

# Changing Profile of HIV-Positive Patients in an Underserved Metropolitan Area of the South over Past 15 Years

Phone Number:  
(615) 327 5753

E-Mail:  
vberthaud@mmc.edu



**Poster 16228: VLADIMIR BERTHAUD, MD, MPH,\* Livette Johnson, Toni Hall, Keisha Ashmeade, Abosede Osijo, Debra Simmons, Maxine Chandler-Auguste, Marie T. Baldwin, Ronda Jennings, Valeria Frierson-Horton, Ethel Harris, Kessy Jean, Derek Wilus, and Mohammad Tabatabai, PhD.**

**Medical College, Meharry Community Wellness Center, Nashville, Tennessee**

## Abstract

### Introduction:

The HIV epidemic disproportionately affects people living in underserved urban communities of the South. While people living with HIV/AIDS (PLWHA) are aging, excess mortality related to cardiovascular disease, cancer, and end-organ damage could boost demand for healthcare services and strain our limited resources,

### Methods:

The purpose of this retrospective observational study was to analyze the changing demographic and clinical features of PLWHA in Nashville/Davidson County and attending the Meharry Community Wellness Center between 2004 and 2019. Our Ryan White grant portfolio expanded between 2008-2019.

### Results:

Among 1,283 patients, the proportion of males rose from 59% to 72%, reflecting the increase of MSM (10.3% to 44%). Homelessness increased four-fold, from 6% to 24%. The clinic registered 205 deaths; 34% of the deceased were homeless and 66% lived in stable housing, suggesting an excess mortality among homeless. From 2004 to 2008, 26% of the deaths were related to AIDS, 15% to sepsis, 21% to cardiovascular disease, 20% to cancer and 18% to other or undetermined causes. By contrast, from 2009 to 2019, they accounted for 12%, 10%, 30%, 40%, and 8% respectively. Latent tuberculosis infection decreased from 30% in 2004 to 1.5% in 2019. Regarding immune status, the proportion of patients with CD4 count <200 cells/mm<sup>3</sup> decreased eight-fold, from 40.2% to 8%, while viral suppression increased nearly two-fold, from 39.6% to 76%.

### Conclusion:

The study findings corroborate the changing HIV landscape, related to scientific advances in HIV treatment, aging of PLWHA, increased incidence of comorbidities as well as pervasive homelessness and disparities in detrimental social determinants of health. The improved virologic and immunologic outcomes stem from expanded access to Ryan White programs between 2008-2019.

## Introduction

HIV/AIDS had become a manageable chronic infection. More potent, simpler and safer antiretroviral treatment results in substantial rate of viral suppression and prolonged survival. As PLWHA are aging, the incidence of comorbidities is rising even among individuals with sustained viral suppression, possibly as a direct effect of HIV, persistent inflammation, and high rate of traditional risk factors. Black/African Americans remain disproportionately affected by HIV/AIDS, virologic failure, comorbidities, and mortality. We conducted this study to better understand the changing profile of PLWHA in Nashville/Davidson County during past 15 years.



## Methods

Study design: retrospective, observational

Target population: underserved, black/African American PLWHA

Setting: urban, academic AIDS Center of Excellence

Study period: 2004-2019

Data collection: After removing all personal identifiers, we performed quality check and corrected for duplication, inaccuracy, unknown, and missing data. Then, we generated a study database consisting of study variables extracted from CAREWare. All deaths were confirmed and designated physician reviewed patients' medical records to establish the causes of death. Viral suppression was considered < 200 copies/mL.

Statistical analysis: We analyzed the trend of a pool of descriptive variables including gender, race/ethnicity, age group, HIV risk factors, housing status, CD4 cell count and plasma viral load, as well as hepatitis C, syphilis, and tuberculosis infection. We determined the independent predictors of death by calculating the odds ratios using IBM-SPSS software, version 22.2. A p-value <0.05 was considered statistically significant.

## Results

### Changing Clinical Profile over 15-Year Follow-up

#### Meharry Community Wellness Center 2004-2019

Clinical Information	2004	2019
CD4 Count <200	40.2%	8%
Undetected Viral Load	39.6%	76%
Syphilis	27.1%	24%
Latent Tuberculosis Infection	30.3%	1.5%

## Results

### Independent Predictors of Death, MCWC

Death Risk Factors	Odds Ratio	95% CI	p-value
Black or African American	1.45	0.8-2.8	0.24
Age Group 45-64	3.20	1.9-5.5	<0.001
0 vs 1 Annual Clinic Visit	9.70	3.8-24.4	<0.001
Chronic Hepatitis C	3.24	2.1-5.0	<0.001
HIV Viremia	3.20	2.0-5.0	<0.001
CD4 Cell Count <200/μL	6.70	4.5-10.9	<0.001

No difference by gender or HIV risk factor

## Results

**Leading underlying causes of death for individuals with human immunodeficiency virus (HIV) infection, by percentage, Meharry Community Wellness Center (MCWC), 2003-2019: N=1,847; 205 deaths**

Study Period	AIDS	Sepsis	Cardiovascular Disease	Cancer	Other or Undetermined
2003-2008	26%	15%	21%	20%	18%
2009-2019	12%	10%	30%	40%	8%

### Lessons Learned

Our study highlights the significant decrease in mortality related to AIDS (more than two-fold) and sepsis (one third) among PLWHA attending the Meharry Community Wellness Center between 2004-2019. Similar to several studies, ours also reveals the rising death trend secondary to cancer and cardiovascular disease. The two-fold increased viral suppression five-fold rise in immune status could explain the lower mortality due to HIV/AIDS and sepsis. The improved virologic and immunologic outcomes stem from expanded access to Ryan White programs. However, the drastic decrease in latent tuberculosis infection probably reflects good public health TB control program. Traditional risk factors certainly play a major role in cancer and cardiovascular mortality. This observation calls for renewed attention on health promotion and disease prevention.

### Limitations

Nonetheless, our study bears limitations inherent to its observational and retrospective nature and unaccounted confounders. However, one particular strength is the regular ascertainment of the cause of death by the physicians.

## Conclusion

The study findings underscore the importance of expanded access to Ryan White programs between 2008-2019 and the temporal shift in the causes of death in PLWHA, from AIDS and sepsis to cardiovascular diseases and cancer. They remind the practitioner to focus on primary prevention and wellness promotion. Moreover, the study results suggest that homelessness may contribute to excess mortality in underserved PLWHA.

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