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Impact of Removing Question Offering HIV Testing from Primary Triage on the Number of HIV Tests Offered and Ordered in a Safety-Net Emergency Department: A Retrospective Interrupted Time Series Analysis

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# Impact of Removing Question Offering HIV Testing from Primary Triage on the Number of HIV Tests Offered and Ordered in a Safety-Net Emergency Department: A Retrospective Interrupted Time Series Analysis

By

Andrés Patiño, MD

An abstract of a thesis submitted to the Faculty of the
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## ABSTRACT

*Impact of Removing Question Offering HIV Testing from Primary Triage on the Number of HIV Tests Offered and Ordered in a Safety-Net Emergency Department: A Retrospective Interrupted Time Series Analysis*

**By:** Andrés Patiño

**Background**
Offering HIV tests to patients as part of the triage process during emergency department (ED) visits can lower barriers to testing, including stigma and lack of primary care access. This is especially relevant for the Grady Memorial Hospital Emergency Department, a safety-net hospital for Atlanta, Georgia; Atlanta is a city with one of the highest incidences of HIV in the United States. For the prior ten years, the Grady ED offered HIV testing during triage. However, due to concerns about the length of the triage process, leadership removed the question offering an HIV test from primary triage in July of 2023.

**Objective**
To study the impact of removing from primary triage the question offering HIV testing on the number HIV tests offered and ordered in the Grady Emergency Department.

**Methods**
Data from the electronic medical records were extracted for one year before and one year after the removal of the HIV question from triage. Descriptive statistics were calculated and graphed. Simple and multivariate linear regression were conducted to assess the number of HIV tests offered and ordered before and after the removal of the HIV question.

**Results**
There were 260,608 visits to the Emergency Care Center: 200,630 (77%) to the main ED, 27,770 (11%) to the Walk-In Center, and 32,208 visits of unknown location (12%). The Walk-In Center offered HIV tests to greater than 90% of patients with no significant change after the removal of the HIV question from triage; therefore, data from the Walk-In Center were removed from further analyses. Conversely, in the ED, there was a statistically significant drop in people being offered an HIV test, from 54% being offered before the change to 7% being offered after it ($p < 0.0001$). Similarly, the percentage of people who had an HIV test ordered in the ED dropped from 9.9% to 7.9% ($p < 0.0001$). The percentage of HIV tests ordered later in the visit for those who did not accept HIV testing (i.e. answered anything other than "accept" when offered an HIV test or were not offered an HIV test in triage) went up after the removal of the HIV question from primary triage, which ameliorated the overall drop in HIV tests ordered.

**Conclusion**
Removal of the HIV question from ED primary triage resulted in large reductions in HIV tests offered and ordered in the ED. Bringing back the HIV question to primary triage would likely help to increase HIV tests offered and ordered to prior levels. Even when the HIV question was included in triage, only half of ED patients were being offered an HIV test. Future work should explore barriers to offering and ordering HIV testing in triage.

# Impact of Removing Question Offering HIV Testing from Primary Triage on the Number of HIV Tests Offered and Ordered in a Safety-Net Emergency Department: A Retrospective Interrupted Time Series Analysis

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**TABLE OF CONTENTS**

# CHAPTER I: INTRODUCTION

## 1. Introduction and rationale

The emergency department at Grady Memorial Hospital serves people disproportionally affected by social determinants of health such as lack of health insurance, low income, and housing insecurity. Furthermore, Grady is in downtown Atlanta, one of the cities with the highest prevalences of human immunodeficiency virus (HIV) in the United States (Centers for Disease Control and Prevention & Prevention, 2023). The FOCUS Program at Grady has been providing HIV testing free of charge in the emergency department (ED) for the last 10 years, in a setting that may constitute the only point of contact with healthcare for many disadvantaged people (Gilead Sciences, Inc, 2014; Grady Memorial Hospital, 2023a; Piske et al., 2024). HIV testing has been primarily offered by nurses during the triage process all patients undergo upon arrival. However, in 2023, the HIV question was removed from the triage module at the recommendation of a consulting firm to reduce triage duration. Since then, nurses ask have been asking the HIV question during secondary triage, which occurs at a later point during each patient's stay. Anecdotally, there have been fewer HIV tests offered since the HIV question was moved to secondary triage, and we predict this has resulted in a decrease in HIV testing in the ED. We analyzed ED HIV testing data to assess the association of the removal of the HIV question from primary triage on HIV the percentage of HIV tests offered and ordered. The results of this study will inform future interventions to increase HIV testing in the Grady ED.

## 2. Problem statement

Removal of the HIV module from triage is hypothesized to have resulted in a decrease in the percentage of HIV tests offered and ordered to people in the Grady ED.

## 3. Theoretical framework

From a health belief model, offering HIV testing in the context of a private interaction with a trusted nurse, utilizing opt-out language ("I will order an HIV test for you today"), provides a cue to action and aims to lower the perceived barrier of HIV stigma by making it appear a part of usual care; in fact, CDC recommends HIV testing as a part of routine health care for all patients between the ages of 13

and 64 (Centers for Disease Control and Prevention, 2025). From a systems theory perspective, incorporating HIV testing as part of triage can reduce variability in offering of tests and increase use. From a socio-ecological perspective, offering HIV testing in the Grady ED is an important intervention at the organizational level, given Grady's role as safety-net institution with a volume of more than 200,000 visits per year, in a community at high risk of HIV. We used a pragmatic evaluation approach by utilizing readily available medical records data to provide actionable recommendations to stakeholders.

**4. Purpose statement**

We aimed to assess the impact of the removal of the HIV question from the ED triage module on the number of HIV tests offered and ordered, to inform future interventions aimed at increasing HIV testing in the Grady ED.

**5. Research question**

- Research question: Did removal of the HIV question from primary triage result in significantly fewer people being offered an HIV test and having an HIV test ordered in the Grady ED?
- Null Hypothesis: There are no differences in the percentages of HIV tests offered and ordered before and after the removal of the HIV question from primary triage in the Grady ED.

**6. Significance**

The results of this study can inform Grady ED leadership about the impact of the removal of the HIV question from triage on HIV tests offered and performed. A substantial reduction in tests offered and performed in Grady's ED population, a population at high risk for HIV, might lead leadership to re-instate the HIV question to primary triage. If there is no substantial change in testing offered or performed after removal of the question, the emergency medicine leadership may feel more confident about their decision to remove the HIV question from primary triage.

**7. Definition of terms**

- Emergency Care Center (ECC): the ED and the Walk-In Center

- Emergency Department (ED): the part of the Emergency Care Center that sees all levels of acuity, from low acuity complaints (e.g. runny nose) to high acuity (e.g. stroke, severe trauma, cardiac arrest).
- Walk-In Center: the urgent care component of the Emergency Care Center, and it is in a separate building. It only serves people with low acuity complaints during business hours and transfers any patient with moderate or high acuity complaints to the ED.
- Primary Triage Module: an electronic medical formed used by nurses to evaluate patients on arrival to the ED and the Walk-In Center. It consists of vital signs, a cursory physical examination, and questions regarding the reason for the visit. It also includes screening questions for common or high-risk conditions such as suicidal thoughts and sexual and domestic abuse. This last section includes the HIV question. At the end of triage, the nurse assigns an acuity number based on the Emergency Severity Index.
- HIV Question: a question offering an HIV test to every patient who has not had an HIV test or was known to have HIV in Grady's electronic medical record. During the second half of our study, this question was removed from the triage module to another module called secondary triage.
- Secondary Triage Module: a module of questions to be asked by the treating nurse once the patient has been brought to a treatment room after triage. Anecdotally, nurses were not completing the HIV question in secondary triage at the time of the analysis.
- Emergency Severity Index (ESI): a 5 number scale assigned at the end of triage that rates the acuity of a person's clinical picture. People who are assigned a 1 need immediate attention, while people assigned a 5 need the least emergent attention. Patients are moved from the triage location and the waiting room to a treatment room based on their ESI number, rather than order of arrival alone.

