Winship Catchment Area Assessment
Winship Community Outreach & Engagement

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COE Catchment Area Assessment: State of Georgia Cancer Burden & Priorities
State Population Demographics: GA

**Age Distribution (%)**: GA vs US

- 0-18: 27% vs 22%
- 19-25: 22% vs 24%
- 26-34: 23% vs 26%
- 35-54: 25% vs 26%
- 55-64: 11% vs 9%
- 65+: 11% vs 8%

27% >55 yr old

**Racial Distribution (%)**

- White: 75%
- Black: 15%
- Hispanic: 5%
- AI/AN: 0%

**Distribution by Sex**

- **Georgia**:
  - US: Females 46, Males 48
  - GA: Females 50, Males 52

**Georgia**:
- 57900 sq mi; 78% rural
- 10.62M total population
- 2.3M reside in rural GA
Age-Adjusted Overall Cancer Incidence: US & GA Top 10 Cancers

US, All Cancers, 2015-2019

Georgia, All Cancers, 2015-2019

Higher rates for prostate, breast, lung, colorectal, melanoma, kidney, and leukemias

- Mortality & Incidence, Both Sexes, Age >50 for Leukemias
- Survival, Both Sexes, for Multiple Myeloma & Hodgkin Lymphoma

Leukemia Incidence

Leukemia Mortality

Multiple Myeloma Survival by Race/Ethnicity

Hodgkin Lymphoma Survival by Race/Ethnicity

Legend:
- US
- GA
- White
- Blacks
- Hispanic
### Change in Leukemia 5-Year Relative Survival Rate Over Time by Age Groups, Race/Ethnicity, & Sex

<table>
<thead>
<tr>
<th></th>
<th>1973-1979 (rate %)</th>
<th>2000-2009 (rate %)</th>
<th>2010-2014 (rate %)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AGE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50-64</td>
<td>43.6</td>
<td>68.4</td>
<td>74.3</td>
</tr>
<tr>
<td>65-74</td>
<td>37.5</td>
<td>60.3</td>
<td>65.7</td>
</tr>
<tr>
<td>&gt;75</td>
<td>26.7</td>
<td>45.4</td>
<td>51.1</td>
</tr>
<tr>
<td><strong>SEX</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>38.1</td>
<td>61.3</td>
<td>67.1</td>
</tr>
<tr>
<td>Male</td>
<td>35</td>
<td>62.6</td>
<td>69.6</td>
</tr>
<tr>
<td><strong>RACE/ETHNICITY</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>37</td>
<td>63.2</td>
<td>69.7</td>
</tr>
<tr>
<td>Non-Hispanic Black</td>
<td>32.4</td>
<td>54.5</td>
<td>61.6</td>
</tr>
<tr>
<td>Hispanic (all races)</td>
<td>36.3</td>
<td>64.1</td>
<td>67.7</td>
</tr>
</tbody>
</table>

Survival from leukemias has improved overall across racial/ethnic, most age-groups and both sexes during the period of 1973 through 2014. However, African-American patients and those >75 years experienced the smallest survival gains.
Multiple Myeloma

• Obesity is an established risk factor for MM
• Obesity is more prevalent in Blacks vs Whites; ~48% of all non-Hispanic Blacks have a higher prevalence of obesity-related medical comorbidities vs 34.5% among all non-Hispanic Whites
• Blacks may be diagnosed with MGUS at higher rates or younger age due to increased medical intervention secondary to obesity & comorbidities
• Blacks may also be UNDER-diagnosed due to inadequate medical care/access
• Question of disparities due to Black race in progression of MGUS to MM needs further research
• Studies are needed that examine molecular mechanisms of clonal evolution early in the continuum of MGUS-SMM-MM stages for high-risk populations, including Blacks and populations with African ancestry
• Investigations that incorporate genomic ancestry would be important to clarify role of genomic ancestry rather than self-identification of race
Age-Adjusted Mortality - US vs GA
Top 10 Cancers – All Races, both sexes

