

# Undetected Health Problems and Surveillance Needs in Long-Term Cancer Survivors

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- Survivors who participated in this research
- All contributors

# Background

- Late medical effects widely, as documented in cross-sectional surveys of cancer survivors after systemic treatment
- Little research has investigated the characteristics, consequences, or risk factors for late effects using standardized, objective testing rather than patient report

# Objectives

- Characterize specific medical late effects in hematopoietic stem cell transplantation (HSCT) survivors who report that they have no major health problems
- Determine levels of undetected health problems in otherwise 'healthy' survivors
- Examine whether objective tests of health risks are elevated in these 'healthy' survivors relative to population norms

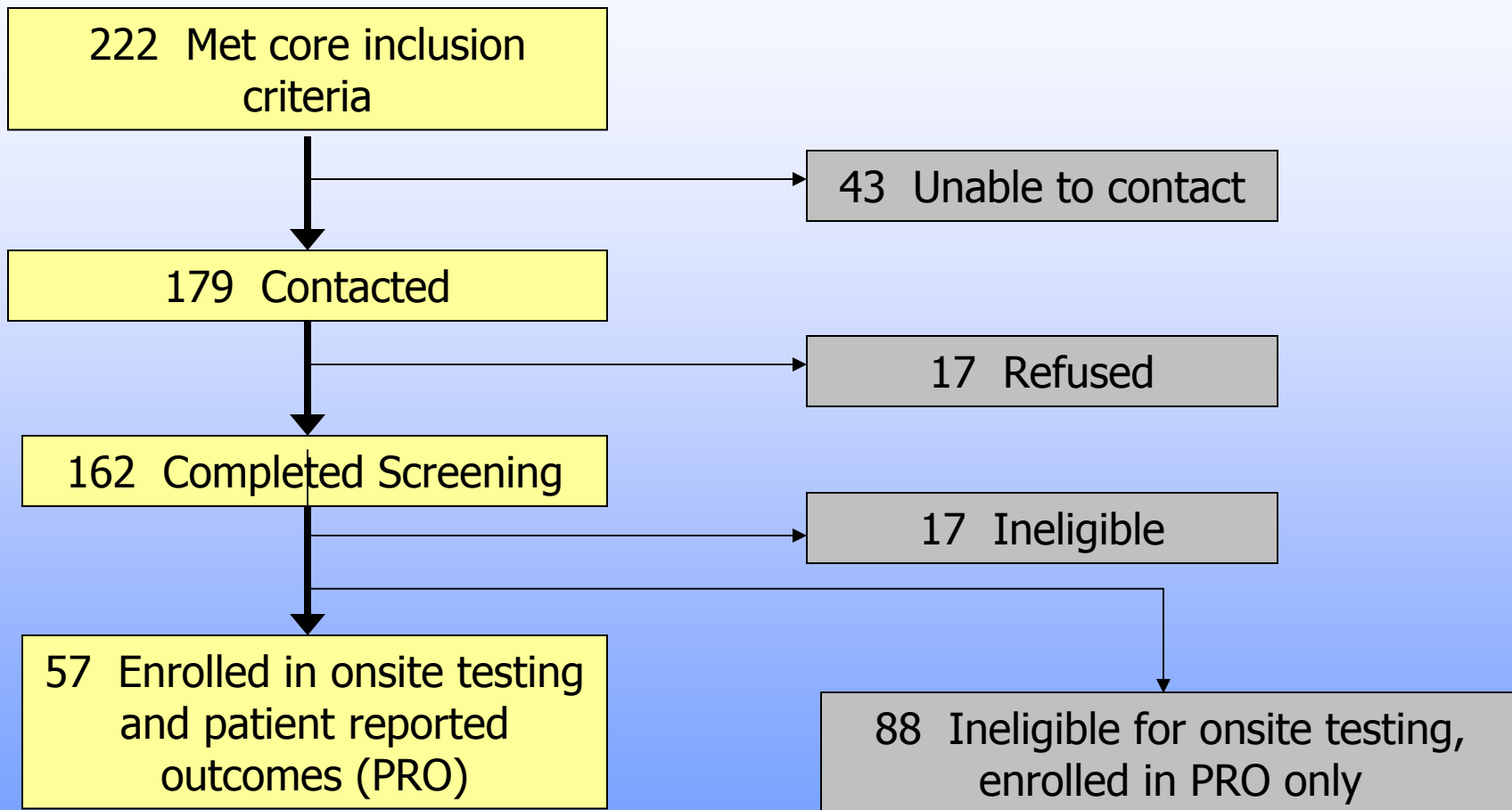
# Method: Participants

- All locally residing HSCT survivors who met eligibility criteria for screening were approached and screened by phone
- Survivors were compared to a cohort from the National Health and Nutrition Examination Survey (NHANES) matched for age, gender and race