## CHAPTER II: REVIEW OF THE LITERATURE

Early HIV diagnosis and treatment are associated with improved outcomes (Grinsztejn et al., 2014). However, up to 13% of people living with HIV in the United States (U.S.) are unaware of their diagnosis (HIV & AIDS Trends and U.S. Statistics Overview, 2024). This is especially relevant at Grady, the safety-net hospital for Atlanta and one of the U.S. metro areas with the highest incidences of HIV (Centers for Disease Control and Prevention, 2023). Most patients at Grady are Black, and Black people experience higher incidence and prevalence of HIV (AIDSVu, 2022; Grady Memorial Hospital, 2023a; Sullivan et al., 2020). Patients seeking care at Grady often have limited options for accessing HIV testing and care, and many of large portion of them are uninsured or insured by Medicaid (American Hospital Association, 2024; KPMG, 2021).

The FOCUS HIV Program has been providing free HIV testing to emergency department patients at Grady for the last 10 years. Nurses drive most of the testing by offering it during triage based on a mandatory triage module in the electronic medical record. In June of 2023, the required HIV module was moved from primary triage to secondary triage by nursing leadership due to concerns about the length of the primary triage process. However, anecdotally, this change appears to have decreased the number of HIV tests offered and ordered in the Grady ED.

### 1. HIV burden

The HIV epidemic in the U.S. is concentrated in the South, with 52% of new cases occurring in this region in 2018 (Sullivan et al., 2021). The state of Georgia is among the states with the highest prevalence of HIV (624.9/100,000 population) and number of deaths of people living with HIV (9.3/100,000 population) compared to the national mean (374.6/100,000 population and 5.7/100,000 population) (Centers for Disease Control and Prevention, 2020). Fulton and Dekalb Counties, the main counties served by Grady, have even higher HIV prevalences of 1,782 and 1,090 /100,000 population respectively (County Health Rankings & Roadmaps, 2025). The Atlanta metropolitan area had the third highest rate of new HIV diagnoses in the country in 2021 (24.5 / 100,000 population) (Centers for Disease Control and Prevention & Prevention, 2023). In 2022 in Atlanta, there were 1751 new diagnoses

and 43,257 people living with HIV, of which 20.6% were diagnosed at a late stage of HIV, 78% were linked to HIV care, and only 63.6% were virally suppressed (*AIDSVu*, 2025). Figure A shows how the high HIV prevalence and incidence in Atlanta compare to the state, region, and country. Figure B shows the high prevalence of HIV in the counties in the Atlanta Metropolitan area.

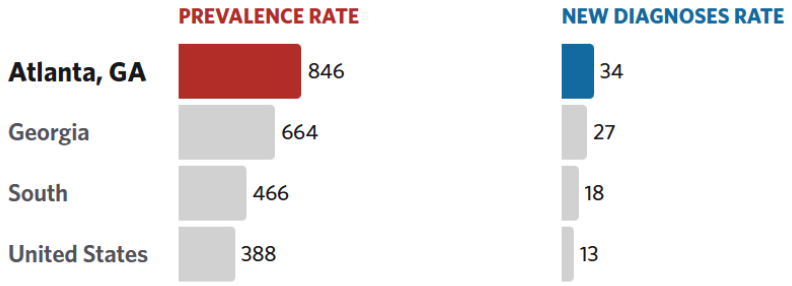



***Figure A: Prevalence and new diagnoses rates of HIV in the Atlanta Metropolitan Area, GA, 2025*** *(Adapted from AIDSVu, 2025). The Atlanta metropolitan area has a high prevalence and incidence of HIV compared to the state, the region and the country.*

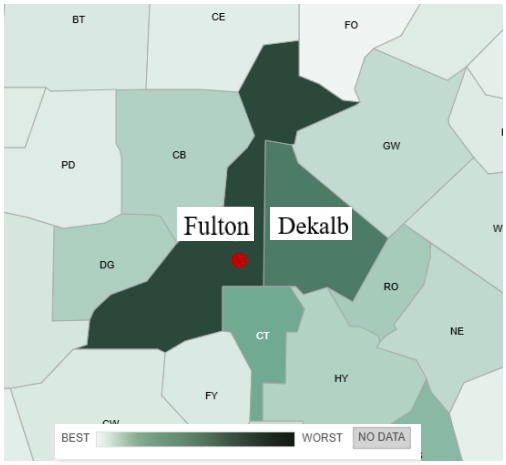



***Figure B: HIV prevalence in counties around Atlanta, GA, 2025*** *(Adapted from County Health Rankings & Roadmaps, 2025). Note the darkest areas with the highest HIV prevalence in the Atlanta Metro Area Fulton and Dekalb counties, the main counties served by Grady. The red dot represents the location of the Grady Emergency Department.*

The high incidence of HIV in the region is likely driven by social determinants of health, including a higher burden of HIV infection among racial and ethnic minorities and unequal access to prevention and treatment services (Sullivan et al., 2021).

## 2. Social determinants of health

Social determinants of health (SDOH) are the environmental conditions in which people live that affect their health and quality of life, and the uneven distribution of SDOH contributes to inequities and disparity in health (U.S. Department of Health and Human Services, 2020). There is increasing

recognition that addressing SDOH is critical for improving health (U.S. Department of Health and Human Services, 2020). Social determinant inequities lead to higher risk of becoming infected with HIV and deter access to prevention and treatment (Gupta et al., 2008). The United States has worse health outcomes compared to other high-income countries; this explained, in part, by social determinants of health. Despite having the highest health spending per capita and by percent of gross domestic product (USD $ 12,500 and 16.6%), the U.S. has the lowest life expectancy among OECD (Organisation for Economic Co-operation and Development) countries (76.4 vs. 80 years), a high rate of preventable deaths (336/100,000 population), among the lowest rates of insurance coverage (91.3%), and the second highest rate of avoidable hospital admissions (725/ 100,000 population) (OECD, 2023). Among OECD countries, higher investment in health is correlated with better life expectancy. However, the U.S. is as an exception to this pattern and is the only country that spends more than the OECD average and has life expectancy lower and avoidable mortality higher than average. The U.S. also has higher mortality from preventable and treatable causes than the OECD mean (238 vs. 158 and 98 vs. 79/100,000 population) (OECD, 2023). Other social determinants of health include that the U.S. has the highest rate of prescription opioid use (4%) and among the highest for cocaine use (2%), and the rate of consultations with doctors is low in the U.S., in part due to the high out-of-pocket costs (OECD, 2023).

People in Georgia face additional challenges. Georgia has not expanded Medicaid, and 14.9% of Georgians are uninsured (*AIDSVu*, 2025). Furthermore, Georgia has 2.7 million people living in health professional shortage areas with only 38% of the primary healthcare providers needed for the size of the population (KFF, 2024). Among people living with HIV in the state, 11.3% had food insecurity and 14% experienced unstable housing (*AIDSVu*, 2025). Georgia has also higher than average rates of HIV stigma (*AIDSVu*, 2025), and until 2022 people living with HIV could be charged with a felony and serve up to 10 years in prison for not disclosing their HIV status before having sex (Straube, 2022).