US, All Cancers, 2015-2019

Georgia, All Cancers, 2015-2019

Big 4 Cancers: Excess Mortality in GA
# Key Cancers Representing *Excess Mortality* in GA Counties:

<table>
<thead>
<tr>
<th>Cancer Type &amp; GA/US Rates</th>
<th>Target Population</th>
<th>County-Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Breast</strong> 27.5/27.3</td>
<td>Black females</td>
<td>Meriwether 48.5; Thomas 41.0; Spalding 35.1</td>
</tr>
<tr>
<td><strong>Colorectal</strong> 18.4/18.0</td>
<td>Blacks, both sexes</td>
<td>Peach 36; Jefferson 33.2; Hall 30.5; Bulloch 28</td>
</tr>
<tr>
<td><strong>Lung</strong> 37/40</td>
<td>Blacks, both sexes</td>
<td>Warren 95; Elbert 72.6; Grady 67; Walton 65</td>
</tr>
<tr>
<td><strong>Melanoma</strong> 2.9/2.6</td>
<td>Whites, both sexes</td>
<td>Catoosa 6.5; Gordon 6; Muscogee 4.7; Walton 4</td>
</tr>
<tr>
<td><strong>Oral Cavity</strong> 2.8/2.5</td>
<td>Whites, both sexes</td>
<td>Whitfield 4.6; Clayton 4.6; Bartow 4.1</td>
</tr>
<tr>
<td><strong>Cervix</strong> 2.3/2.2</td>
<td>All races, females</td>
<td>Richmond 3.9 (5.2 Blacks); Muscogee 3.8</td>
</tr>
<tr>
<td><strong>Pancreas</strong> 11/13.2</td>
<td>All races, both sexes, all ages</td>
<td>Jefferson 23.6, Wayne 20.1, Bryan 17.9, Coffee 16.6</td>
</tr>
<tr>
<td><strong>Pancreas (Black only), 65+</strong> 73.8/75.3</td>
<td>Blacks only, both sexes, 65+</td>
<td>Fayette 131.3, Newton 120.8, Chatham 105.3</td>
</tr>
</tbody>
</table>
GA Population has less education, less income.
Greater % GA population is uninsured, lives in poverty, and is unemployed
Georgia is a Rural State

• 78% of state qualifies as rural
• Rurality is often indicator or predictor of disparities and worse outcomes, regardless of race, ethnicity, or insurance
Rurality in Georgia (2015-2019)

2.3M Georgians reside in rural areas; 30% are >55yrs
72% of rural GA students eligible for free/reduced lunch (60% GA; 49.5% US)
Rural per capita income=$24K (GA=$31K; US=$34.1K)
Education <HS: Rural=17.6% (GA=12.86%; US=12%)
Uninsured: Rural=14.2% (GA=13.2%; US=8.8%)

Rural residents in GA have less income, less education, and less insurance and experience higher rates of cancer incidence, mortality, obesity, current smoking with lower CRC screening rates; compared to the US and non-rural GA.
<table>
<thead>
<tr>
<th>Georgia Health Measures</th>
<th>2020 Value for GA</th>
<th>Rank in US States</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Behavioral</strong></td>
<td></td>
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</tr>
<tr>
<td>High School Graduate (% of students)</td>
<td>80.6%</td>
<td>41</td>
</tr>
<tr>
<td>Obesity (% of adults)</td>
<td>32.5%</td>
<td>30</td>
</tr>
<tr>
<td>Physical Inactivity (% of adults)</td>
<td>26.2%</td>
<td>37</td>
</tr>
<tr>
<td>Smoking (% of adults)</td>
<td>16.1%</td>
<td>25</td>
</tr>
<tr>
<td>Behaviors (all behavior measures)</td>
<td><strong>31</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Clinical Care</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low birthrate (% of live births)</td>
<td>9.9%</td>
<td>47</td>
</tr>
<tr>
<td>Mental health providers (#/100,000)</td>
<td>137.3</td>
<td>46</td>
</tr>
<tr>
<td>Primary Care Physicians (#/100,000)</td>
<td>123.9</td>
<td>41</td>
</tr>
<tr>
<td>Clinical Care (all clinical care measures)</td>
<td><strong>45</strong></td>
<td></td>
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<tr>
<td><strong>Outcomes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cancer deaths (per 100,000)</td>
<td>194.8</td>
<td>30</td>
</tr>
<tr>
<td>Disparity in health status (% point difference)</td>
<td>26.8%</td>
<td>30</td>
</tr>
<tr>
<td>Premature deaths (yrs lost &lt; age 75/100,000)</td>
<td>8243</td>
<td>34</td>
</tr>
<tr>
<td>All Outcome Measures</td>
<td></td>
<td><strong>38</strong></td>
</tr>
<tr>
<td><strong>Overall Health Ranking in GEORGIA</strong></td>
<td><strong>40</strong></td>
<td></td>
</tr>
</tbody>
</table>
Obesity in US & Georgia by Race & Ethnicity

