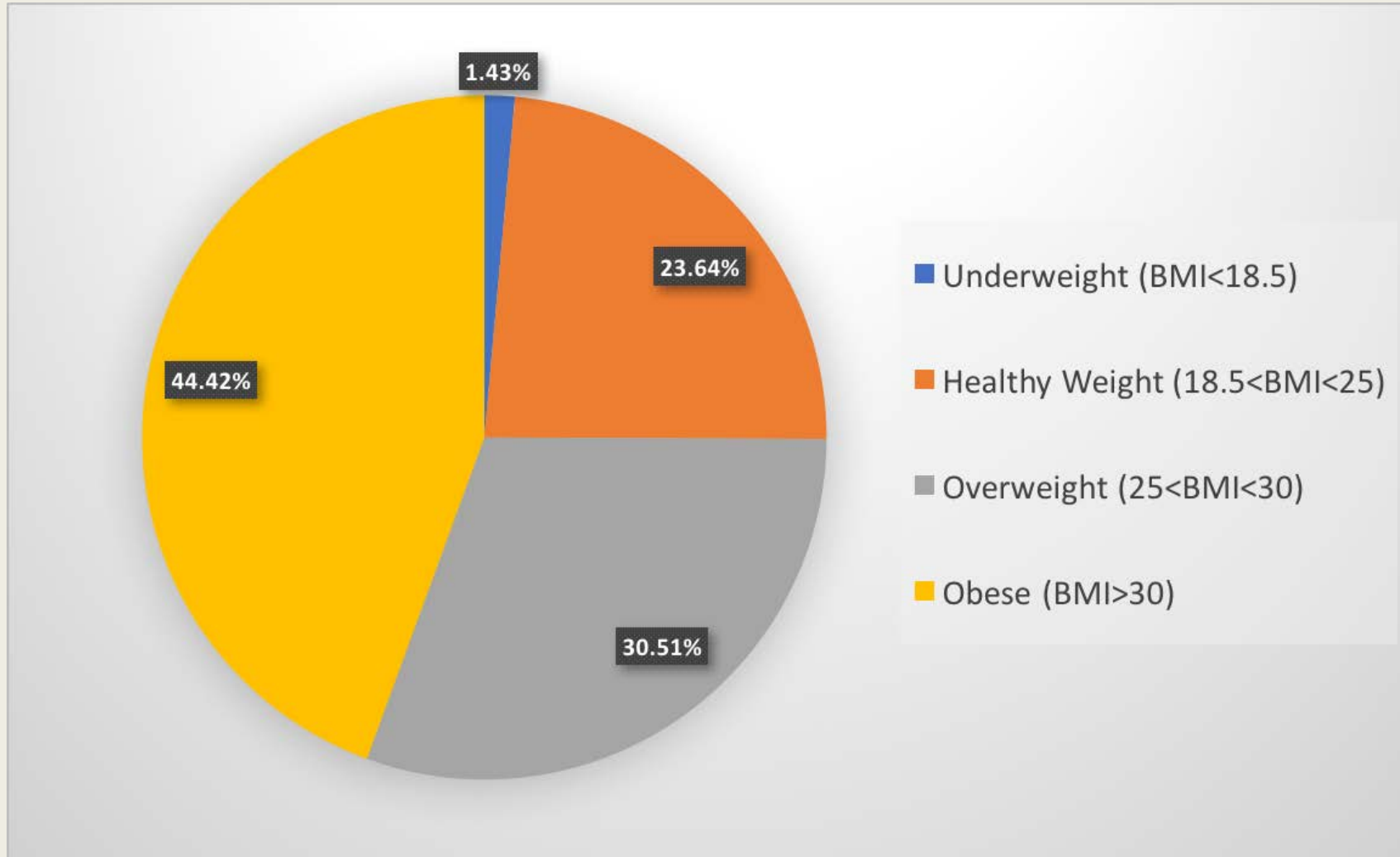
# Demographics: Income



# Demographics: Residence

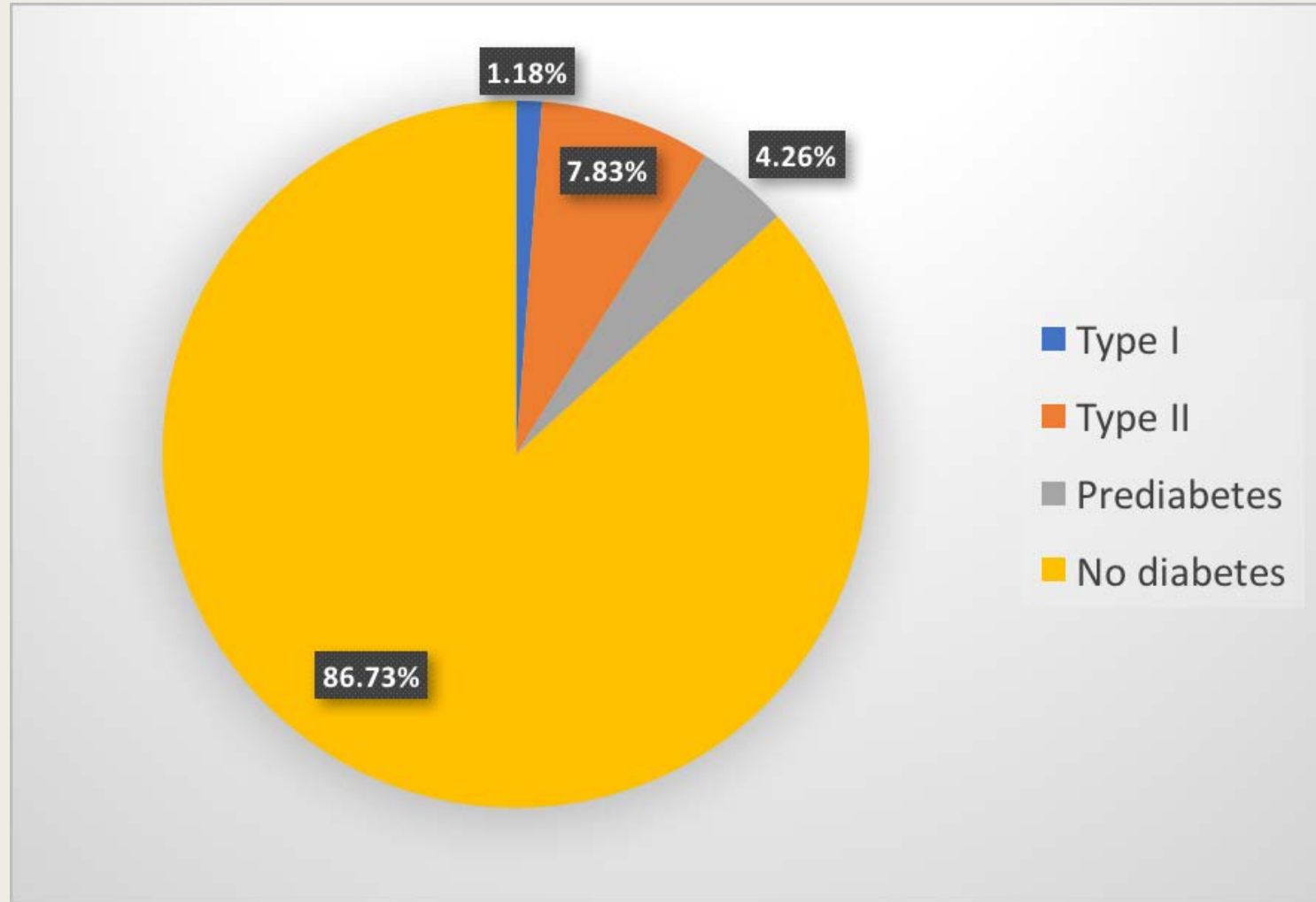