Important social determinants in Atlanta, Grady's catchment area, include poverty, lack of insurance access, and housing costs. The percentage of people living in poverty in Fulton and Dekalb counties in 2019 were 14.4% and 16.1%. Poverty rates were even higher for single parent households in

Fulton, with a poverty rate of 31.8% (Grady Memorial Hospital, 2023b). Lack of health insurance coverage is closely related to poverty, with low-income individuals more likely to be uninsured or underinsured. The rate of uninsured was 17% in Fulton and 12% in Dekalb, with parts of these counties with rates as high as 20%. Similarly, 16.5 % of people were enrolled in Medicaid in Fulton and 19.8% in Dekalb (Grady Memorial Hospital, 2023b). These numbers are even higher at Grady, with more than 40% of patients being uninsured, and 60% of hospital revenue coming from Medicare and Medicaid (American Hospital Association, 2024; KPMG, 2021).

High housing costs in these counties were exacerbated by the COVID pandemic, with a quarter of home owners and half of renters paying more than 30% of their income in housing and 14% living in unstable housing (*AIDSVu*, 2025; Grady Memorial Hospital, 2023b). Fulton and Dekalb have high costs of living requiring, hourly incomes of $51 and $49 to cover the minimum living expenses for a family of one adult and two children; 1 in 4 Fulton and Dekalb families in both counties report overcrowding, high housing costs, lack of kitchen facilities or lack of plumbing facilities (County Health Rankings & Roadmaps, 2025). Other social determinants in the area include that 9.2% of adults in Atlanta did not complete high school, and there is high income inequality, with a Gini Coefficient of 0.47 (*AIDSVu*, 2025).

**3. Race and ethnicity**

HIV affects racial groups disproportionately. A large portion of the population of Atlanta is Black, making up 52% of Fulton and 43% of Dekalb county residents. This proportion is even higher at Grady, where 75% of patients identify as Black (Grady Memorial Hospital, 2023a). Figure C shows that in Atlanta, more than two thirds of existing and new cases of HIV occur in Black people, even though Black people only make up one third of the population (AIDSVu, 2022). Additionally, the incidence of HIV among Hispanic people has been going up in Atlanta, with 15% of cases occurring among Hispanic people – who comprise only 12% of the Atlanta population (*AIDSVu*, 2025). Hispanic people make up approximately 7% of all Grady patients (Grady Memorial Hospital, 2023a).

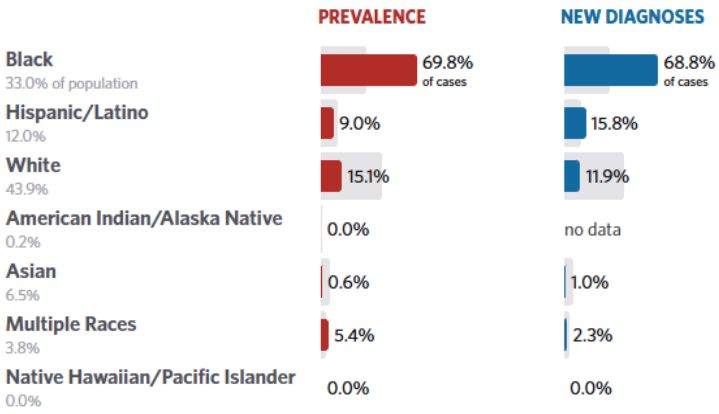
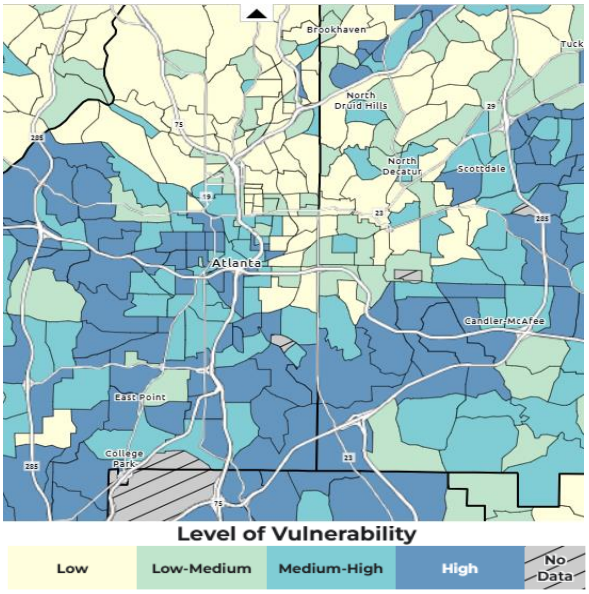



***Figure C: Percentage of new HIV cases by race and ethnicity, Atlanta, GA, 2025*** *(Adapted from AIDSVu, 2025). The red and blue boxes represent the percentage of cases for a given race or ethnicity. The gray boxes represent the share of the total population made up by the given racial or ethnic group. Black people make a up a much larger portion of the prevalence and new diagnoses than their percentage of the population. Hispanic/Latino people have a higher proportion of new cases compared to their share of the population.*

The disproportionate numbers of HIV diagnoses across racial and ethnic groups are not due to biological differences but rather to social vulnerability. For instance, because of historical racial discrimination and residential segregation Black people are more likely to live in communities with higher social vulnerability indices (Dailey et al., 2022). The social determinants that comprise the social vulnerability index include poverty, employment, housing cost, education, health insurance status, disability, English proficiency, single parent household, race, ethnicity, housing characteristics and transportation (CDC, 2024a). As an example, rates of HIV were 1.4 to 5.5 times higher among people in census-tract with higher poverty, unemployment, and vacant housing and lower educational levels, income and health insurance rates (Johnson Lyons et al., 2022). This is especially relevant in the Grady catchment area, because in both Fulton and Dekalb neighborhoods and schools are still highly segregated between White and Black residents (County Health Rankings & Roadmaps, 2025). Figure D shows racial segregation across census tracts in Atlanta. Southern census tracts in Atlanta have both a higher proportion of Black people and higher social vulnerability, when compared to the northern census tracts in the city.

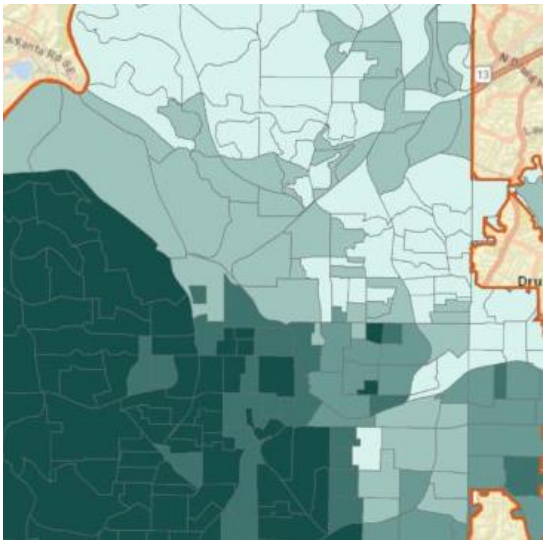
***Figure D: Black race and social vulnerability by census tract, Atlanta, GA, 2025****. A. Yellow and light green represent low and darker green and blue represent high social vulnerability. B. The darker the green, the higher the proportion of Black people living in the census tract. Map B shows racial segregation with census tracts with higher proportions of Black people in the south of the city, with a distribution very similar to that of census tracts with high social vulnerability.*