Obesity = BMI > 30.0
Overweight = BMI > 25 but < 30.0
Screening & Risk Factors: US, GA, By Sex, By Race

**Target: White, Males, Black Males**

**Target: Blacks, Females, Black Females**

**Target: Blacks, Black Males, Females**

**Target: Blacks, Males, Black Males**

**BL Females**

**BL Males**

**Females**

**Males**

**Whites**

**Blacks**

**GA**

**US**
Elevated rates of risk factor associated cancers in GA, including obesity, tobacco, physical inactivity for Blacks, Males, Females.
HIV in the US, the South, and Georgia

- Of the 37968 new HIV diagnoses in the US (2018), **51% were in the South**
- In GA, PLWH are 76% male, 67% Black, 54% >age 45 yr
- NEW dx of HIV: 70.7% Black, 9.8% Hispanic

IN GEORGIA:
- Rate of **Black males** living with HIV dx is **6x** that of White Males.
- Rate of **Hispanic Males** living with HIV dx is **2.3x** that of White males
- Rate of **Black females** living with HIV dx is **11.9x** that of White females
- Rate of **Hispanic females** living with HIV dx is **3.7x** that of White females

PLWH are at increased risk for non-AIDS defining cancers & at increased risk for dying from cancer. Cancer is the #1 cause of mortality among PLWH.
- 19x↑ risk of anal ca;
- 3x↑ risk of liver ca;
- 2x↑ risk of lung & oral cancers;
- 8x↑ risk for Hodgkin lymphoma
Summary: Winship Catchment Area Assessment – Cancer Burden

• Cancer Burden: Age-adjusted overall **cancer incidence**: Top 10 cancers in GA same as in US, with excess incidence only for prostate, breast, lung, colorectal, melanoma, kidney, and leukemia.
  - **Blacks** have higher incidence of breast, prostate, uterine, myeloma & pancreatic ca in GA
  - **Whites** have higher incidence of lung ca in GA

• Cancer Burden: Age-adjusted overall **cancer mortality**: Excess mortality in GA for Big 4 Cancers vs US (lung, breast, prostate, CRC). Specific examples include:
  - **GA Black women** experience **27% increase** in **breast ca mortality** vs overall US rate
  - **Black men in GA** experience **>2 x** the **mortality** rate from **prostate cancer** compared to US prostate ca rates
  - **Blacks in GA** have a **24% increase** in **mortality** for both **pancreatic** and **colorectal** cancers compared to the US mortality rates overall for these cancers
  - **Blacks in Warren County** are reported to have **lung cancer mortality** rates that are **2.56 x** the US overall lung ca mortality rates
  - **Blacks in Fayette County** have **1.77x greater mortality** from **pancreatic cancer** vs Blacks in rest of GA and **11.9x mortality rate** vs all others in GA who die from pancreatic cancer
Summary: Winship Catchment Area Assessment – Social Determinants of Health (SDOH)

- Georgia residents have less income, education, insurance, access to healthcare, & employment vs US
- Elevated rates of risk factor-associated cancers in GA, including obesity, tobacco, physical inactivity for Blacks, Males, Females
- For Health Measures, GA ranks #31 for all behaviors, #45 for all clinical care, #38 for all outcomes, and **#40 in US for overall health ranking**
Catchment Area-Relevant Research – High Priority Research Targets

- **Cancers**: Breast, prostate, lung, colorectal; pancreatic especially among Blacks; myeloma, leukemias

- **Role of Risk Factors in Tumorigenesis, Recurrence, Outcomes**: Smoking, obesity, physical activity, mechanistic pathways driven by stress, oxidation, methylation, gene expression profiles

- **Special Populations**: Rural (possible exposures), HIV+ malignancies
New Funding Opportunities to Promote Basic Science Research in Cancer Health Disparities!