# Biometrics: Body Mass Index



Average:  $30.30 \pm 7.01$

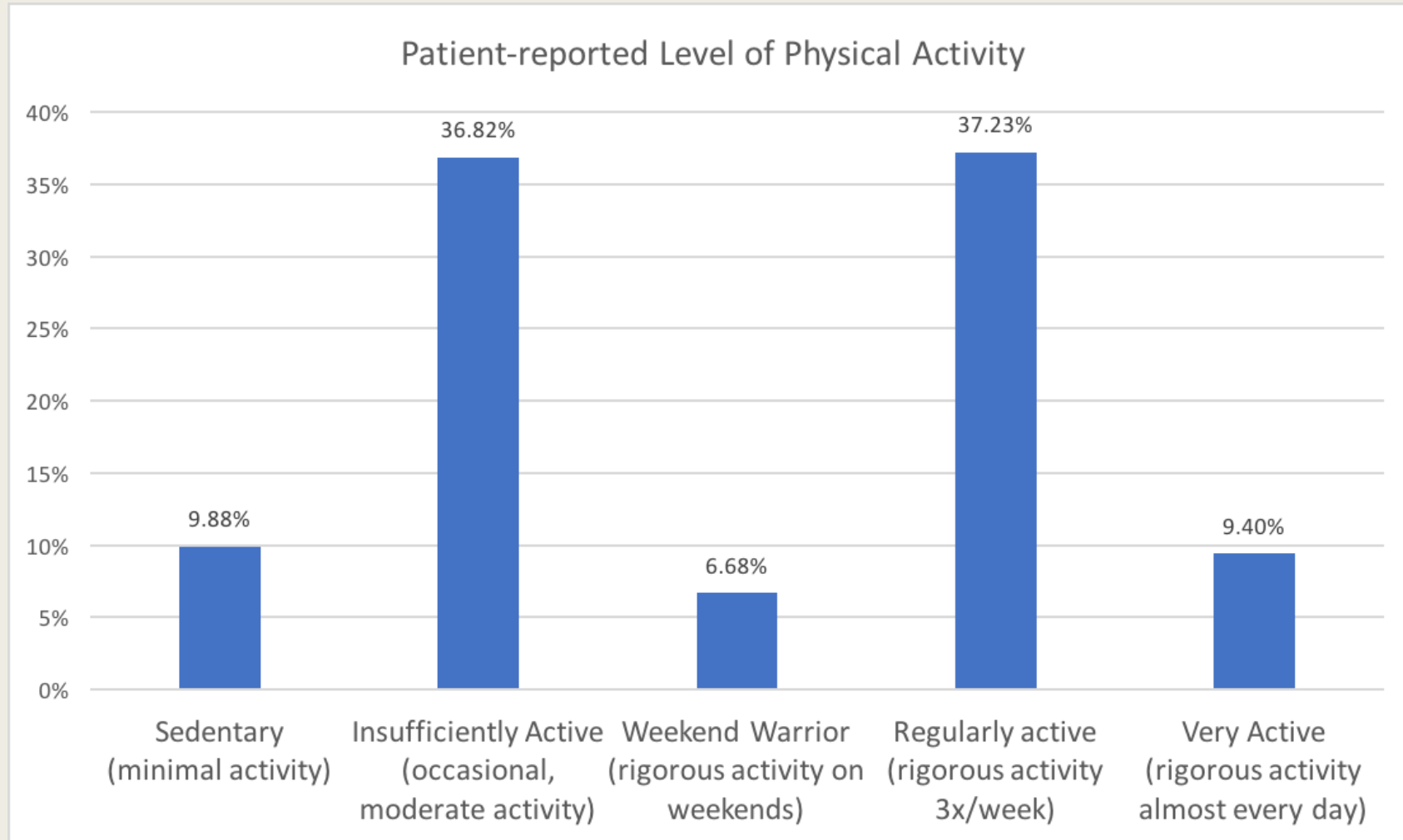
# Disease Burden: Prevalence of Diabetes