*A. Social Vulnerability*




*(Adapted from CDC, 2024b)*

*B. Black race*



Darker green represents higher proportion of Black people

*(Adapted from UREx SRN Data Portal, 2021)*

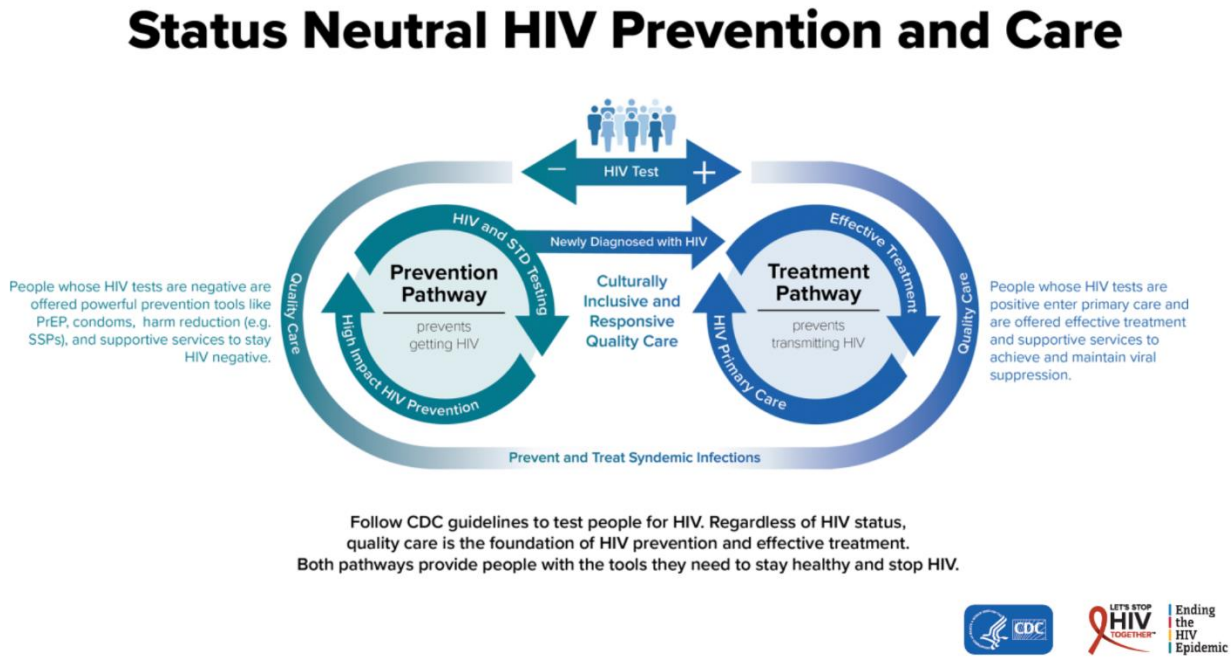
**4. HIV screening and opt-out testing in the emergency department**

Approximately 40% of HIV infections are transmitted by people who did not know they had HIV (Centers for Disease Control and Prevention, 2025). Universal HIV screening reduces stigma, is cost effective and leads to earlier diagnosis and treatment and provides an opportunity to test people who would otherwise have been reluctant to get tested (Centers for Disease Control and Prevention, 2025). Diagnosing and connecting people to HIV care can lead to decreased transmission since long-term treatment leads to undetectable virus levels in the blood and eliminates transmission. In the past, people living with HIV were given the option to wait until their immune system was severely impaired before starting treatment. However, it has now been shown that early treatment of HIV reduces mortality and complications and reduces transmission of HIV (Zhao et al., 2018).

Opt-out HIV testing refers to offering HIV testing to everyone and using language that routinizes testing. Instead of asking "would you like an HIV test today?" the healthcare provider says something like: "I see you are due for an HIV test, so I will order you one." Opt-out HIV testing has been shown to lead to 12% higher HIV test uptake compared to opt-in testing (Soh et al., 2022). The U.S. Preventative

Task Force and CDC recommend opt-out testing to reduce stigma (Centers for Disease Control and Prevention, 2025; US Preventive Services Task Force, 2019). CDC recommends all people between 13 and 64 years of age get tested at least once in their lifetime, people at ongoing risk of HIV once yearly, and MSM every 3-6 months (Centers for Disease Control and Prevention, 2025). This is part of a "Status-Neutral HIV Prevention and Care Strategy" from CDC, in which not just people at high risk for HIV are tested, but everyone is offered testing, prevention services, and treatment throughout their lifetime (Figure E).

***Figure E: Status neutral HIV prevention and care strategy from CDC,*** *(Adapted from Centers for Disease Control and Prevention, 2025). CDC recommends HIV testing, prevention services, and treatment for everyone as part of routine care and throughout everyone's lifetime.*




## 5. Grady Health System

Grady Memorial Hospital is a large tertiary hospital in Downtown Atlanta. Grady was founded in 1890 to care for Atlanta's poor. It has more than 900 inpatient beds and a large network of outpatient primary and specialty care clinics, including Ponce HIV Center, which provided care to 8,000 patients

living with HIV or every 1 in 5 people living with HIV in the city, with a treatment retention rate of 80% and rate of viral suppression of 91% (Grady Memorial Hospital, 2023a). Ponce Center's patients were 67% male, 31% female, and 2% transgender, 89% Black, 9% White, and 7% Latinx (Grady Memorial Hospital, 2023a). In 2021, the Grady Health System tested 28,000 people for HIV, 333 of whom were positive (Grady Memorial Hospital, 2021)

The Grady ED is one of the busiest in the world, seeing more than 150,000 visits per year and serving as Atlanta's only level 1 trauma center. Given the social determinants faced by the neighboring communities as detailed above, Grady's ED serves as the only point of contact with healthcare for many people who are not able to access primary or specialty care otherwise.

**6. FOCUS Program at Grady Memorial Hospital**

Because EDs are often the only point of contact with healthcare for people who are uninsured or have limited access to care due to other social determinants, screening for HIV in the ED can result in testing people who would otherwise not have access to HIV testing. However, only 0.55% of ED visits in the U.S. received HIV testing between 2009 and 2017 (Hoover et al., 2020). Grady has been a pioneer in HIV testing in the ED. With support from CDC, Grady ran a study of HIV screening in the ED in 2008 and showed it was cost effective (Spaulding et al., 2015). From 2013 to 2024 Grady ran the FOCUS HIV Program for opt-out HIV screening in the ED with support from the Gilead Foundation. At the start of the program, approximately 1% of ED patients tested positive for HIV with approximately half of them having AIDS at the time of diagnosis (WABE, 2015). Though financial support from the Gilead Foundation has ended, Grady has and is committed to continuing screening for HIV in the ED.

**7. Time pressures in the emergency department**

The Grady ED, like a large portion of ED's in the U.S., suffers from overcrowding, which leads to long wait times. ED crowding is mostly driven by external factors, with perhaps the largest contributor being the lack of inpatient beds, which results in boarding, or admitted patients who should go to inpatients units staying in the ED for hours or days and reducing the number of beds available to see new patients. Another important external factor contributing to ED crowding is the lack of access to timely and

affordable primary and specialty care, leading people to seek care in the ED. Long wait times are associated with increased mortality (Singer et al., 2011). EDs work to offset long wait times by addressing internal factors under their control to increase efficiency in all processes.

The Joint Commission, one of the most prestigious hospital accrediting organizations in the U.S. recommends reducing the time patients remain in the ED because it increases access to care, quality of treatment, and increases the ability to treat other patients (Joint Commission, 2025). In 2023, the Grady ED was expecting a site visit from the Joint Commission. The ED was highly motivated to increase efficiency to reduce wait times and removed the HIV question from primary triage to secondary triage at the advice of a consulting firm. Primary triage is performed when the patient arrives and results in the patient being assigned an acuity level (ESI), which in turn is used to prioritize the order in which patients are seen. Secondary triage is completed by the nurse assigned to the patient once the patient is in a room or care area. Primary triage is more time sensitive, because it is meant to identify patients who may be experiencing a life-threatening emergency and need immediate care. The timing of HIV testing in the ED is not critical, so moving it to later in the ED visit would be reasonable. However, anecdotally, the number of HIV tests ordered appears to have gone down since the HIV question was moved to secondary triage.