R03, R21, R01
Example of Model for Biological Basis for Cancer Disparities

Disparities
- Income disparities
- Lack of access to grocery stores
- Unsafe neighbourhoods
- Lack of exercise

Obesity and diabetes

Activation of signalling networks that promote aggressive biology

Epithelial cell proliferation and genomic instability
- STAT3–NF-κB
- PI3K–AKT
- WNT–miR34–p53
- Aurora A–PLK

Angiogenesis
- HIF1α

Collagen crosslinking
- COX2
- FAK and AKT

Pro-inflammatory cytokines and factors
- Leptin
- TNF
- IL-6
- CCL2
- TGFβ
- Insulin

Tumour cell
Fibroblast
CD8+ T cell
Adipocyte
Collagen
M1 macrophage
Model of Genetic & Epigenetic Mechanisms that Link DNA Sequences & Disparities with Genomic Instability & Aggressive TNBC in Blacks

- Unique germline mutations
  - BRCA1
  - Other DNA repair genes (TP53, PALB2, etc.)

- Unique SNPs

- miRNA shifts

- Disparities in access and co-morbid disease
  - IL-6–STAT3
  - AKT–mTOR
  - WNT, BMI1 and EZH2

- Genomic instability
  - Activation of Aurora A
  - Loss of p53 and BRCA

- Exposure to heavy metals and poor prenatal nutrition
  - Abnormal imprinting
  - Epigenetic loss of genes regulating DNA repair
  - Chromatin opening

- Changes in histone acetylation

- Lack of safe neighbourhoods and physical education
  - Low vitamin D

- Histone
Social Determinants of Health & Comorbidities Leading to Biological Basis for Cancers

Access to health care
- Cultural and economic barriers to health care
- Delay in diagnosis, treatment and follow-up
- Low rate of genetic testing (BRCA and BROCA)
- Lack of access to MRI screening

Co-morbid disease
- Obesity
- Diabetes
- Hypertension

Reproductive factors
- Early child bearing
- High rate of gestational diabetes
- Low rate of breast feeding

Advanced stage at diagnosis
- Activation of signalling pathways associated with aggressive TNBC (EMT, apoptosis resistance, progenitor-cell turnover and tissue inflammation)
- Epigenetic shifts
- Loss of normal imprinting
- Poor survival

Socioeconomic factors
- Poor health insurance
- Income disparities
- Education
- Cultural barriers

Unsafe neighbourhoods
- Heavy metals
- Carcinogens
- Stress
- Food deserts
PAR-21-324  **R03** Basic Research in Cancer Health Disparities

- Encourages grant applications from investigators interested in conducting basic, mechanistic research into the biological/genetic causes of cancer health disparities.

- R03 supports projects that can be carried out in a short period of time with limited resources.

- Propose innovative studies designed to investigate biological/genetic bases of cancer disparities, such as (1) mechanistic studies of biological factors associated with cancer disparities, including related to basic research in cancer biology or cancer prevention strategies, (2) the development and testing of new methodologies and models, and (3) secondary data analyses.