# Participants

- Inclusion criteria
  - 5-20 years post-transplant for hematologic malignancy
  - Current age 18-49
  - Able to travel to the Hutchinson Center
  - Able to walk without assistance or aids
- Exclusion criteria
  - Relapse of cancer post-transplant or second cancer
  - Hepatitis C, HIV or AIDS
  - Pulmonary disease or emphysema
  - Arthritis, muscle, joint, or nerve disease
  - Autoimmune disease
  - On immunosuppressive medications
  - Diabetes requiring insulin
  - Uncontrolled cardiovascular disease or cardiac problems
  - Thyroid or electrolyte imbalance not controlled with medication
  - Smoking, alcohol >2/day, or recreational drug use
  - Physician advice not to exercise
  - Unable to read and understand English

# Flow Diagram



# Method: Procedure

- **Patient-reported outcomes** included the Medical Outcomes Study Short Form 36 (SF-36)
- **Objective tests** included:
  - DXA scan for body fat percent
  - Body mass index (BMI)
  - Blood pressure
  - Blood glucose level, lipid panel
  - Treadmill testing for  $VO_2$ max
- **Participants** paid \$100

# Demographic Characteristics of Survivors (N=57)

<u>Age, M <math>\pm</math> SD</u>	39.6 $\pm$ 9.2
<u>Gender, n (%)</u>	
Female	31 (54%)
<u>Ethnicity, n (%)</u>	
Not Hispanic or Latino	53 (93%)
<u>Race, n (%)</u>	
Caucasian	49 (85%)
<u>Educational status, n (%)</u>	
High school degree/GED only	7 (9%)
<u>Family income, n (%)</u>	
<\$40,000	13 (23%)
>\$80,000	31 (54%)
<u>Marital status, n (%)</u>	
Married/living with a partner	38 (67%)

# Clinical Characteristics of Survivors (N=57)

## Diagnosis, n (%)

Chronic Myeloid Leukemia	19 (33%)
Acute Lymphocytic Leukemia	7 (12%)
Acute Myeloid Leukemia	6 (11%)
Hodgkin Disease	6 (11%)
Non-Hodgkin Lymphoma	5 ( 9%)
Myelodysplastic Syndrome	5 ( 9%)
Other	9 (15%)

## Type of transplant, n (%)

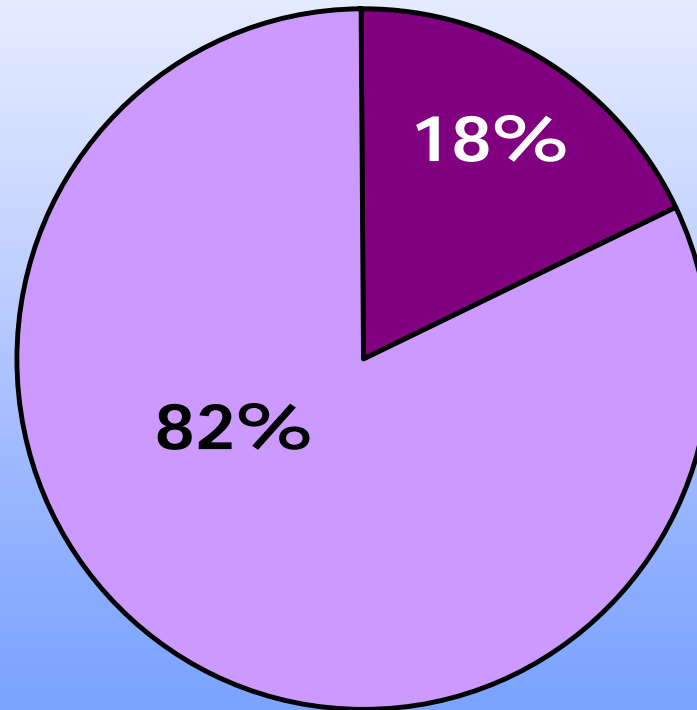
Allogeneic	45 (79%)
Autologous	12 (21%)

