Thoughts from REGARDS on where to focus efforts to reduce racial disparities in stroke

George Howard Department of Biostatistics UAB School of Public Health Birmingham, AL

Recent Pattern of Racial/Ethnic Disparities in Stroke Mortality



Races are shown for non-Hispanic population, and Hispanic population is shown for all races.

Age-Specific Race-Ethnic Stroke Mortality Disparities (2018)

White Reference



Mortality Ratio

Races are shown for non-Hispanic population, and Hispanic population is shown for all races.

What we know ... and what we need to know



We know there is racial disparity in stroke defined on the basis of mortality

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Stroke Incidence		x Case Fatality after Stroke	
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f stroke incidence is driving disparity	mc	If case fatality is driving disparity	
nen need to focus on estroke prevention in e general population	es t rve	then need to focus on 1. severity disparities, and 2. improved care in the hospital	

REasons for Geographic And Racial Differences in Stroke (REGARDS) Study

- General population study with diverse aims ... but for today ...
- Central participant recruitment and telephone interview
 - 30,239 white and black participants aged 45+
 - 56% from the Stroke Belt
 - 42% black
- In-home evaluation for physical, venipuncture and ECG
- Central follow-up at 6-month intervals for detection of suspected stroke events (and other outcomes)
- Physician adjudication of new stroke events
- Provides both measures of stroke incidence and case fatality



Black-White Disparities in Stroke Incidence in REGARDS (Incidence of Strokes)



Howard G, et al. Stroke 2016;47:1893-1898

Black-White Disparities in Stroke Case-Fatality In REGARDS

- Examined case-fatality in the 30-days after stroke
- There were no interactions between age, race and sex (p > 0.10)
- Predictors of case-fatality

Implications

- These findings were nearly perfectly mirrored in the GCNKSS (except case fatality was non-significantly <u>lower</u> in African Americans!)
- If black-white disparities are to be reduced:
 - Focus <u>MUST</u> be on stroke prevention in blacks
 - As the disparity is nearly all in ages less than 75 years, the focus must be in younger blacks
 - Suggestion of only minor gains through improved stroke treatment in blacks
- So ... what does place African Americans at higher stroke risk?

Looking under the street light?

- So ... there is approximately a 300% increased stroke risk in "young" blacks
- Everyone knows the prevalence of hypertension and diabetes in blacks is hugely higher than whites
- For example, in REGARDS
 - 71% of blacks are hypertensive 51% of whites
 - 29% of blacks of diabetic 15% of whites
- Framingham and CHS have shown hypertension and diabetes approximately double the risk of stroke
- But the disparity in prevalence of hypertension only <u>differentially</u> affects 71% - 51% = 20% of the black population, and diabetes 29% - 15% = 14%
- ... but difference in the prevalences should be expected to be only a 71% increased risk *But what accounts for the rest of the*

 $1.0 + (0.2 \times 2.0) + (0.15 \times 2.0) = 1.7$

But what accounts for the rest of the disparity????









Approaches to reduce racial disparities in stroke?

- So what can be done to address the half-full portion?
 - For most risk factors (for example, hypertension and diabetes) we are examining prevalent disease (present/absent) ... not effectiveness of treatment
 - This implies that risk factor treatment is not the key to this half of the disparity ... but risk factor prevention
 - Suggesting that focus of "racial disparities in stroke" research should perhaps shift to "racial disparities in risk factor prevention" research
- ... and what is happening with the half empty portion?
- Differential susceptibility to risk factors?
 - Residual contounding?
 - Impact of "non-traditional" risk factors?
 - Measurement error?

Potential Differential Impact of SBP?



Howard G, et al. JAMA Int Med 2013;173:46-51

Potential Differential Impact of SBP?



Howard G, et al. JAMA Int Med 2013;173:46-51

Potential Differential Impact of SBP?



Implications of Differential Susceptibility?

- Many interactions between race, age, and SBP
- Consider black-white stroke risk differences within strata by age and SBP
 - Age: <65, 65-74, 75+
 - **SBP:**
 - o Normotensive (<120 mmHg)</p>
 - \odot Prehypertension (120 139 mmHg)
 - \odot Stage 1 hypertension (140 159 mmHg)
 - Stage 2 hypertension (160+ mmHg) too few white participants, not presented
- Remember ... the excess black stroke risk is at young ages (< 65 years mainly)

Black-white stroke risk in young (<65) normotensive (< 120 mmHg)



* Black-to-white hazard ratio after adjustment for sex and hypertension medications

Howard G, et al. JAMA Int Med 2013;173:46-51

Black-white stroke risk within age-SBP strata



Howard G, et al. JAMA Int Med 2013;173:46-51

... so SBP and Racial Disparities in Stroke

- Strike 1: African Americans are more likely to be hypertensive
 - 51% of whites versus 71% of AAs in REGARDS
 - Everyone knows this
- Strike 2: African Americans are more likely to know they are hypertensive, more likely to be treated, but less likely to be controlled
 - B/W odds ratio for control ≈ 0.70
 - Fewer people know this
- Strike 3: Once blood pressure is not controlled, it is much worse for AAs than whites
 - Three times as bad!

But Will Control of Blood Pressure Really Solve the Problem?

Risk of incident stroke by SBP level achieved and number of antihypertensive medications



Table 2: Hazard ratio for incident stroke (95% CI) after adjustment for age, race, age-by-race interaction, sex and the deviation from the mean SBP level for the category. Tests for trend represent the estimated increase in the hazard ratio per category for number of medications and SBP category (and test for interaction across strata).

Concluding thoughts on B/W disparity in stroke risk

- Excess risk of stroke mortality in African Americans is concentrated below age 75, where the risk of stroke death is 2-3 times higher
- The B/W disparity in stroke mortality is nearly perfectly reflected in a B/W disparity in stroke incidence; however, there is no apparent disparity in case fatality
- This suggests that <u>community-based interventions to reduce stroke risk</u> in AAs will be the key to reducing the B/W disparity in stroke
- A higher prevalence of "traditional" risk factors and poorer SES profile explain about half of the disparity; however, but affecting this contributor will require risk factor prevention (rather than control)
- A wide spectrum of other factors are likely to be contributing to the other half of the disparity, including differential susceptibility, residual confounding, and non-traditional risk factors

REGARDS Functional Units



Questions?





Acknowledgments

- We welcome others to join in analysis of REGARDS data
 - We are proud that 80%+ of REGARDS papers are first-authored by non-REGARDS collaborators
 - Over 140 funded ancillary studies have enriched the scope of data for everyone
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