Identifying priority areas for geographically targeted cancer screening in the City of Hope catchment area

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Background

Identifying small, geographically defined priority areas for cancer screening within a cancer center's catchment area may increase the efficiency of resource allocation and provide higher leverage to reduce cancer burden for screen-detected cancers.

Aims

1. Develop systematic and data-driven geospatial methodology to identify priority areas for screening.
2. Determine how different measures of disease burden shift the boundaries of priority screening areas.

Methods

Using breast cancer as a test case, we developed an equally-weighted index for each tract in catchment based on:

Domains	Measures	Rationale
Access	1. Federally Qualified Health Centers 2. Mammography locations	1. Potential location to host COH sponsored cancer screening 2. If mammography is nearby, not a high need screening area
Burden	1. Cancer incidence 2. Cancer cases	1. Relative measure 2. Magnitude measure
Disparities (minority compared to non-Hispanic white)	1. Rate ratio 2. Rate difference	1. Relative measure 2. Magnitude measure
Screening	1. Mammography prevalence	1. Lower screening prevalence, higher need

Table 1. Domains and measures used to construct screening priority ranking.

Data

- AAIR and cases: California Health Maps (californiahealthmaps.org)
- Mammography prevalence: CDC PLACES (cdc.gov/places/)
- Mammography facilities: FDA (accessdata.fda.gov)
- FQHCs: HRSA (data.hrsa.gov)

Main Finding: Utilizing two different methods for prioritizing screening can help identify unexpected cases and areas where increased screening may have the most impact.

Black AAIR priority ranking =
(Black AAIR > COH Black median) +
(Mammography prevalence ≤ COH median) +
(Mammograph facilities ≥ 3 mi) +
(FQHCs < 8 mi)

Black Cases priority ranking =
(Black cases > COH Black median) +
(Mammography prevalence ≤ COH median) +
(Mammograph facilities ≥ 3 mi) +
(FQHCs < 8 mi)

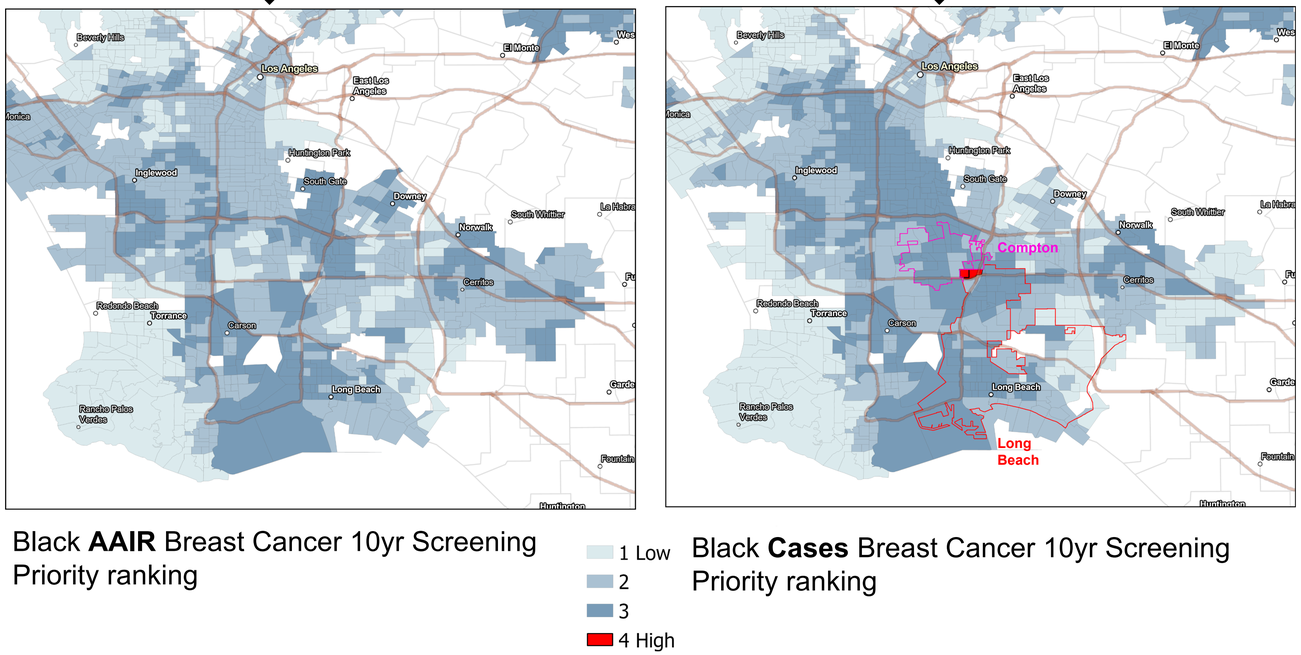

Figure 1. Comparison of priority breast cancer screening areas using burden measures of Black age adjusted incidence rate for breast cancer (left) and Black cases (right).

	Pros	Cons	Likely Use
AAIR	Standardized rate • comparable across areas • accounts for age distribution	Less likely to identify high concentration areas	• Targeted screening of areas for most unexpected cases • Public health overview
Cases	Raw counts • identify individuals' cancer centers could treat	Does not consider age or denominator (e.g., expected cases/population)	• Targeted screening for most cases • Providers/Oncologists

Table 2. Comparison of using age adjusted incidence rate and cases as the burden measure.

Conclusions

No single method or set of indicators exists for identifying priority cancer screening areas. The selection of specific burden metrics depends on the availability of local resources and infrastructure and the priorities of stakeholders within the catchment area. For example, while total case counts highlight the volume of service needed for existing infrastructure, age-adjusted rates identify high-risk clusters that may require new outreach efforts. To align these findings with operational capacity, decision thresholds are adjustable (e.g., shifting from a median value to the 90th percentile) to concentrate resources on a manageable number of highest-need areas.

Measures of access, such as mammography locations, may include quality or utilization to better reflect availability.

Data on early-onset or late-stage at diagnosis may allow additional indicators to target priority areas for screening.

Finally, other domains, such as barriers to care, may include indicators such as area poverty, health insurance status, or transportation access.

References

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Abbreviations

AAIR, age adjusted incidence rate
COH, City of Hope
FQHCs, Federally Qualified Health Centers