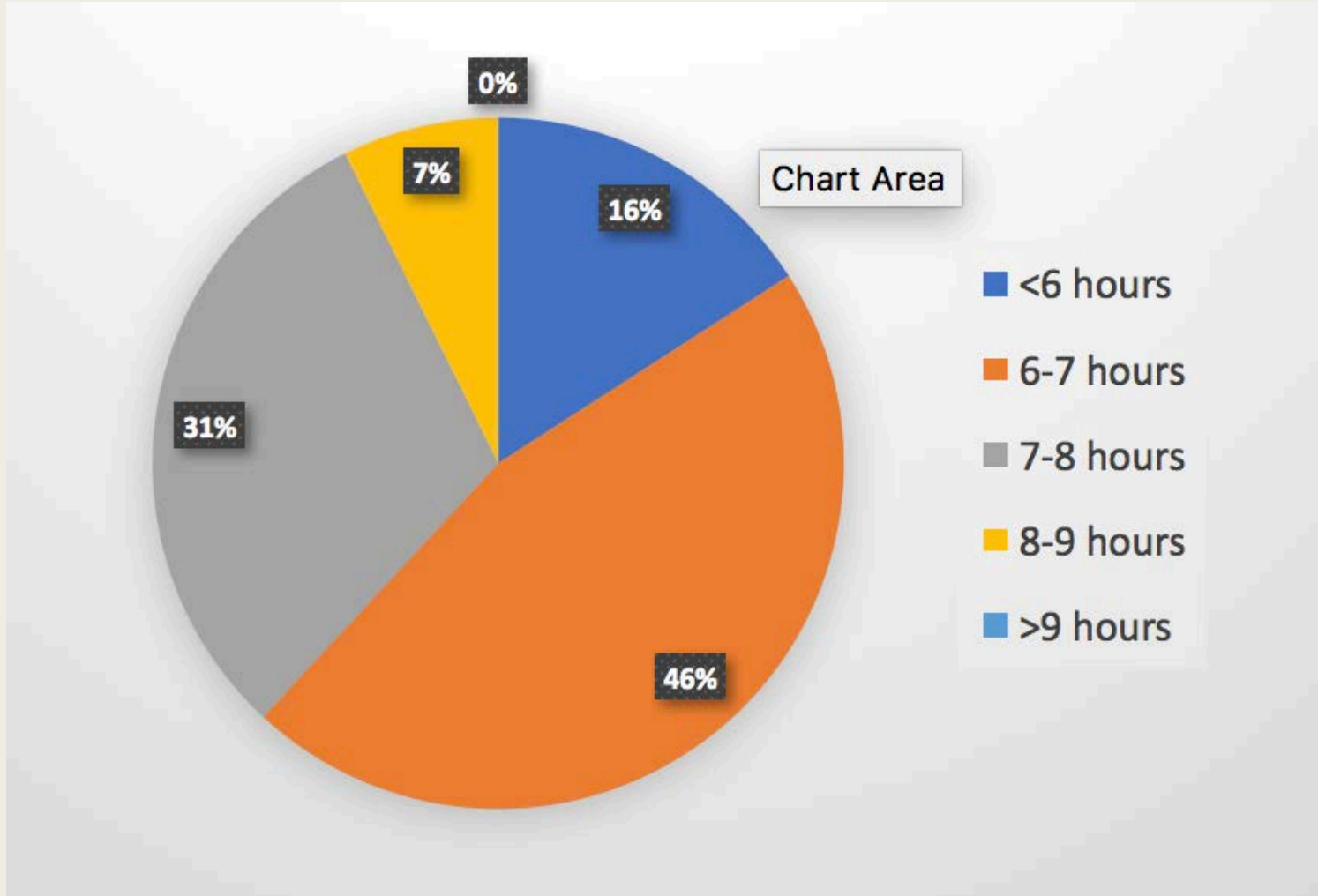
Total Type I and Type II: 9.01%



# Behavioral Health: Physical Activity



# Behavioral Health: Hours of Sleep

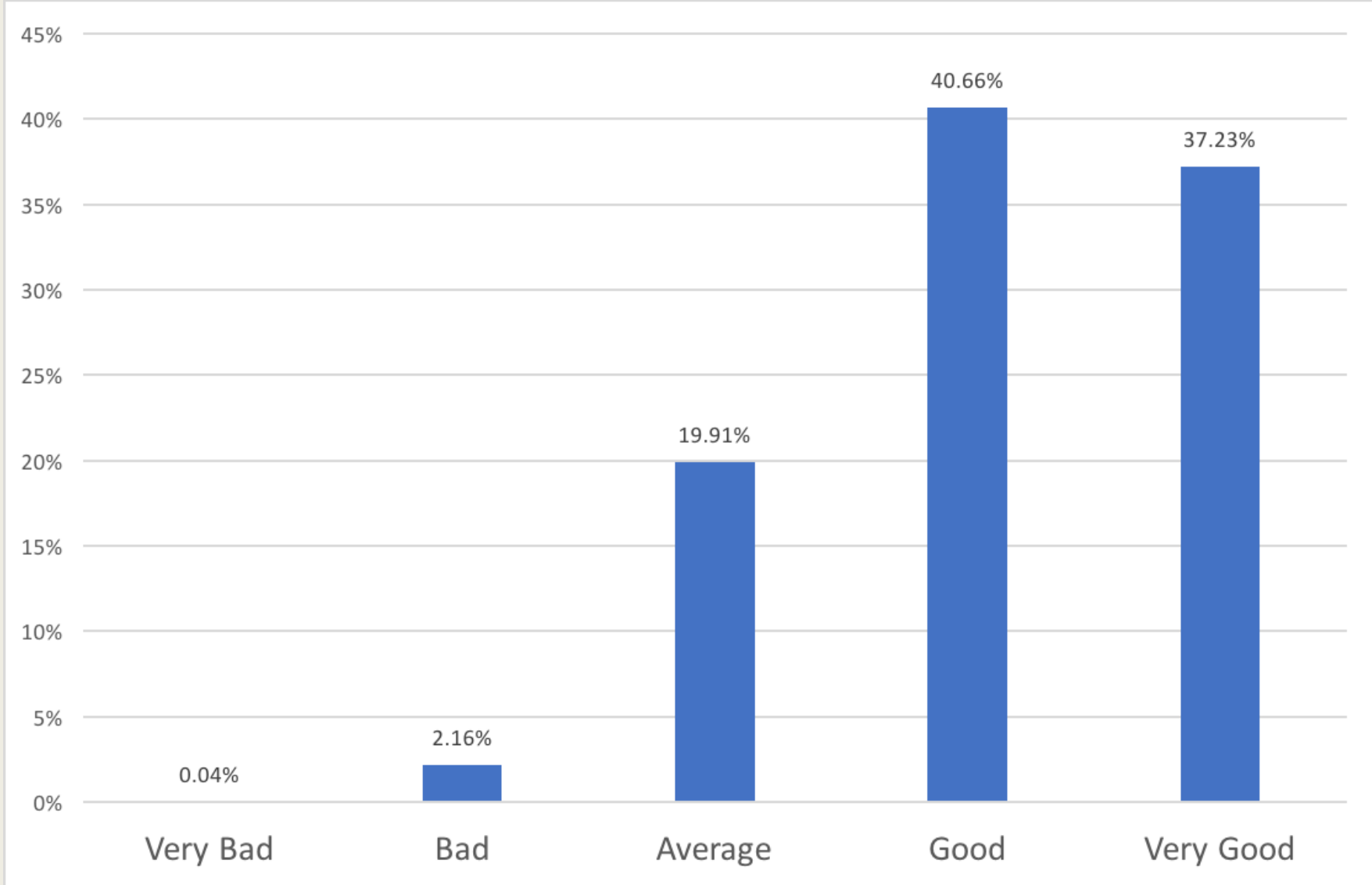


- 62% of respondents are sleeping less than 7 hours per night on average
- Only 38% sleeping the recommended 7-9 hours