Age at transplant, M  $\pm$  SD 28.1  $\pm$  10.7

Years since transplant, M  $\pm$  SD 11.5  $\pm$  4.2

# Patient report of physical function (SF-36)

At or above  
population  
mean  
(T score 50  
or higher)

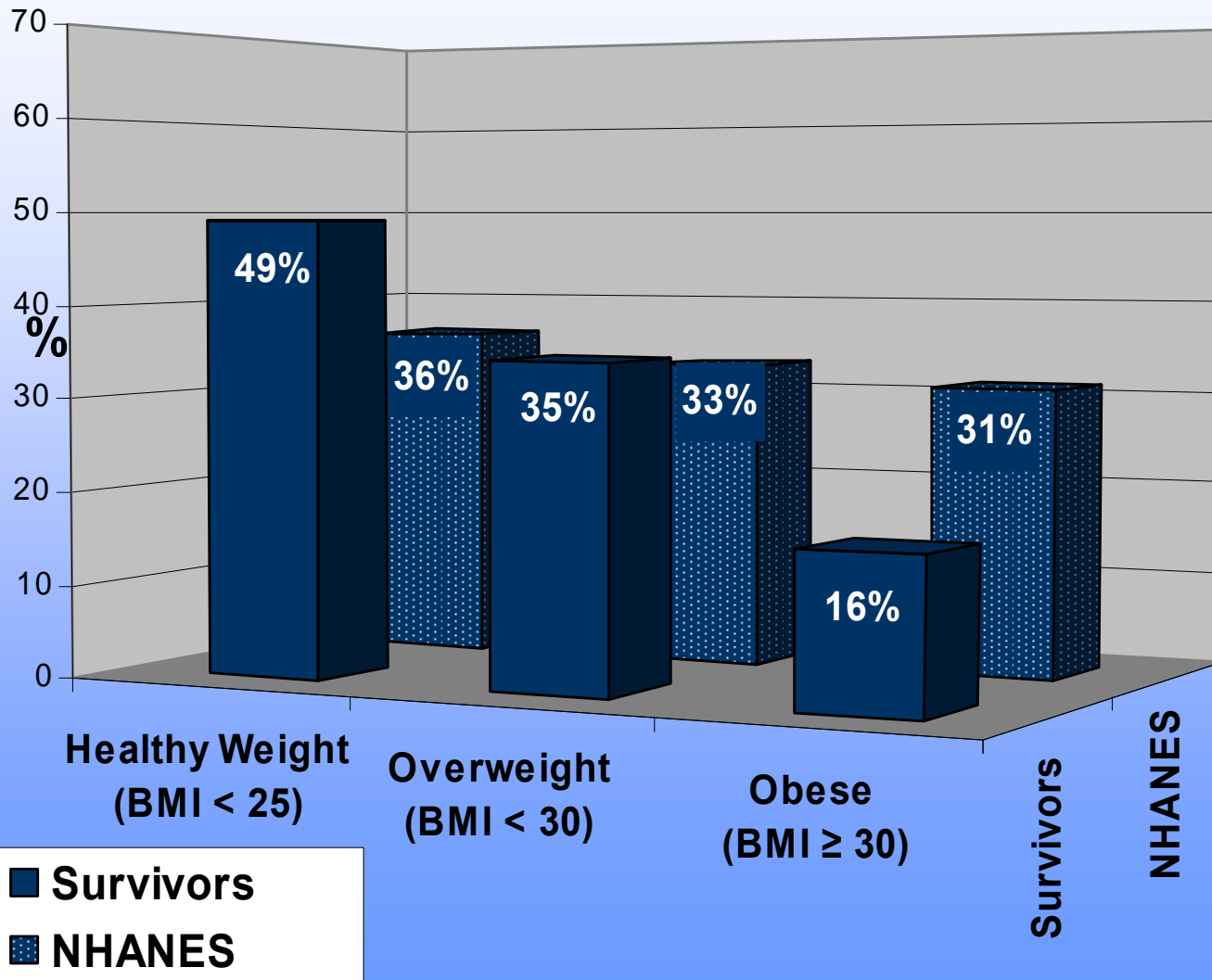


Below  
population  
mean  
(T score  
below 50)