**8. Summary of current problem and study relevance**

HIV screening is critical for early diagnosis and treatment, to prevent complications of the disease and reduce transmission. Social determinants of health result in limited access to HIV testing for underserved patient populations like Grady's. The Grady ED has been testing for HIV for many years, but the recent removal of the HIV question from primary triage to secondary triage to increase primary triage efficiency likely resulted in decreased HIV testing, which would be a missed public health opportunity in a high-risk patient population like Grady's.

## CHAPTER III: METHODOLOGY

We analyzed patient care data from the Grady Emergency Department to measure the impact of the removal of the HIV question from the primary triage module on July 2023 on the percentage of people being offered an HIV test and the number of tests ordered.

**1. Population and sample**

The population of this study was adults (18 years or older) presenting to the Emergency Care Center at Grady Memorial Hospital from July 2022 through June of 2024, encompassing one year before and one year after the removal of the HIV question from primary triage. The population comprised two groups given the difference in acuity and processes: people seen in the ED and those seen in the Walk-In Clinic.

**2. Research design**

We conducted an interrupted time series analysis of retrospective patient care data, utilizing simple and multivariate linear regression to measure the impact of the removal of the HIV question from primary triage on the percentage of HIV tests offered and ordered.

**3. Data source and instrument**

We extracted data from the electronic medical record (Epic) with premade reports used by the FOCUS HIV Program to track HIV screening in the ED. These reports consisted of demographic, triage, and HIV screening variables, including answers to the triage question offering an HIV test and whether an HIV test was ordered.

**4. Procedures**

We extracted data one month at a time, the maximum allowed by the electronic medical record. We uploaded monthly datasets to SAS Software (Release 3.81, 2022), cleaned variable names, and merged data into a single dataset. We excluded people younger than 18 years and created an age group variable based on age groups from CDC HIV publications (Centers for Disease Control and Prevention, 2023). The continuous time of arrival variable was coded into an hour of arrival variable. After analysis of baseline characteristics and percentages of HIV tests offered for ED, Walk-In Clinic, and all patients was performed, Walk-In-Clinic patients and patients with unknown location were excluded.

**5. Data analysis**

Descriptive statistics were calculated using SAS software for baseline characteristics (sex, age, acuity, day of arrival, time of arrival, ED care zone, whether laboratory or radiology tests were ordered,

disposition, and mode of arrival), overall and stratified by ED and Walk-in Clinic patients. We performed simple linear regressions utilizing PROC REG in SAS to evaluate the impact of the removal of the HIV question from the triage module on the number of HIV tests offered and ordered. We performed multivariate linear regressions for each outcome (i.e., HIV tests offered and ordered), utilizing SAS Proc GLM. We selected, based on clinical experience and literature review, the variables most likely to impact whether the HIV question was asked and an HIV test was ordered from the variables available in the FOCUS HIV Program report. The same covariates were used for both models (HIV tests offered and HIV tests ordered): sex, age group, acuity, day of the week, time of arrival, ED care zone, whether laboratory studies were ordered, whether radiology studies were ordered, disposition, and mode of arrival. The following were graphed utilizing Microsoft Excel (version 2503): the percentage of HIV tests offered in triage over time, the percentage of HIV tests ordered over time, and the percentage of HIV tests ordered based on answers to the HIV triage question.

## CHAPTER IV: RESULTS

During the study period there were a total of 260,608 visits to the Grady ECC, including 200,630 (77%) visits to the ED, 27,770 (11%) visits to the Walk-In Center, and 32,208 visits of unknown location (12%). Overall, 94,970 (36%) of people presenting in the ECC were offered an HIV test in triage; offering was lower among those presenting to the ED (58,306 (29%)) than to the Walk-In Center (26,419 (95%)).

### 1. HIV tests offered in the emergency department

Table 1 shows the proportions of patients offered HIV tests by patient characteristics for all visits and stratified by ED and Walk-In Center visits. The Walk-In Center had a larger proportion of people who were offered HIV tests (95%) compared to the ED (29%). The proportion of people offered HIV tests was above 90% for all Walk-In Center subgroups, except for higher acuity patients who were likely directed to the ED (ESI 1-3) and patients who left without being seen. The ED saw more males than females, but there was no significant difference in the percentage of HIV tests offered by sex. All other demographic and clinical characteristics were significantly associated with the percentage of HIV test offered in triage in the ED. Higher acuity ED patients and patients presenting for care on Sundays were significantly less

likely to be offered an HIV test in triage. Lower offering of HIV tests in triage was also associated with nighttime visits (7:00 pm to 7:00 am), being seen in the Detention and Trauma zones, and having radiology tests ordered (Table 1). Though statistically significant, the percentages of HIV tests offered across ED age groups or having had other laboratory tests ordered were similar. In terms of disposition, patients who left without being seen or eloped (left without completing treatment) had the highest percentages of HIV tests offered; patients documented to have walked away, who were deceased, or who were sent to the operating room had the lowest rates of HIV tests offered. Regarding mode of arrival, those arriving in a private vehicle had the highest rates of HIV tests offered compared to those arriving by ambulance (Table 1).

***Table 1: Proportions of patients triaged in the Grady Emergency Care Center who were offered an HIV test, Atlanta, July 2022 – June 2024***
*The Emergency Care Center includes both the main Emergency Department which cares for all levels of acuity (middle column) and the Walk-In Center cares for low acuity complaints only (last column). Visits from both make up All Emergency Visits (first column). All variables listed were significantly associated with whether people were offered an HIV test in triage for all people. In the ED all variables, except sex, were significantly associated with whether people were offered and HIV test.*