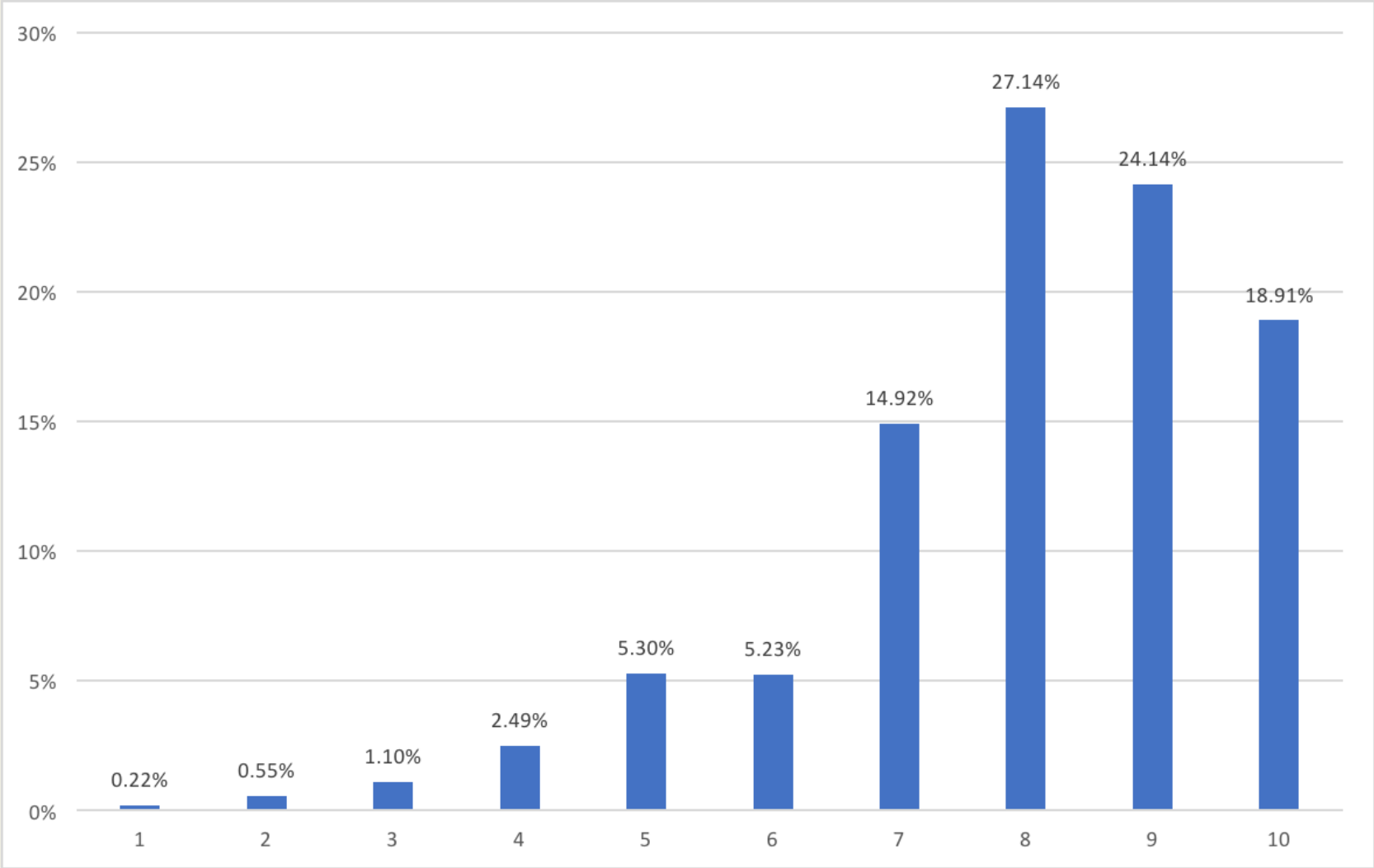


# Quality of Life: Quality of Health in Previous Month



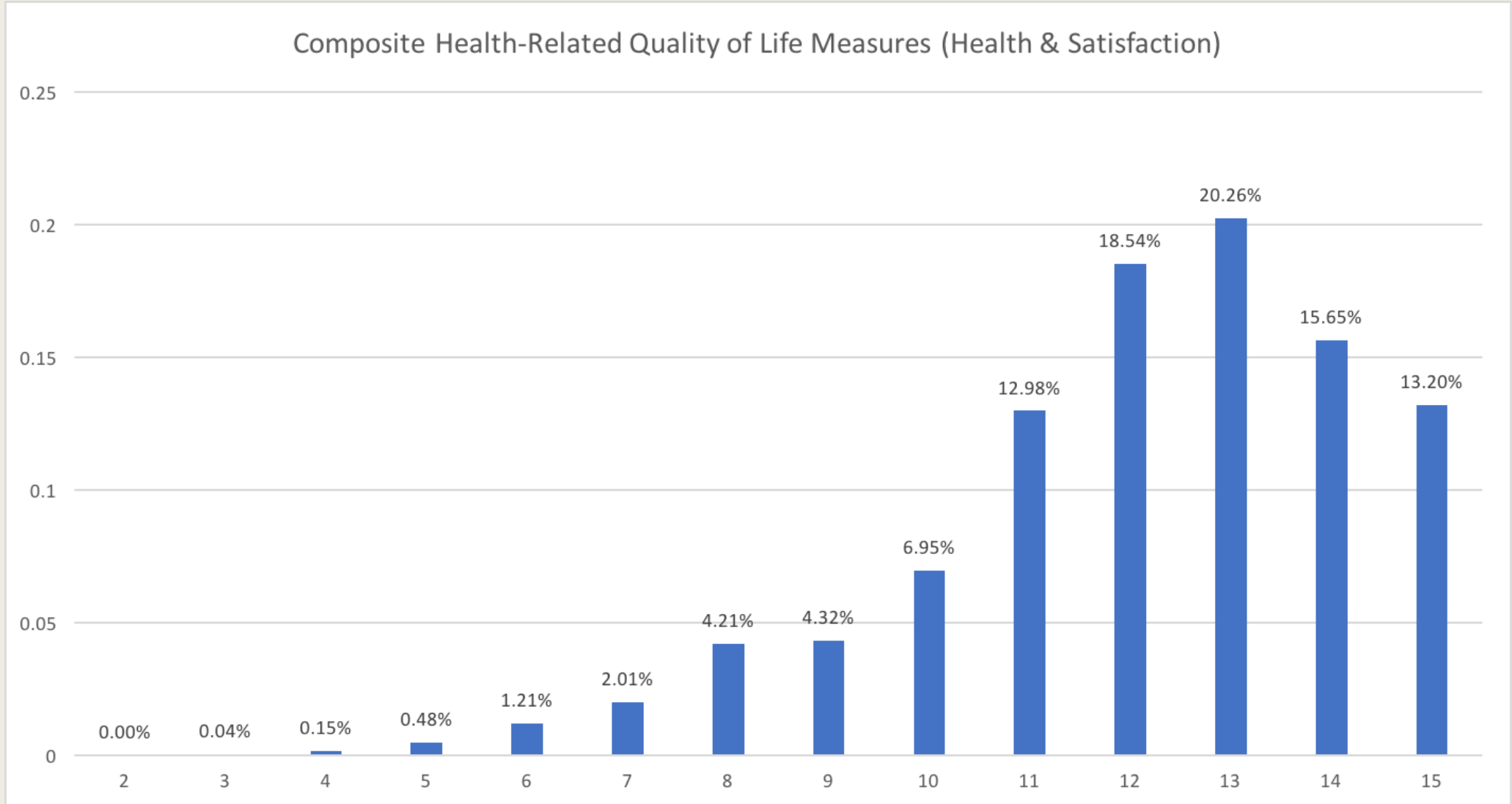


# Quality of Life: Satisfaction with Life (1-10 Scale)

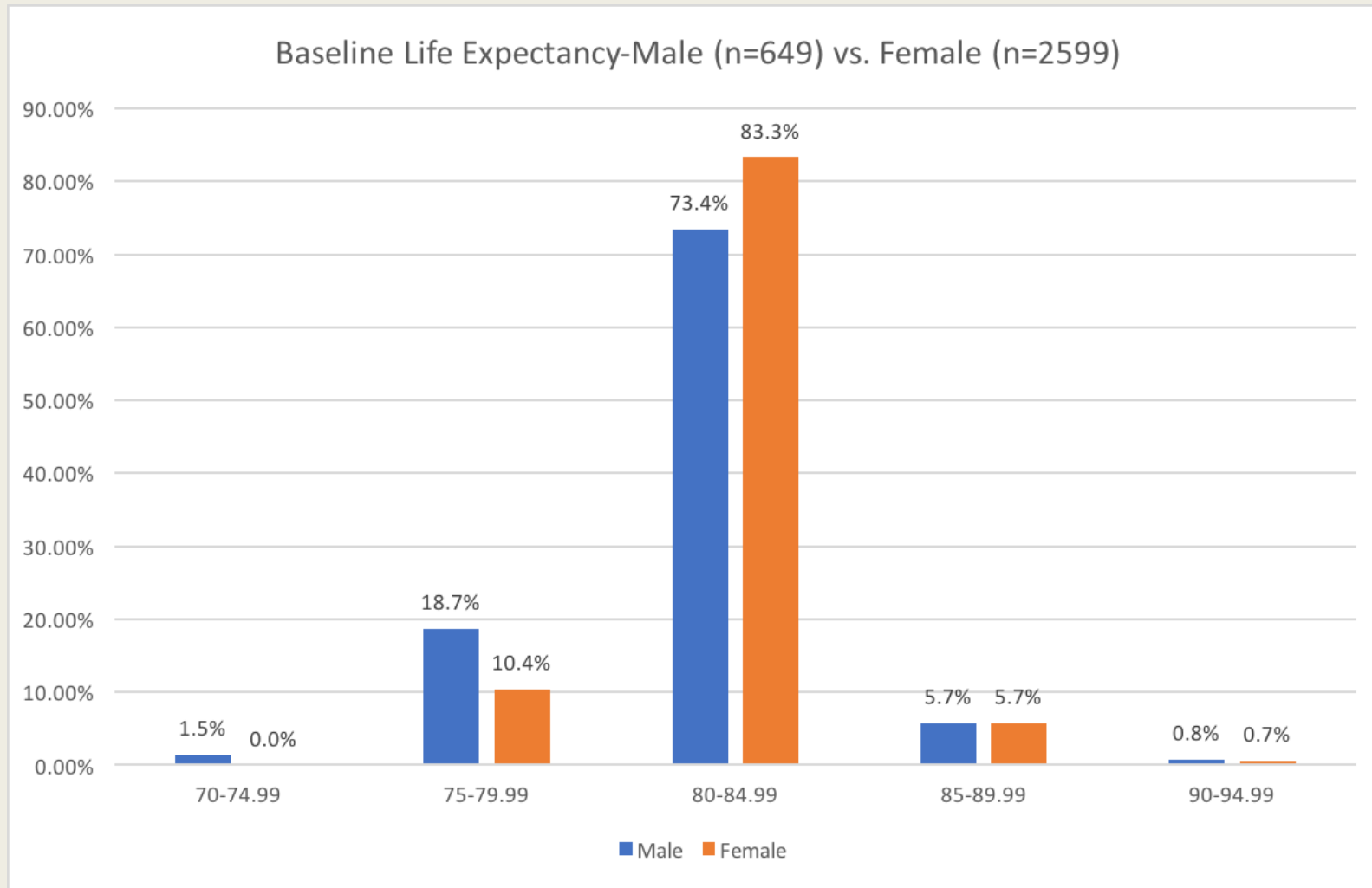




# HRQoL: Composite Score (1-15)



# HRA Reports: Baseline