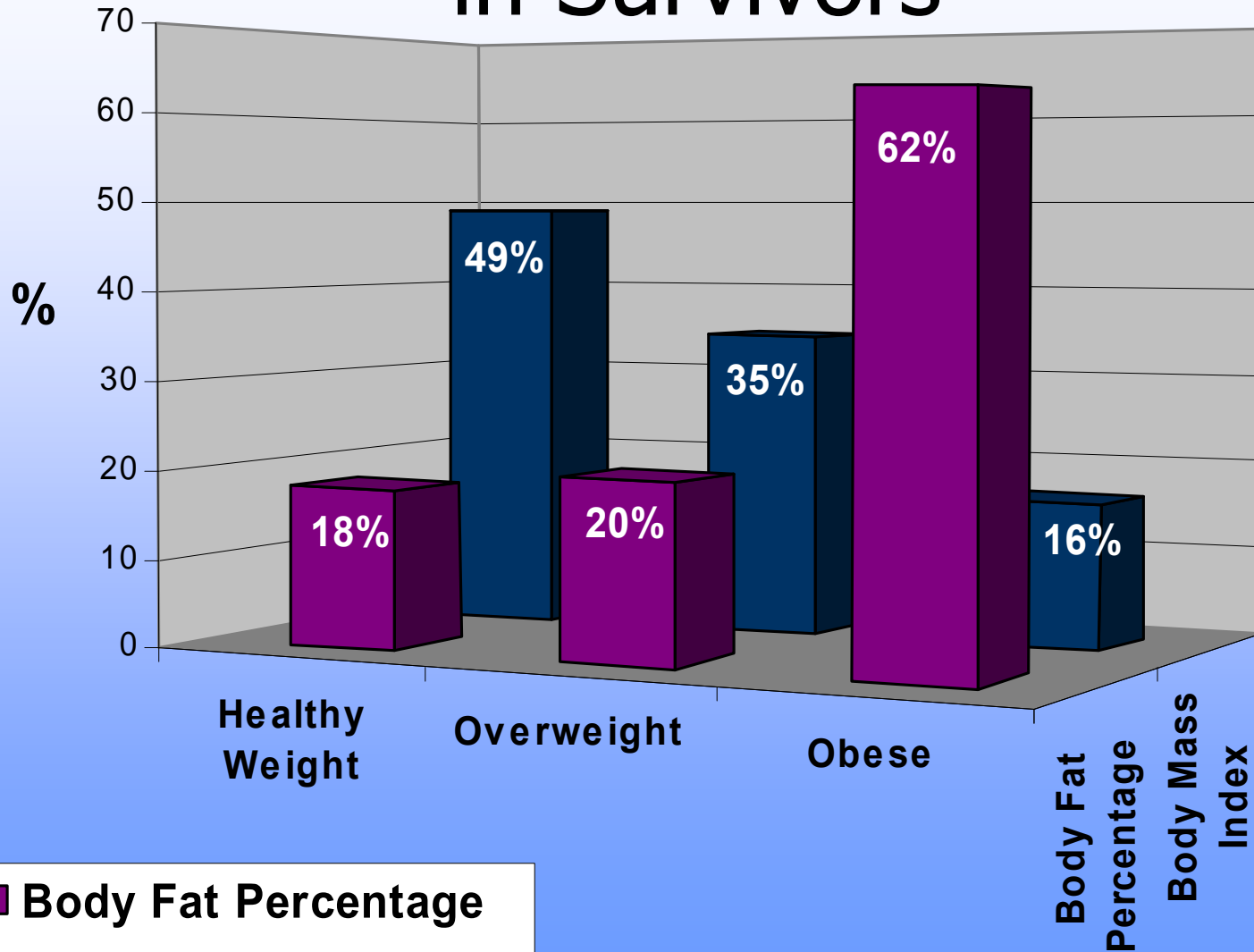
# Comparison of Survivors to matched NHANES cohort