| | All Emergency Visits (n=260,608) | | | | | | ED Only (n=200,630) | | | | | | Walk-In Center Only (n=27,770) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | HIV Test Offered in Triage | | | | | | HIV Test Offered in Triage | | | | | | HIV Test Offered in Triage | | | | | |
| | Yes | | No | | Total | p | Yes | | No | | Total | p | Yes | | No | | Total | p |
| **Sex** | | | | | | | | | | | | | | | | | | |
| Male | 51524 | 36% | 92733 | 64% | 144257 | <0.0001 | 35100 | 29% | 85481 | 71% | 120581 | 0.5643 | 11721 | 95% | 602 | 5% | 12323 | 0.8888 |
| Female | 41766 | 40% | 63318 | 60% | 105084 | | 23206 | 29% | 56843 | 71% | 80049 | | 14698 | 95% | 749 | 5% | 15447 | |
| **Age** | | | | | | | | | | | | | | | | | | |
| 18-24 | 11641 | 37% | 20186 | 63% | 31827 | <0.0001 | 6730 | 30% | 16045 | 70% | 22775 | <0.0001 | 3472 | 96% | 129 | 4% | 3601 | <0.0001 |
| 25-34 | 18674 | 36% | 33708 | 64% | 52382 | | 11415 | 29% | 27644 | 71% | 39059 | | 5114 | 96% | 226 | 4% | 5340 | |
| 35-44 | 16127 | 36% | 28885 | 64% | 45012 | | 10130 | 29% | 24498 | 71% | 34628 | | 4122 | 95% | 202 | 5% | 4324 | |
| 45-54 | 15546 | 38% | 25438 | 62% | 40984 | | 9549 | 30% | 22006 | 70% | 31555 | | 4287 | 95% | 227 | 5% | 4514 | |
| 55 & older | 32982 | 36% | 57421 | 64% | 90403 | | 20482 | 28% | 52131 | 72% | 72613 | | 9424 | 94% | 567 | 6% | 9991 | |
| **Acuity (ESI)** | | | | | | | | | | | | | | | | | | |
| Immediate (1) | 1312 | 15% | 7550 | 85% | 8862 | <0.0001 | 1355 | 15% | 7899 | 85% | 9254 | <0.0001 | 0 | - | 0 | - | 0 | |
| Emergent (2) | 9819 | 25% | 29165 | 75% | 38984 | | 9801 | 24% | 30590 | 76% | 40391 | | 5 | 56% | 4 | 44% | 9 | |
| Urgent (3) | 40199 | 34% | 78452 | 66% | 118651 | | 35126 | 31% | 76490 | 69% | 111616 | | 460 | 85% | 80 | 15% | 540 | |
| Less Urgent (4) | 29073 | 53% | 25850 | 47% | 54923 | | 10149 | 32% | 22003 | 68% | 32152 | | 16100 | 95% | 859 | 5% | 16959 | |
| Non-Urgent (5) | 11820 | 72% | 4549 | 28% | 16369 | | 1365 | 31% | 3056 | 69% | 4421 | | 9731 | 96% | 379 | 4% | 10110 | |
| **Day of the Week** | | | | | | | | | | | | | | | | | | |
| Monday | 15645 | 39% | 24428 | 61% | 40073 | <0.0001 | 8877 | 30% | 21187 | 70% | 30064 | <0.0001 | 5391 | 91% | 505 | 9% | 5896 | |
| Tuesday | 15272 | 40% | 23381 | 60% | 38653 | | 8266 | 29% | 20357 | 71% | 28623 | | 5393 | 95% | 304 | 5% | 5697 | |
| Wednesday | 15603 | 41% | 22044 | 59% | 37647 | | 8688 | 30% | 20013 | 70% | 28701 | | 5250 | 98% | 116 | 2% | 5366 | |
| Thursday | 14924 | 40% | 22374 | 60% | 37298 | | 8378 | 29% | 20286 | 71% | 28664 | | 5144 | 97% | 170 | 3% | 5314 | |
| Friday | 15300 | 40% | 22618 | 60% | 37918 | | 8668 | 30% | 20618 | 70% | 29286 | | 5241 | 95% | 256 | 5% | 5497 | |
| Saturday | 9118 | 31% | 20462 | 69% | 29580 | | 8438 | 30% | 19972 | 70% | 28410 | | 0 | - | 0 | - | 0 | |
| Sunday | 7427 | 27% | 20489 | 73% | 27916 | | 6990 | 26% | 19874 | 74% | 26864 | | 0 | - | 0 | - | 0 | |
| **Time of Arrival** | | | | | | | | | | | | | | | | | | |
| 0000-0059 | 1961 | 26% | 5509 | 74% | 7470 | <0.0001 | 1743 | 26% | 5090 | 74% | 6833 | <0.0001 | 0 | - | 0 | - | 0 | |
| 0100-0159 | 1864 | 27% | 5152 | 73% | 7016 | | 1618 | 25% | 4754 | 75% | 6372 | | 0 | - | 0 | - | 0 | |
| 0200-0259 | 1743 | 26% | 5009 | 74% | 6752 | | 1485 | 25% | 4505 | 75% | 5990 | | 0 | - | 0 | - | 0 | |
| 0300-0359 | 1498 | 27% | 4150 | 73% | 5648 | | 1279 | 25% | 3848 | 75% | 5127 | | 0 | - | 0 | - | 0 | |
| 0400-0459 | 1668 | 27% | 4481 | 73% | 6149 | | 1522 | 26% | 4327 | 74% | 5849 | | 0 | - | 0 | - | 0 | |
| 0500-0559 | 1999 | 29% | 4905 | 71% | 6904 | | 1888 | 28% | 4875 | 72% | 6763 | | 0 | - | 0 | - | 0 | |

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0600-0659 | 1729 | 28% | 4376 | 72% | 6105 | | | 1609 | 27% | 4311 | 73% | 5920 | | | 13 | 100% | 0 | 0% | 13 | |
| 0700-0759 | 6659 | 58% | 4783 | 42% | 11442 | | | 2268 | 35% | 4297 | 65% | 6565 | | | 4079 | 94% | 238 | 6% | 4317 | |
| 0800-0859 | 6542 | 51% | 6263 | 49% | 12805 | | | 2781 | 32% | 5796 | 68% | 8577 | | | 3343 | 94% | 196 | 6% | 3539 | |
| 0900-0959 | 7607 | 49% | 8049 | 51% | 15656 | | | 3373 | 32% | 7316 | 68% | 10689 | | | 3664 | 95% | 189 | 5% | 3853 | |
| 1000-1059 | 7324 | 46% | 8681 | 54% | 16005 | | | 3468 | 31% | 7842 | 69% | 11310 | | | 3125 | 95% | 153 | 5% | 3278 | |
| 1100-1159 | 6780 | 44% | 8760 | 56% | 15540 | | | 3505 | 31% | 7781 | 69% | 11286 | | | 2647 | 95% | 128 | 5% | 2775 | |
| 1200-1259 | 6131 | 42% | 8361 | 58% | 14492 | | | 3131 | 30% | 7353 | 70% | 10484 | | | 2390 | 96% | 88 | 4% | 2478 | |
| 1300-1359 | 5665 | 41% | 8219 | 59% | 13884 | | | 3117 | 30% | 7254 | 70% | 10371 | | | 2022 | 95% | 108 | 5% | 2130 | |
| 1400-1459 | 5500 | 42% | 7743 | 58% | 13243 | | | 2992 | 30% | 6883 | 70% | 9875 | | | 1977 | 97% | 69 | 3% | 2046 | |
| 1500-1559 | 4961 | 40% | 7586 | 60% | 12547 | | | 2888 | 30% | 6645 | 70% | 9533 | | | 1585 | 94% | 103 | 6% | 1688 | |
| 1600-1659 | 4586 | 38% | 7418 | 62% | 12004 | | | 3040 | 31% | 6676 | 69% | 9716 | | | 1174 | 95% | 64 | 5% | 1238 | |
| 1700-1759 | 3597 | 33% | 7180 | 67% | 10777 | | | 2818 | 30% | 6555 | 70% | 9373 | | | 384 | 96% | 15 | 4% | 399 | |
| 1800-1859 | 3052 | 31% | 6947 | 69% | 9999 | | | 2722 | 30% | 6339 | 70% | 9061 | | | 16 | 100% | 0 | 0% | 16 | |
| 1900-1959 | 2794 | 28% | 7236 | 72% | 10030 | | | 2525 | 28% | 6598 | 72% | 9123 | | | 0 | - | 0 | - | 0 | |
| 2000-2059 | 2681 | 28% | 6912 | 72% | 9593 | | | 2379 | 27% | 6336 | 73% | 8715 | | | 0 | - | 0 | - | 0 | |
| 2100-2159 | 2633 | 28% | 6620 | 72% | 9253 | | | 2366 | 28% | 6154 | 72% | 8520 | | | 0 | - | 0 | - | 0 | |
| 2200-2259 | 2241 | 28% | 5883 | 72% | 8124 | | | 1982 | 26% | 5536 | 74% | 7518 | | | 0 | - | 0 | - | 0 | |
| 2300-2359 | 2074 | 27% | 5573 | 73% | 7647 | | | 1806 | 26% | 5236 | 74% | 7042 | | | 0 | - | 0 | - | 0 | |
| **ED Care Zone** | | | | | | | | | | | | | | | | | | | | |
| CDU | 2871 | 30% | 6727 | 70% | 9598 | <0.0001 | | 2871 | 30% | 6727 | 70% | 9598 | <0.0001 | | | | | | | |
| Detention | 2677 | 25% | 7975 | 75% | 10652 | | | 2677 | 25% | 7975 | 75% | 10652 | | | | | | | | |
| PES | 3805 | 34% | 7269 | 66% | 11074 | | | 3805 | 34% | 7269 | 66% | 11074 | | | | | | | | |
| Trauma | 10940 | 26% | 30360 | 74% | 41300 | | | 10940 | 26% | 30360 | 74% | 41300 | | | | | | | | |
| Zone 1 | 10761 | 31% | 24473 | 69% | 35234 | | | 10761 | 31% | 24473 | 69% | 35234 | | | | | | | | |
| Zone 2 | 7488 | 28% | 19441 | 72% | 26929 | | | 7488 | 28% | 19441 | 72% | 26929 | | | | | | | | |
| Zone 3 | 9032 | 27% | 23972 | 73% | 33004 | | | 9032 | 27% | 23972 | 73% | 33004 | | | | | | | | |
| Zone X | 7864 | 33% | 16247 | 67% | 24111 | | | 7864 | 33% | 16247 | 67% | 24111 | | | | | | | | |
| **Laboratory Tests Ordered** | | | | | | | | | | | | | | | | | | | | |
| No | 46151 | 50% | 46448 | 50% | 92599 | <0.0001 | | 13607 | 30% | 31646 | 70% | 45253 | <0.0001 | | 26403 | 95% | 1350 | 5% | 27753 | |
| Yes | 48819 | 29% | 119190 | 71% | 168009 | | | 44699 | 29% | 110678 | 71% | 155377 | | | 16 | 94% | 1 | 6% | 17 | 0.5718 |
| **Radiology Ordered** | | | | | | | | | | | | | | | | | | | | |
| No | 55220 | 46% | 63636 | 54% | 118856 | <0.0001 | | 20396 | 32% | 44308 | 68% | 64704 | <0.0001 | | 26392 | 95% | 1349 | 5% | 27741 | |
| Yes | 39750 | 28% | 102002 | 72% | 141752 | | | 37910 | 28% | 98016 | 72% | 135926 | | | 27 | 93% | 2 | 7% | 29 | 0.6507 |
| **Disposition** | | | | | | | | | | | | | | | | | | | | |
| Discharged | 66732 | 40% | 98135 | 60% | 164867 | <0.0001 | | 41139 | 30% | 93874 | 70% | 135013 | <0.0001 | | 24448 | 95% | 1202 | 5% | 25650 | |
| Admitted | 15069 | 26% | 42057 | 74% | 57126 | | | 15045 | 26% | 41958 | 74% | 57003 | | | 2 | 100% | 0 | 0% | 2 | |
| LWBS | 3141 | 32% | 6539 | 68% | 9680 | | | 151 | 40% | 229 | 60% | 380 | | | 59 | 89% | 7 | 11% | 66 | |
| Eloped | 3853 | 46% | 4566 | 54% | 8419 | | | 773 | 40% | 1183 | 60% | 1956 | | | 70 | 95% | 4 | 5% | 74 | |