- 2 yr projects, $50K directs/yr, pilot/feasibility, methods development

- Due Dates: 10/16/21, 2/16/22, 6/16/22, 10/16/22, 2/16/23, 6/16/23
PAR-21-323  **R21** Basic Research in Cancer Health Disparities

- Support pilot and feasibility studies designed to investigate biological/genetic bases of cancer health disparities, e.g.,
  - (1) mechanistic studies of biological factors associated with cancer health disparities,
  - (2) the development and testing of new methodologies and models
  - (3) secondary data analyses
- Further development of scientific areas, providing support for early-stage exploratory projects that lead to future in-depth mechanistic studies (e.g., R01 projects) of biology of cancer health disparities
- Preliminary data not required but may be included
- 2 yr projects; $200K/yr for max $275K direct costs total
- Due Dates: 10/16/21, 2/16/22, 6/16/22, 10/16/22, 2/16/23, 6/16/23
PAR-21-322  **RO1** Basic Research in Cancer Health Disparities

• Research projects must propose to investigate the interplay of race/ethnicity and/or other social determinants with cancer biology to mechanistically explain an unequal burden of cancer among populations.

• Use biospecimens, patient-derived models, and/or data sets derived from different racial/ethnic and/or underserved groups. Studies investigating age and/or gender disparities, without race/ethnicity variables, are not solicited.

• Research projects using a comparative research design between ≥2 populations are encouraged, in which one or more is underserved.

• (1) mechanistic studies of biological factors associated with cancer health disparities, including related to basic research in cancer biology or cancer prevention strategies

• (2) the development and testing of new methodologies and models

• (3) secondary data analyses

• Clinical Trials NOT allowed

• DUE DATES: 10/5/21, 2/5/22, 6/5/22, 10/5/22, 2/5/23, 6/5/23, 10/5/23, 2/5/24, 6/5/24
Grant Opportunities for Mechanistic Studies of Cancer Disparities

• https://grants.nih.gov/grants/guide/pa-files/PAR-21-322.html R01
• https://grants.nih.gov/grants/guide/pa-files/PAR-21-324.html R03
Data Resources for Catchment Area Assessment

- **State Cancer Profiles** (CDC, NCI) – incidence, mortality, demographics, risk factors by tables, maps [https://statecancerprofiles.cancer.gov/](https://statecancerprofiles.cancer.gov/)

- Also includes 2020 BRFSS screening & risk factor survey

- 2019 American Community Survey Data

- Screening and risk factor data

- Smoking statistics
Data Resources for Catchment Area Assessment

- **US Cancer Statistics – Data Visualizations (CDC)**
  https://gis.cdc.gov/Cancer/USCS/#/AtAGlance/
- Specific cancers, incidence, mortality, by sex, race, ethnicity
- Stage at diagnosis, screening & risk factors, prevalence, trends
- CDC - Chronic Disease Indicators - [https://www.cdc.gov/cdi/](https://www.cdc.gov/cdi/)
- State level data for chronic diseases, including cancer, and risk factors
- Includes screening data (mammography, Pap test, colorectal screening)
Additional Data Sources Relevant to Catchment Area Assessment

- Behavioral Risk Factor Surveillance System (BRFSS)
- 2020 data: [https://www.cdc.gov/brfss/](https://www.cdc.gov/brfss/)
- Includes phone survey data for states related to risk behaviors, e.g., fruit and vegetable consumption, physical activity, use of screening and prevention services
- Report physical activity levels in each of Georgia’s 159 counties and estimate the overall burden of inactive and irregularly active lifestyles on deaths, hospitalizations, and hospital charges for related health conditions.
Georgia Department of Health

- Georgia Cancer Data Report (2016)
- Georgia Childhood Cancer Report (2016)
- Cancer Program and Data Summary (2013)
- Reports of specific cancers (breast, cervical, ovarian, colorectal, prostate)
- Georgia Tobacco-Related Cancers Report
- HPV Report in Georgia
- https://dph.georgia.gov/cancer-reports
Georgia Dept of Health- Georgia Cancer Plan

• Most recent publicly available is 2014-2019
• Includes sections on Tobacco and Obesity
• HPV Vaccination
• Breast, Cervical Cancer Screening
• Screening for lung, colorectal cancers
• Palliative care
• Overview of Cancer Health Disparities in GA (2018)
• Georgia Cancer Plan logic model (2017)
For additional data, resources, or help in catchment area assessment:

• Contact Winship Community Outreach & Engagement (COE)
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Associate Director for Community Outreach & Engagement
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