	<u>Survivors</u> (N=57) M (SD)	<u>NHANES</u> (N=571) M (SD)	<u>P</u>
<b>BMI (kg/m<sup>2</sup>)</b>			
Males	26.1 ( 4.2)	28.1 ( 4.9)	.03
Females	24.6 ( 5.5)	27.4 ( 6.9)	.01
<b>Blood Pressure</b>			
Systolic	114.8 ( 13.3)	116.9 (13.2)	.25
Diastolic	76.5 ( 11.1)	73.3 ( 11.0)	.04
<b>Glucose, fasting</b>	94.3 (20.9)	90.9 (20.9)	.22
<b>Cholesterol</b>			
LDL	124.0 ( 38.2)	122.9 (22.8)	.83
Triglycerides	165.9 (107.7)	141.9 (173.3)	.09
Total Cholesterol	217.0 ( 41.1)	205.3 (40.5)	.01

# Overweight and Obesity: Body Mass Index



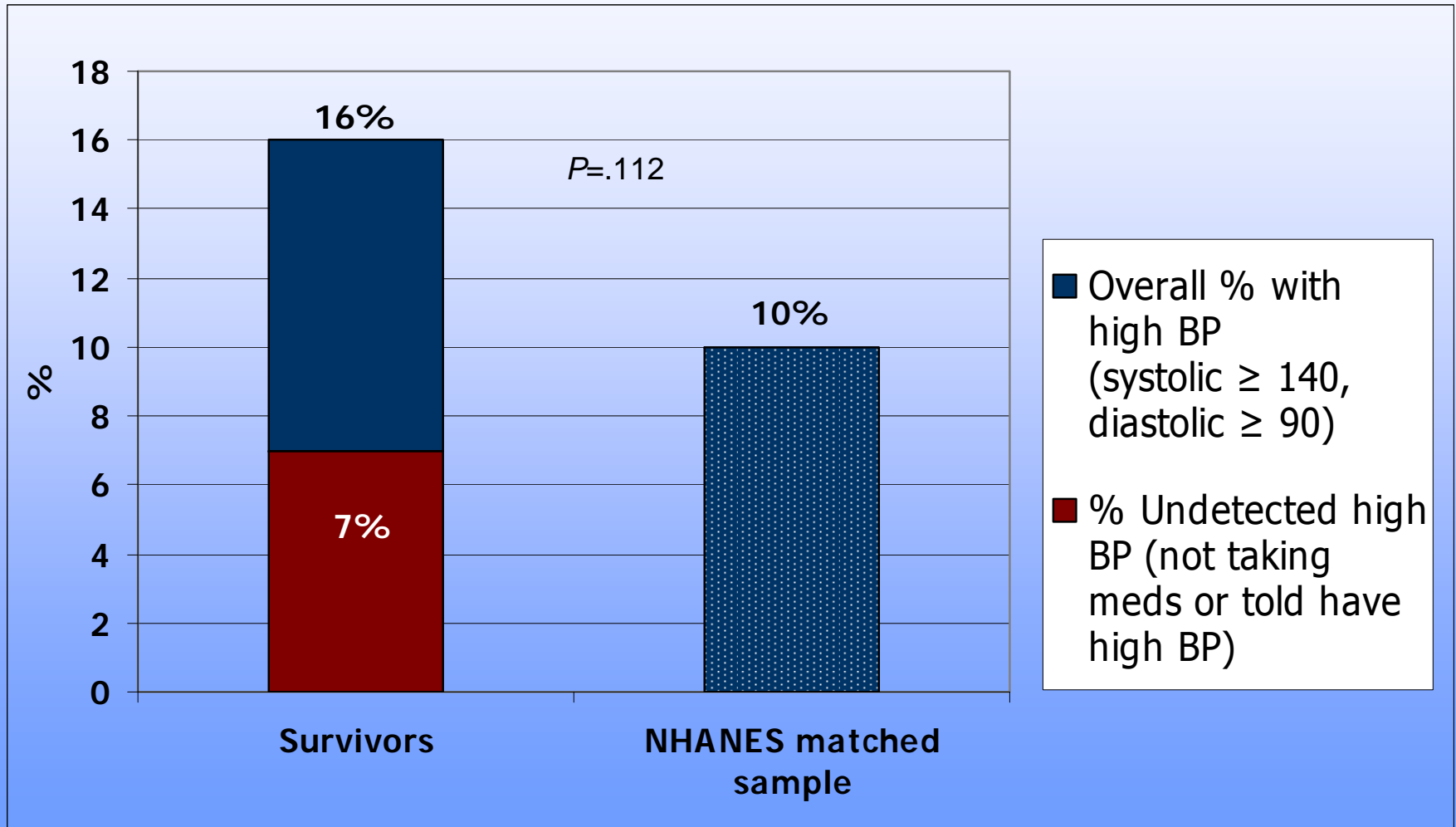