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Walked Away | 262 | 4% | 6610 | 96% | 6872 | | | 26 | 3% | 938 | 97% | 964 | | | 19 | 90% | 2 | 10% | 21 | |
| ED (From WIC) | 3752 | 84% | 700 | 16% | 4452 | | | 37 | 28% | 94 | 72% | 131 | | | 1499 | 93% | 112 | 7% | 1611 | |
| Labor & Deliv | 681 | 22% | 2459 | 78% | 3140 | | | 106 | 22% | 376 | 78% | 482 | | | 189 | 92% | 16 | 8% | 205 | |
| AMA | 1046 | 34% | 2052 | 66% | 3098 | | | 761 | 29% | 1824 | 71% | 2585 | | | 112 | 95% | 6 | 5% | 118 | |
| Deceased | 76 | 7% | 971 | 93% | 1047 | | | 76 | 7% | 971 | 93% | 1047 | | | 0 | - | 0 | - | 0 | |
| Operating Room | 76 | 12% | 548 | 88% | 624 | | | 75 | 12% | 545 | 88% | 620 | | | 0 | - | 0 | - | 0 | |
| WIC (From ED) | 118 | 22% | 414 | 78% | 532 | | | 3 | 30% | 7 | 70% | 10 | | | 3 | 100% | 0 | 0% | 3 | |
| Transferred | 61 | 25% | 181 | 75% | 242 | | | 28 | 27% | 77 | 73% | 105 | | | 2 | 100% | 0 | 0% | 2 | |
| **Mode of Arrival** | | | | | | | | | | | | | | | | | | | | |
| Walk In | 65668 | 41% | 93031 | 59% | 158697 | <0.0001 | | 31192 | 30% | 73126 | 70% | 104318 | <0.0001 | | 25789 | 95% | 1301 | 5% | 27090 | |
| Ambulance | 21286 | 27% | 56130 | 73% | 77416 | | | 20463 | 27% | 54694 | 73% | 75157 | | | 82 | 93% | 6 | 7% | 88 | |
| Police | 3706 | 28% | 9427 | 72% | 13133 | | | 3568 | 28% | 9002 | 72% | 12570 | | | 0 | - | 0 | - | 0 | |
| Private vehicle | 3993 | 44% | 5130 | 56% | 9123 | | | 2881 | 41% | 4193 | 59% | 7074 | | | 469 | 94% | 30 | 6% | 499 | |
| Clinic Referral | 66 | 13% | 460 | 87% | 526 | | | 60 | 12% | 429 | 88% | 489 | | | 0 | - | 0 | - | 0 | |

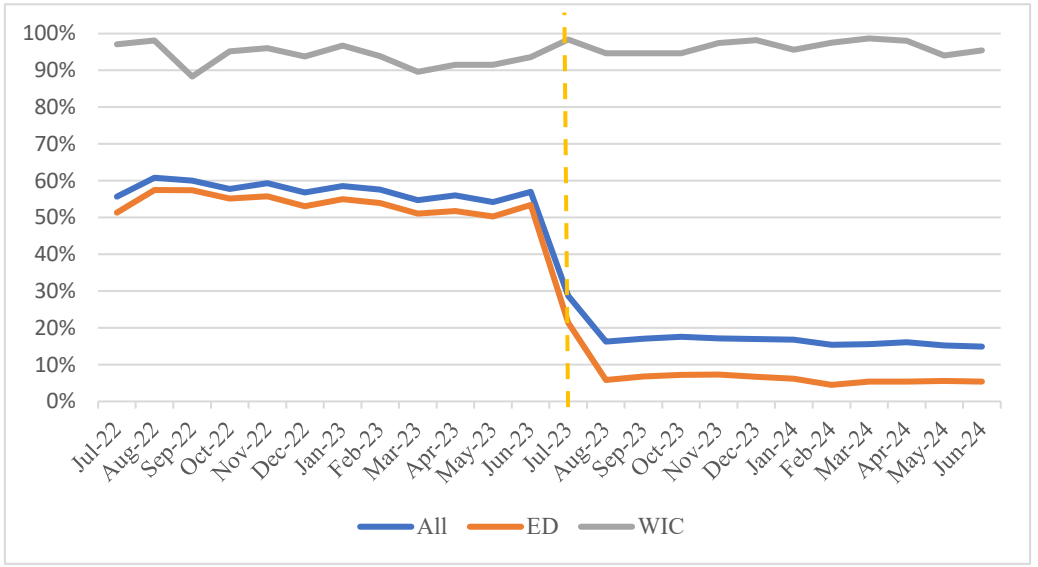



***Figure 1: Proportion of patients offered an HIV test in triage by month, Grady Emergency Department, Atlanta, July 2022 – June 2024:*** *The electronic medical record prompted nurses to offer an HIV test during (first contact with patient). This HIV question was removed from primary triage to secondary triage in July of 2023 (yellow dotted line). In the Emergency Department (ED, orange), visits offered an HIV test in triage dropped from around 50% before the change in triage to less than 10% after the change. In the Walk In Center (WIC, gray), the percentage of visits offered an HIV test remained mostly above 90% before and after the change. All visits (All, blue) followed the ED's trend since the ED accounts for a larger proportion of visits than the Walk-In Center.*

Figure 1 shows the percentage of ED patients offered and receiving an HIV test over time. The Walk-In Center did not have appreciable change, with rates of test offering being mostly above 90% throughout the study periods. The ED had an 89% drop in the percentage of visits being offered an HIV test after the policy change, from a mean of 54% in the pre-removal period to less than 7% in the after period. The ECC, or the combination of the ED and Walk-In Center, experienced a slightly less pronounced drop due to the contribution of the Walk-In Center, which did not drop its percentage of tests offered.