Life Expectancy (at completion)



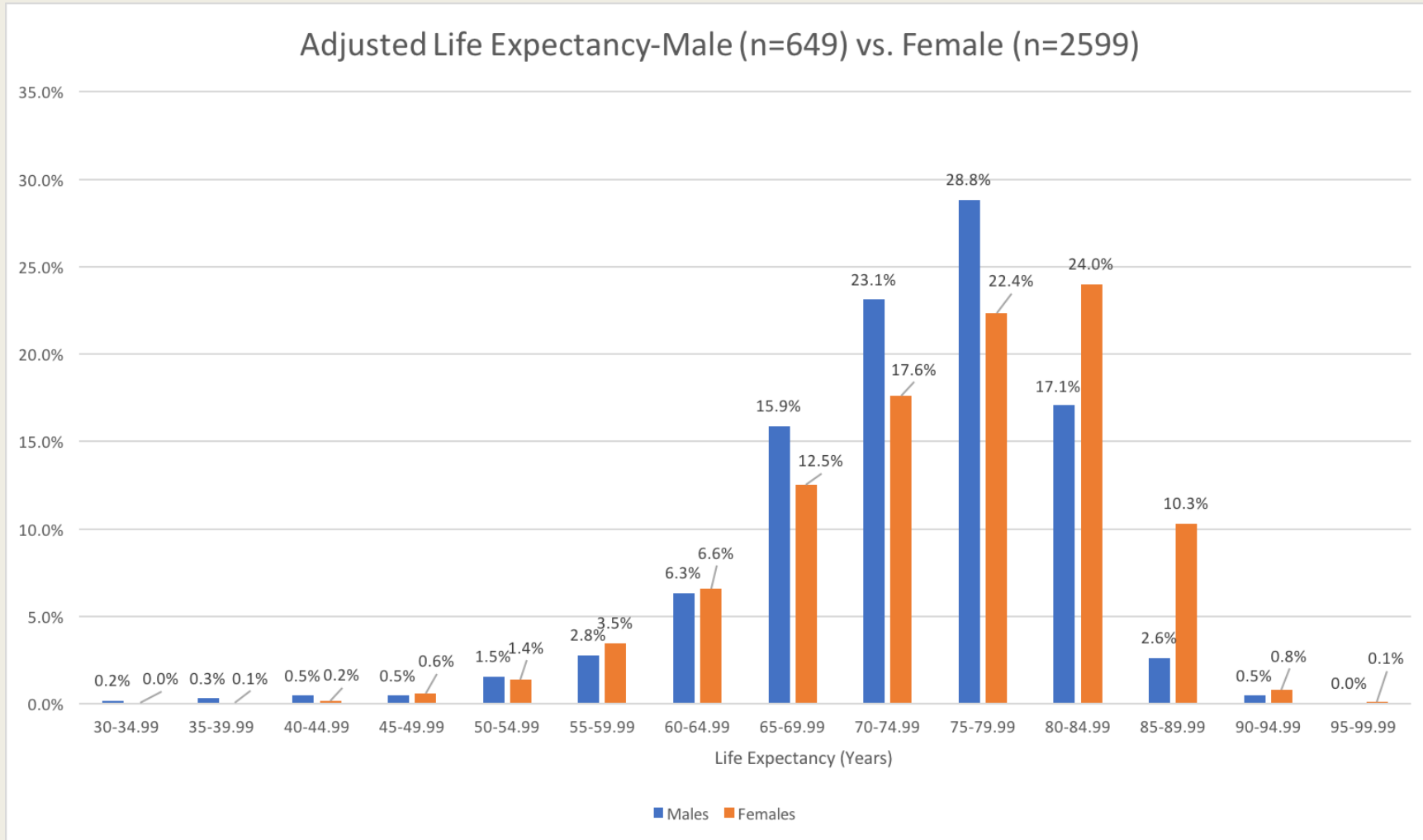
## Males

Average:  $79.6 \pm 3.4$  years

## Females

Average:  $82.5 \pm 2.0$  years

# HRA Report: Adjusted Life Expectancy (at completion)



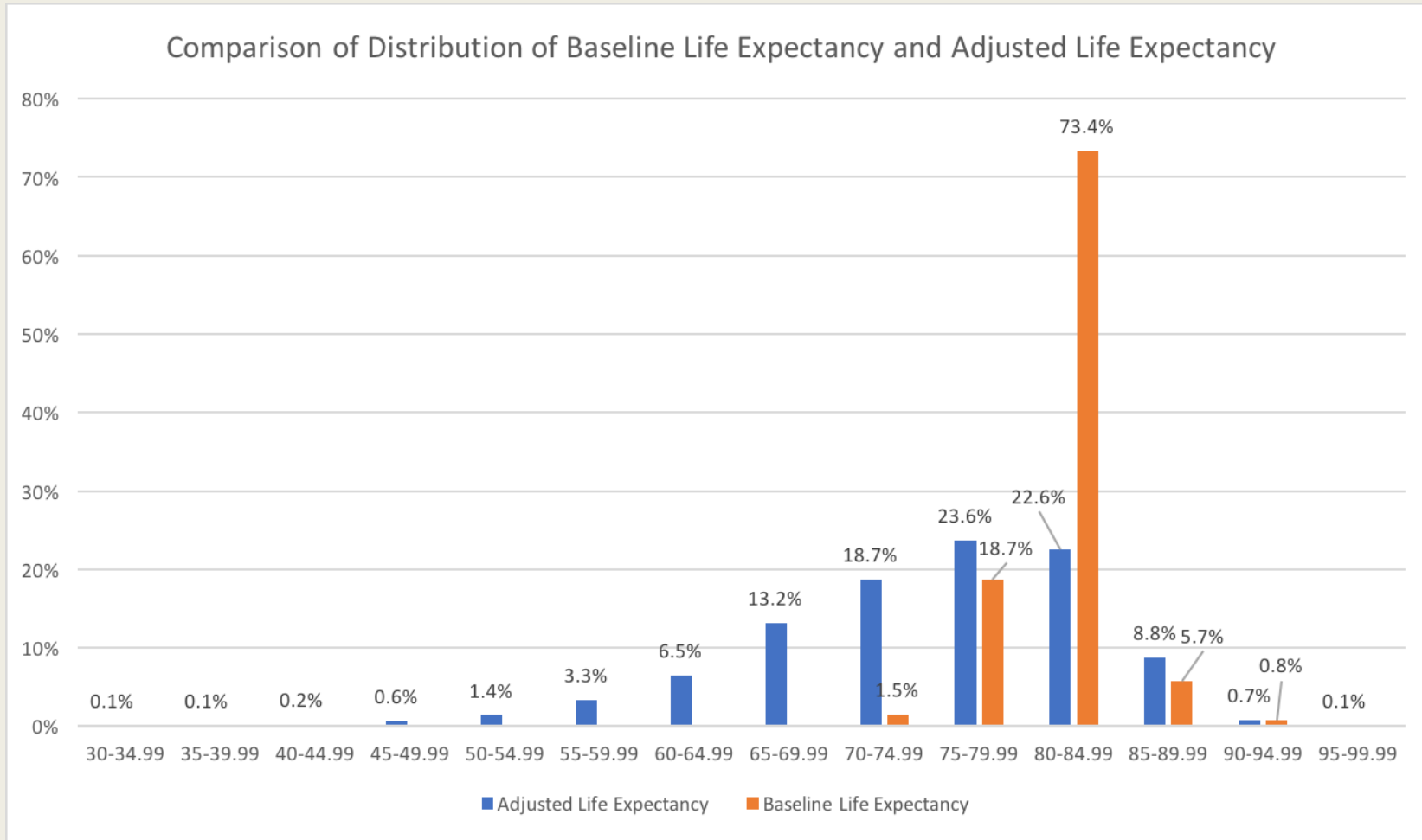
## Males

Average: 73.5 ± 8.1 years