# Overweight and Obesity in Survivors



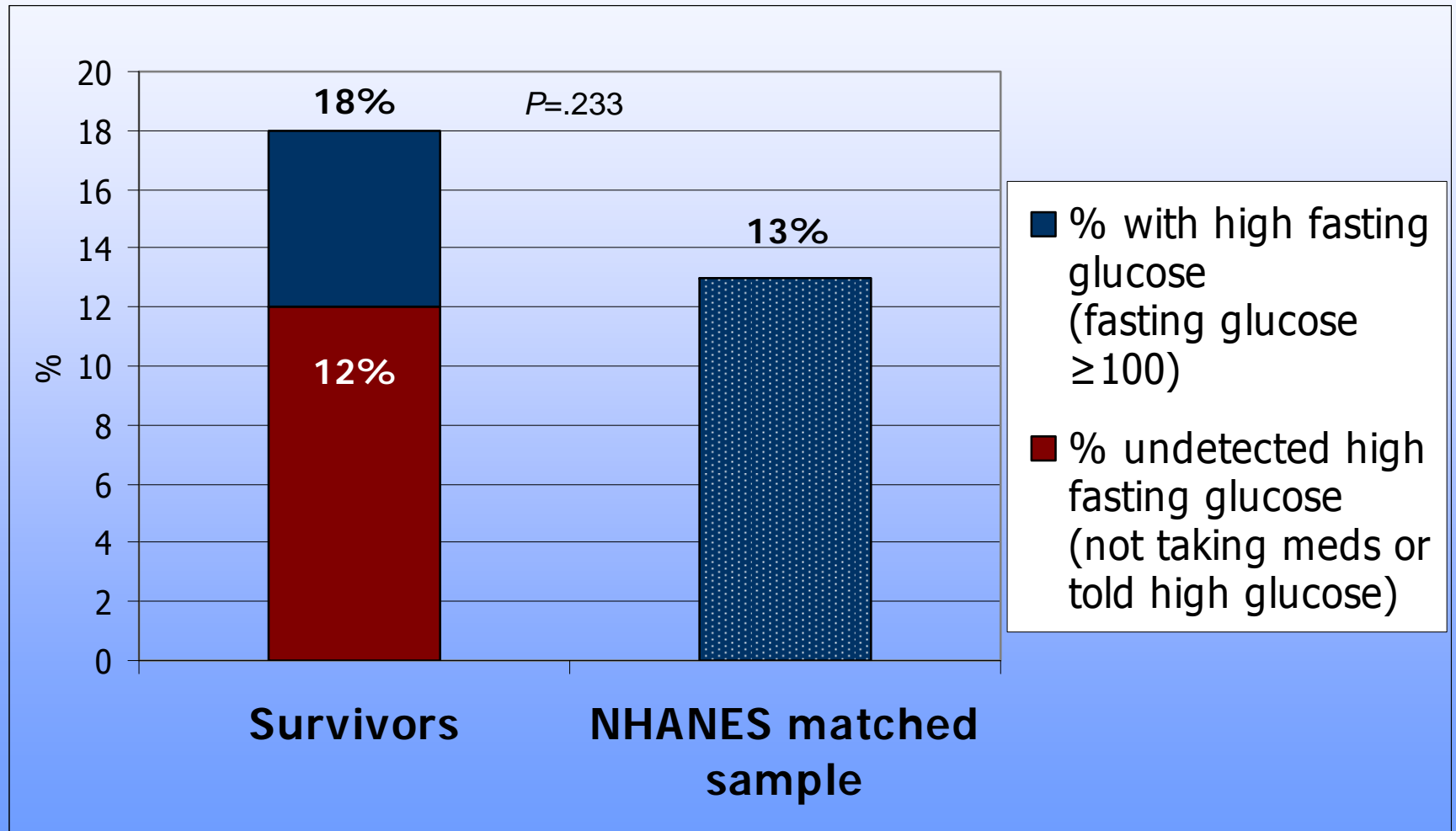
■ Body Fat Percentage

■ Body Mass Index

# Elevated Blood Pressure

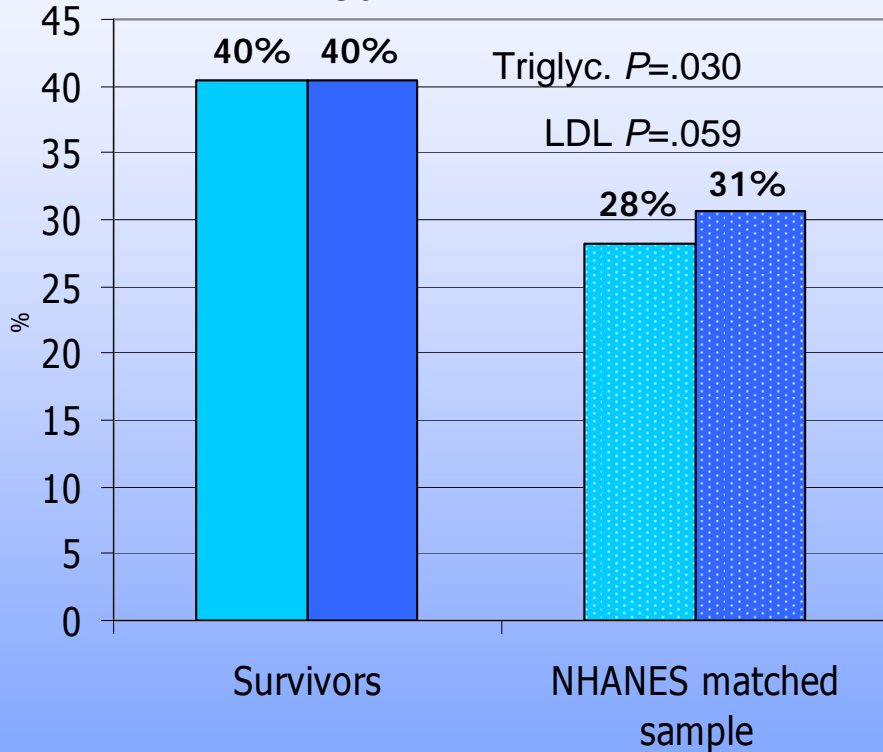


# Elevated Fasting Glucose

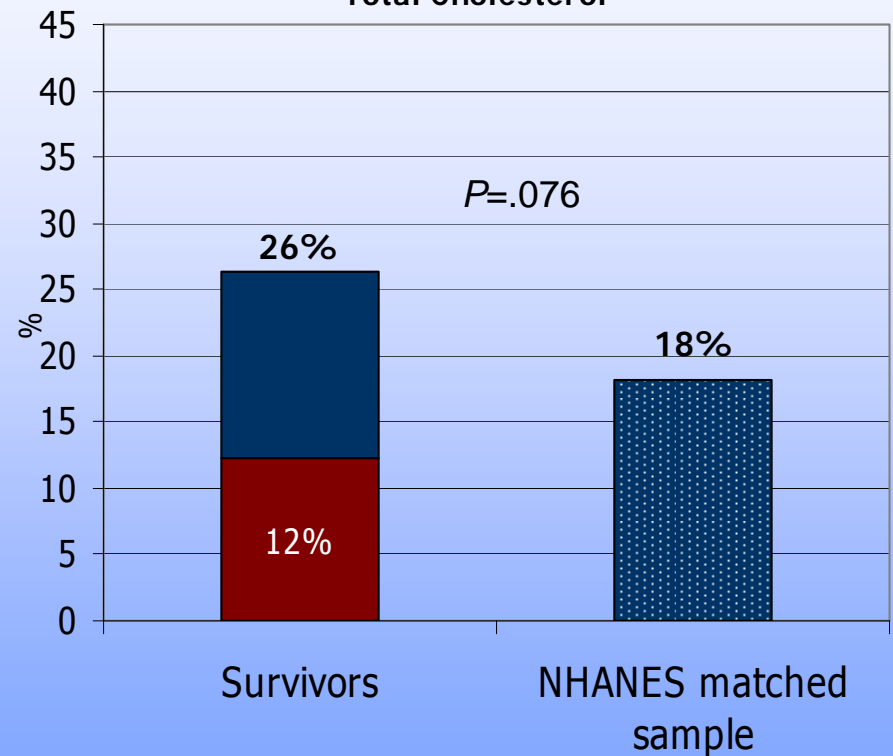


# Hyperlipidemia

### Triglycerides and LDL



### Total Cholesterol



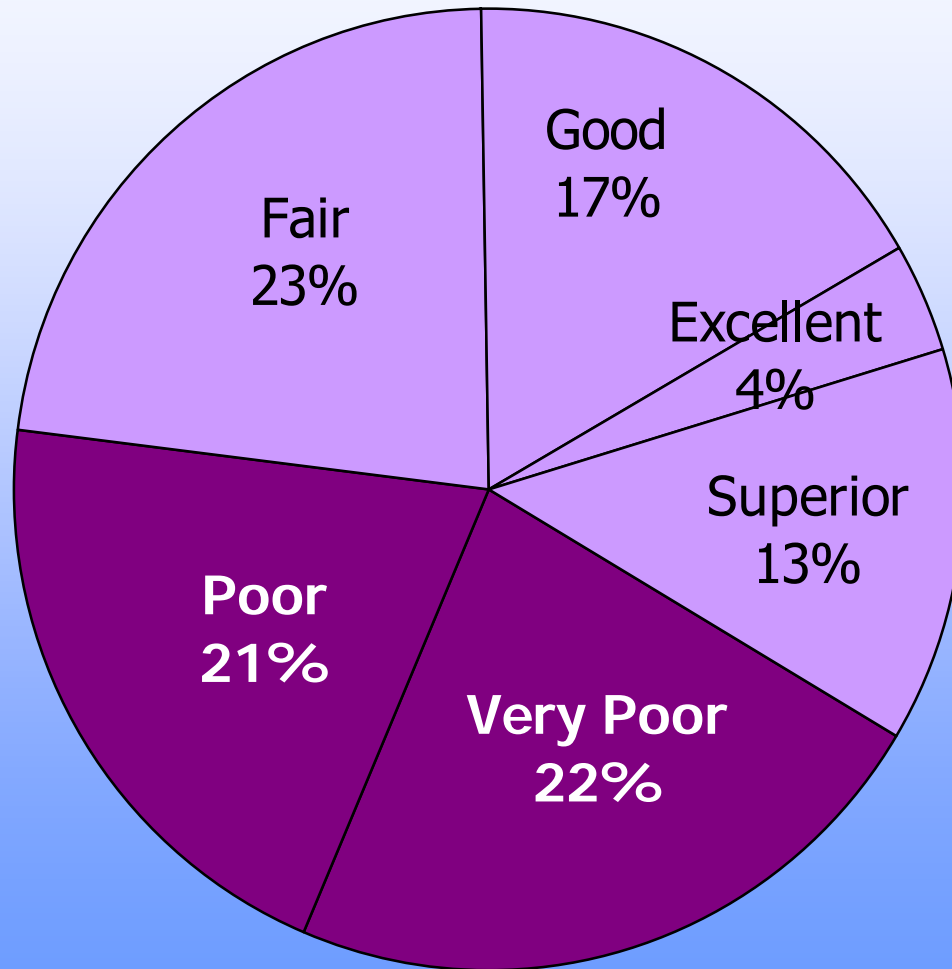
■ % with high triglycerides ( $\geq 150$ )

■ % with high LDL ( $\geq 130$ )

■ % with high TOTAL cholesterol ( $\geq 240$ )

■ % undetected high cholesterol (not taking meds or told have high cholesterol)

# VO<sub>2</sub>max (aerobic capacity)



# Limitations and Strengths

- Limitations
  - Small sample
  - Cross sectional study
  - Does not provide fully representative population-based cohort for determining prevalence
- Strengths
  - New information in HSCT survivor cohort
  - Standardized objective test results
  - Results can be compared to population norms

# Conclusions

- High percentages of health risks relative to population norms, many previously undetected:
  - Hyperlipidemia and high blood pressure
  - Elevated fasting glucose
  - Poor aerobic capacity
- Body fat percentage relative to BMI is concerning, indicating loss of muscle mass
  - 16% obese on BMI vs. 62% on body fat percentage
- These are underestimates of medical problems in HSCT survivor populations

# Implications

- Low aerobic capacity and high body fat percentage increase risks for:
  - Metabolic syndrome
  - Cardiovascular events
- Surveillance guidelines are needed
  - Expand list of recommended tests
  - Mandate routine testing at younger ages
- Primary care providers need education
- Clinical trials need to target these complications