## Females

Average: 75.4 ± 8.7 years

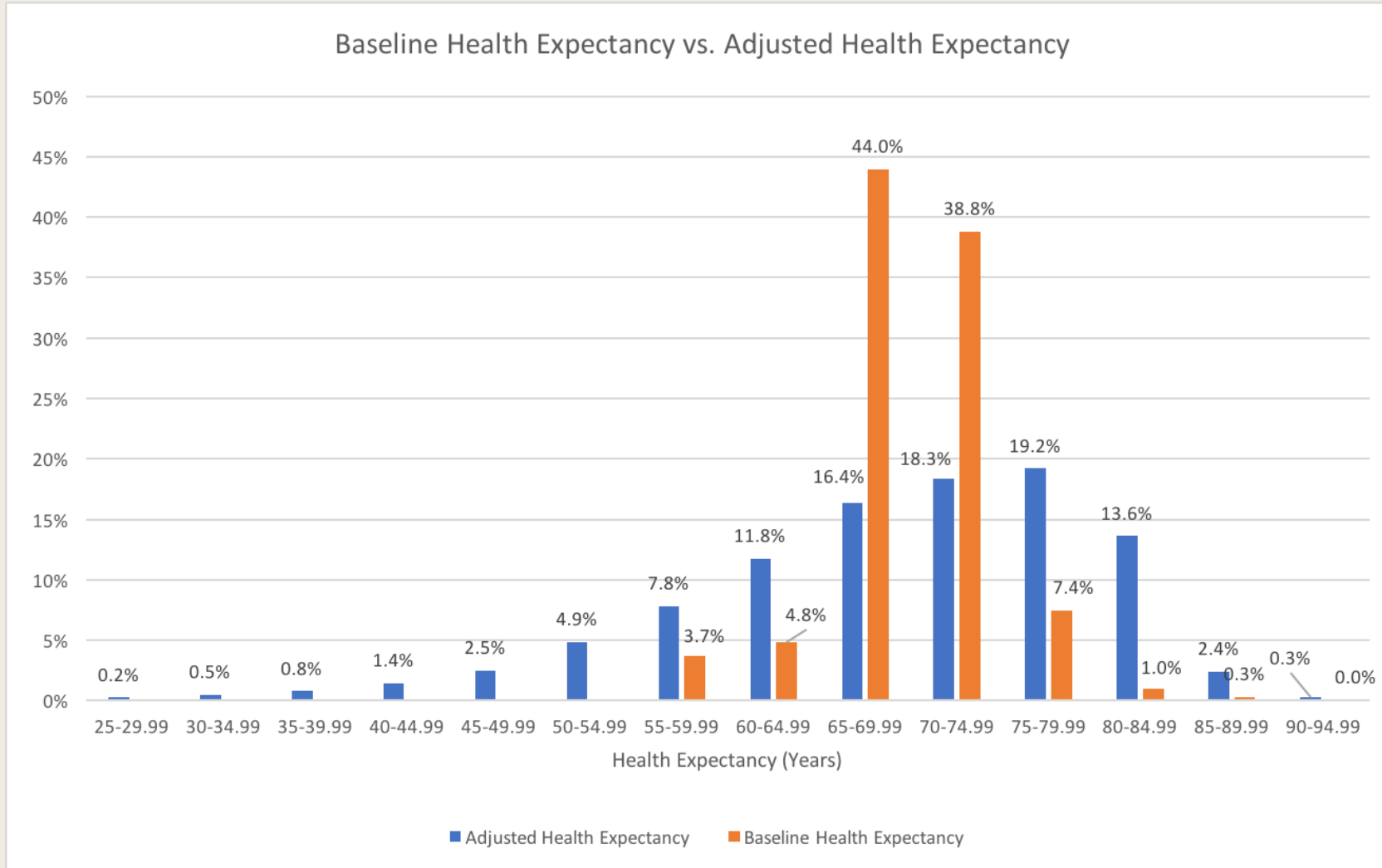
# HRA Report: Baseline vs. Adjusted Life Exp.



Baseline  
Average: 81.9 ± 2.7 years

Adjusted  
Average: 75.0 ± 8.6 years

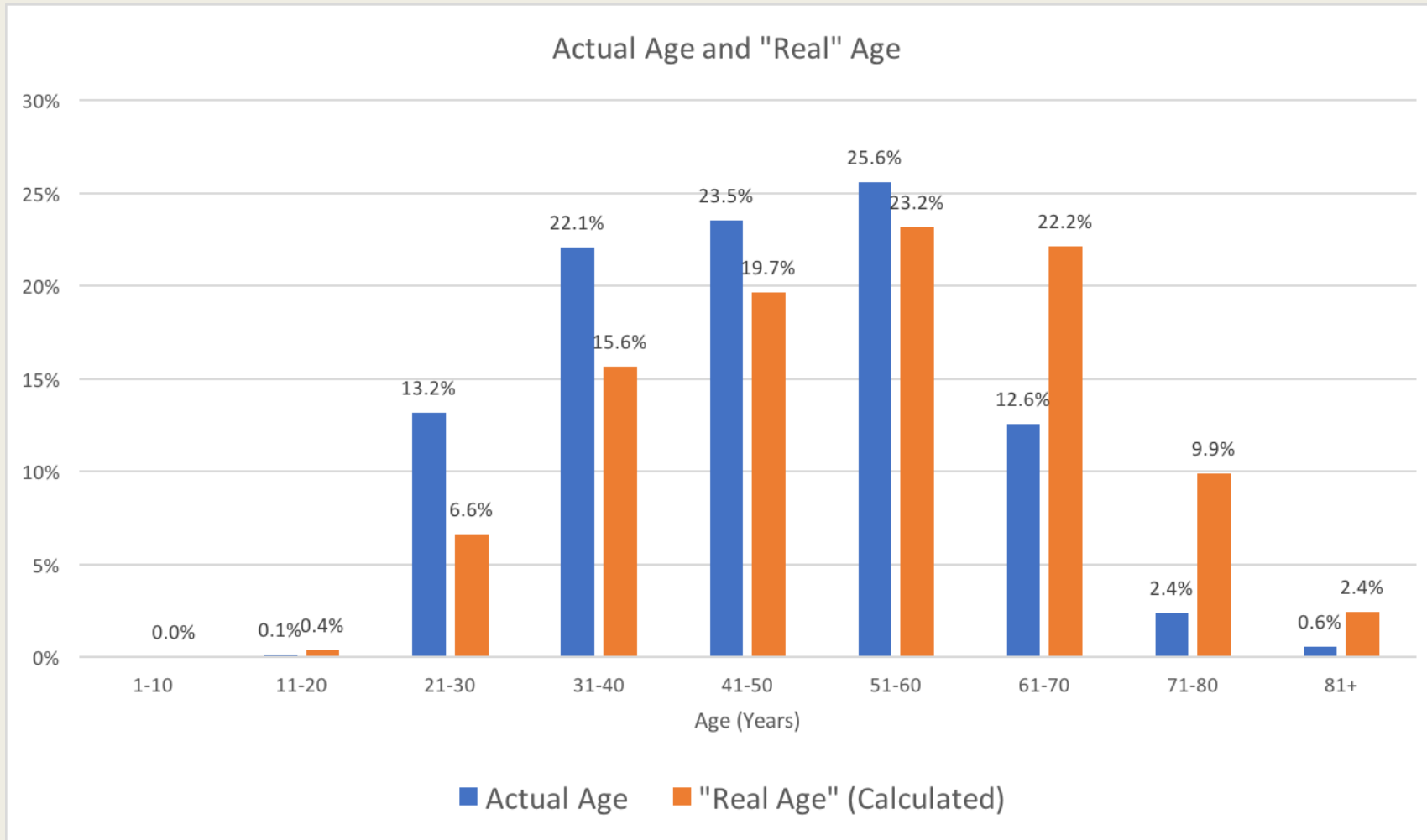
# HRA Report: Baseline vs. Adjusted Health Exp.



Baseline  
Average: 69.9 ± 4.2 years

Adjusted  
Average: 69.4 ± 10.1 years

# HRA Report: Actual Age vs. "Real Age"



Actual Age

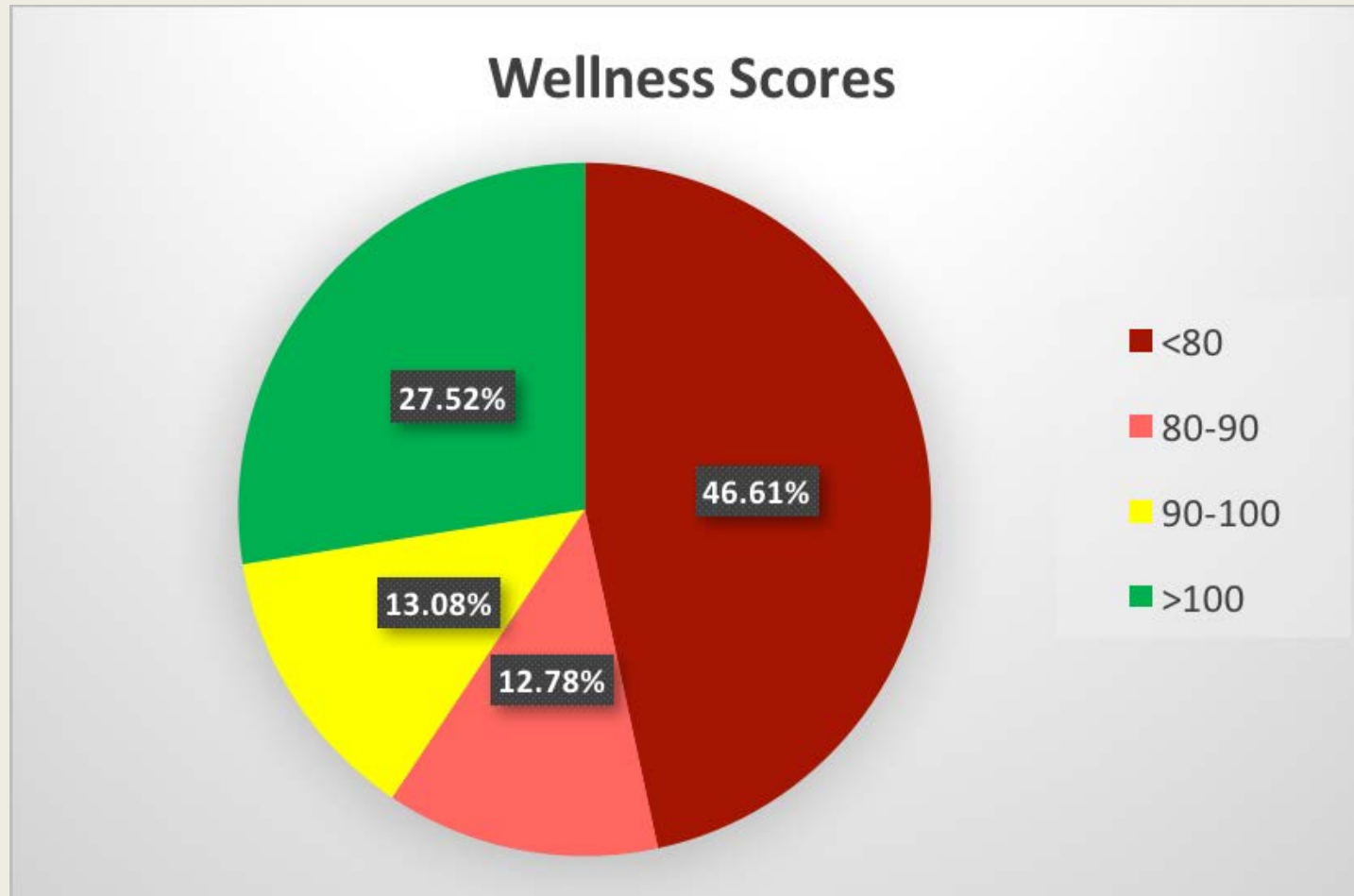
Average:  $46.6 \pm 13.1$  years

Real Age

Average:  $53.5 \pm 14.8$  years



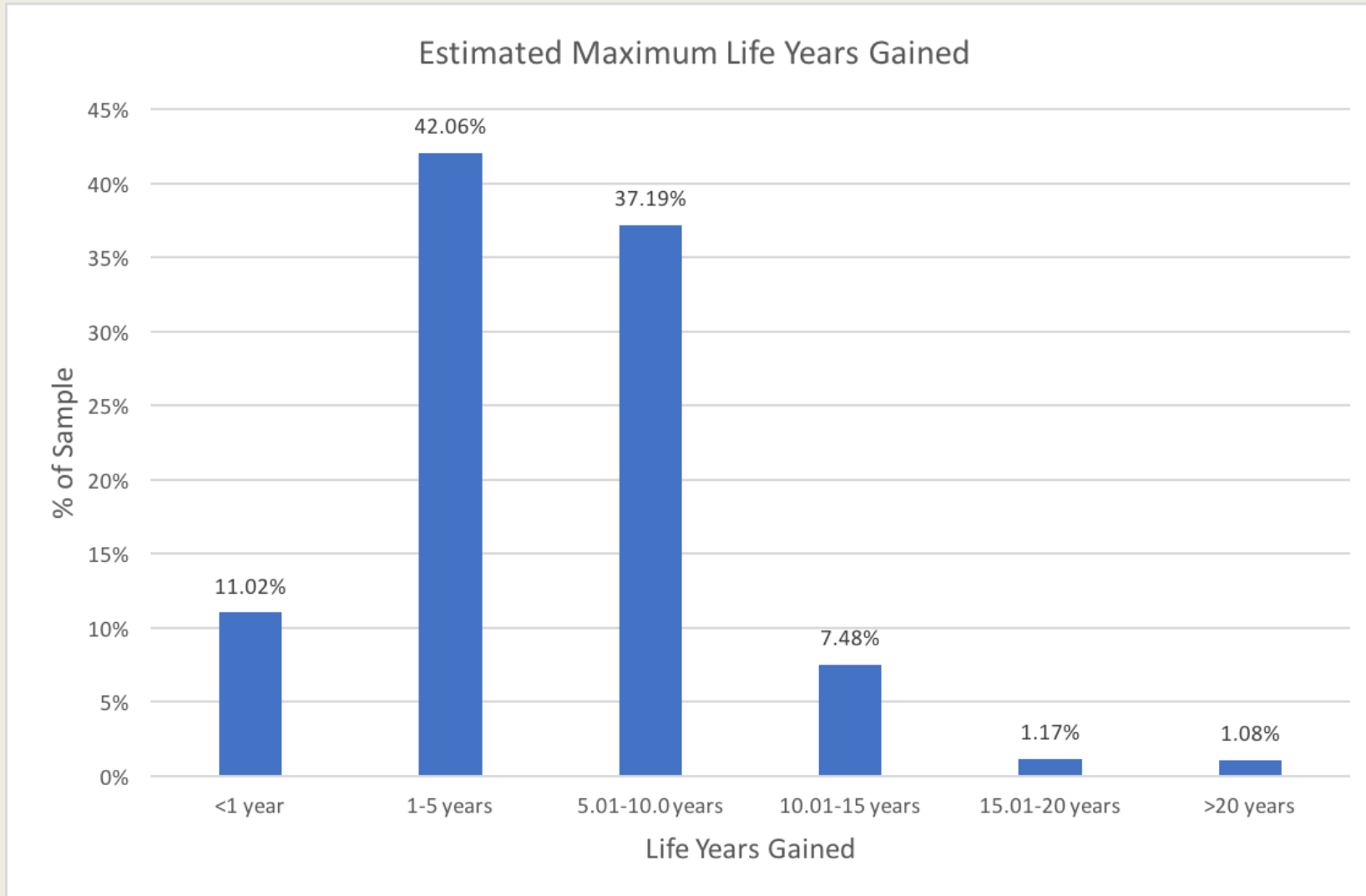
# HRA Report: Wellness Scores



Mean: 81.9

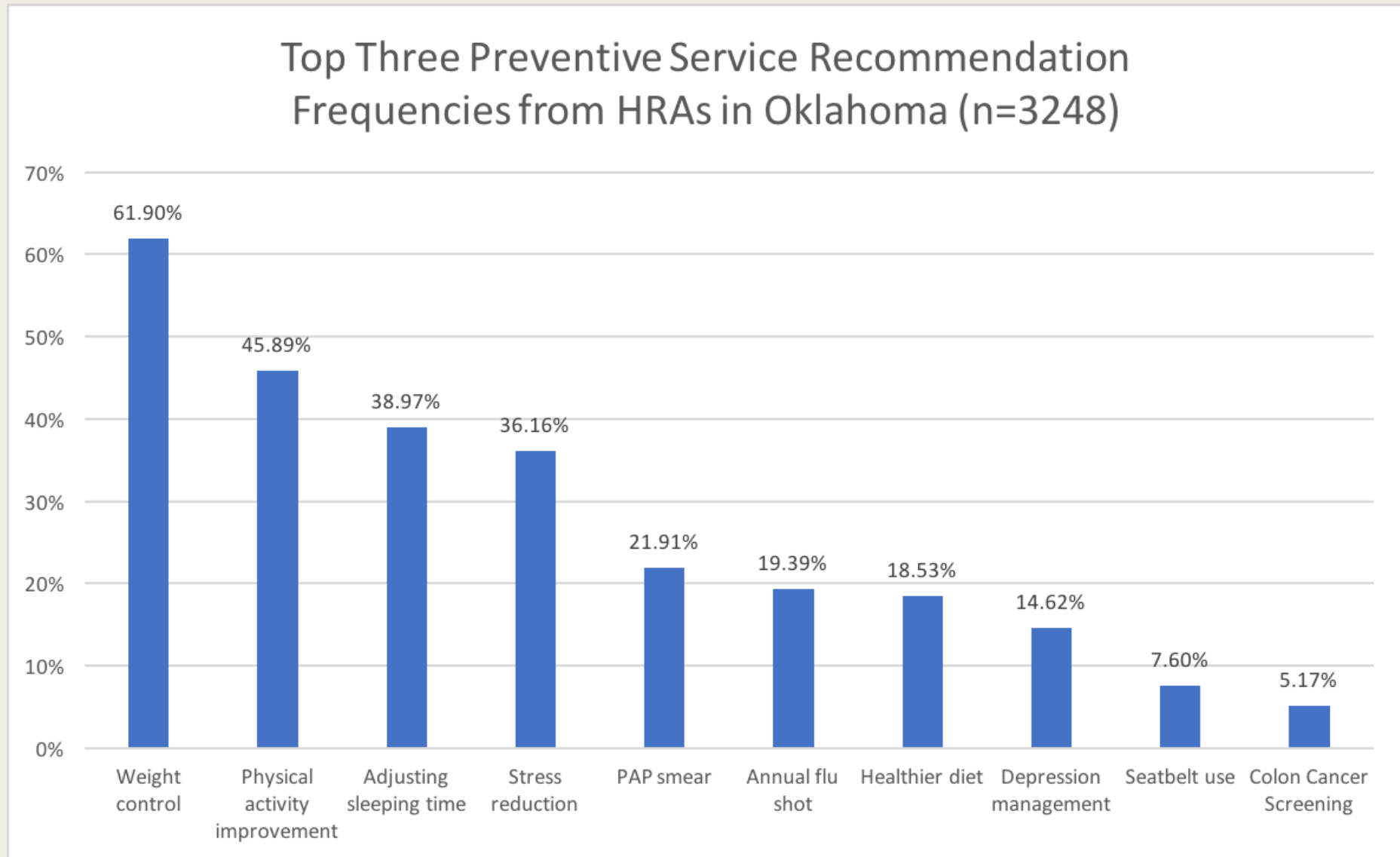
Age-standardized score derived from life years gained or lost comp. to peers

# HRA Report: Life Years That Could Be Gained

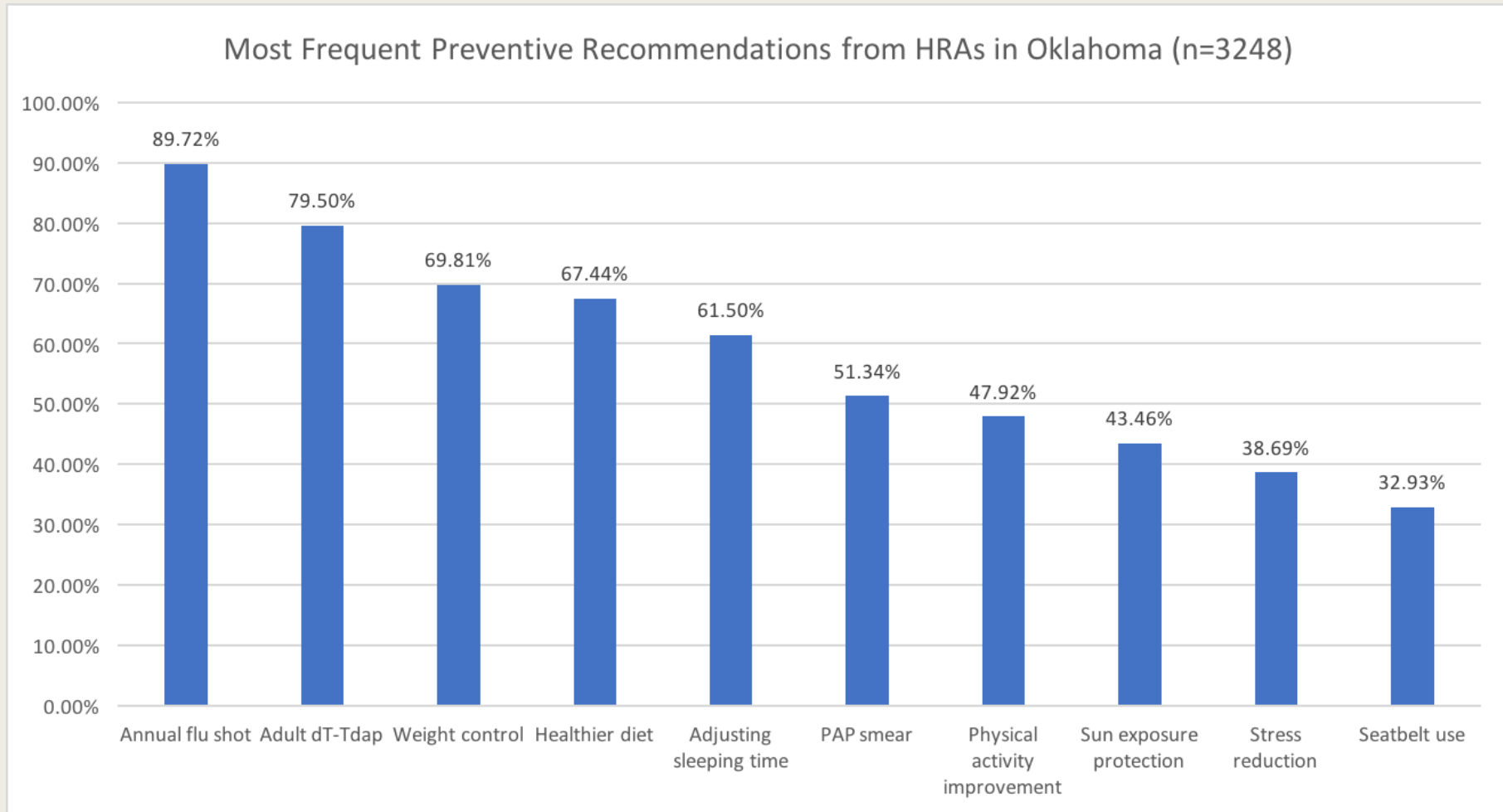


Average:  $5.8 \pm 9.4$  years

# HRA Report: Prev. Health Recommendations (3)



# HRA Report: Prev. Health Recommendations (10)





# HRA Report: Avg. Life Years Saved by Service

- Physical Activity Improvement: 2.46 Life Years Saved
- Weight Control: 1.91 Life Years Saved
- Adjusting Sleeping Time: 1.10 Life Years Saved

# Discussion

- Our sample seems to be representative of Oklahoma population in some ways (e.g., disease prevalence, obesity, cardiovascular risks), while it represents somewhat more educated and higher SES groups due to employment and access to insurance (sampling)
- Many unfavorable Oklahoma trends are well illustrated by the results compared to national statistics
- Global health scores can be highly valuable for risk stratification and development of personalized care plans
- The top 4-5 long-term health recommendations and the large impact of addressing them are related to behavioral health vs. the biomedical risk factors that we tend to address in care settings
- This innovative approach can provide quantitative projections for the individual and population health impact of preventive interventions

# What's Next?

- Comorbidity analysis adjustment
- Regression modeling
  - Relationships between top 3 health recommendations and demographics or
  - Maximum life years saved and demographics
  - Possible others
- Paper writing
- Publication

Questions or Comments?



# References

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