Table 2 shows the results of the simple and multivariate linear regressions for the impact of removing the HIV question from primary triage on the percentage of patients offered an HIV test in the ED. The simple linear regression showed a reduction of 46%. The multivariate regression incorporated all the basic characteristics listed in Table 1 as covariates which resulted in an estimated reduction of 47%, very similar to the simple linear regression. The R square of the multivariate regression was 0.28, thus, the model explained about 28% of the change in the percentage of patients offered an HIV test in the ED.

***Table 2: Simple and multivariate linear regressions of HIV tests ordered by removal of HIV question from primary triage, Grady Emergency Department, Atlanta, July 2022 – June 2024.*** *Consistent with Figure 2, simple logistic regression showed that the percentage of visits offered HIV testing went down by 46% after the removal of the HIV question from primary triage. Multivariate regression with all the variables listed in Table 1 as covariates resulted in a similar decrease of 47% in visits offered an HIV test. Based on the R square obtained, the change in HIV questions explained around 26% of the change in the proportion of visits offered an HIV test.*

| | Simple Linear Regression | | Multivariate Linear Regression | |
|---|---|---|---|---|
| | **Estimate** | **Pr > \|t\|** | **Estimate** | **Pr > \|t\|** |
| **Change in HIV Triage Question** | -0.46 | <.0001 | -0.47 | <.0001 |
| **R square** | 0.26 | | 0.28 | |
| **Pr > F** | <.0001 | | <.0001 | |

Figure 2 shows the answers to the triage question offering HIV testing. The great majority of patients declined testing with only 8% accepting testing.

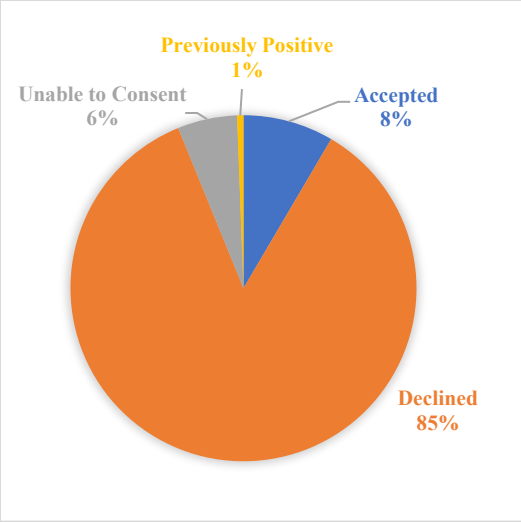
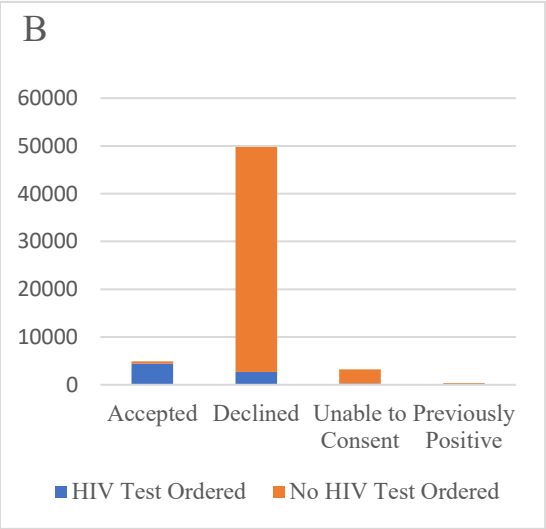


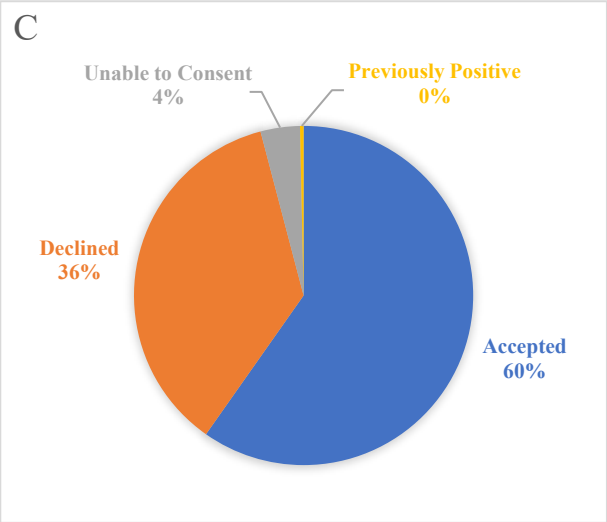

***Figure 2: Rate of acceptance of HIV testing in HIV testing in triage, Grady Emergency Department, Atlanta, July 2022 – June 2024.*** *Nurses offered HIV tests in an opt-out fashion during triage. A great majority of patients declined testing. Only 8% accepted testing.*

**2. HIV tests ordered in the emergency department**

The responses of 58,306 patients who were offered an HIV test in the ED and the proportion of them for whom an HIV test was ordered was are graphed in Figure 3. Of all patients offered an HIV test, 13% had one ordered: 89% of those who accepted testing, 5% of those who declined, 9% of those who were unable to consent, and 7% of those who said they had a previous positive HIV result. Although the percentage of patients who received HIV testing after declining it in triage was low, people who declined testing in triage still accounted for 36% of all HIV tests ordered (Figure 3C).

***Figure 3: HIV tests ordered by answer to HIV triage question, Grady Emergency Department, Atlanta, July 2022 – June 2024:*** *Percentages (A) and absolute numbers (B) of tests ordered and not ordered by answer to HIV question in triage. Answer to HIV triage question of all patients with an HIV test ordered (C). Most people who accepted HIV testing in triage had an HIV test ordered, and most people who declined HIV testing did not have it ordered.*




After the HIV question was removed from the primary triage process, there was a significant decrease of 20% in the proportion of patients who had HIV tests ordered (a drop of 2% from 9.9% baseline) by simple and multivariate linear regression ($p < 0.0001$) (Table 2). R square values from the univariate regression suggested that the removal of the HIV question from primary triage explained 0.1% of the change in HIV tests ordered. The multivariate model estimated that the removal of the question explained about 7.6% of the change.

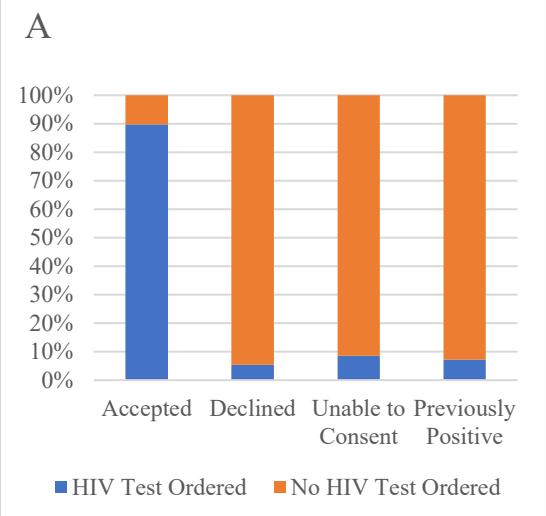
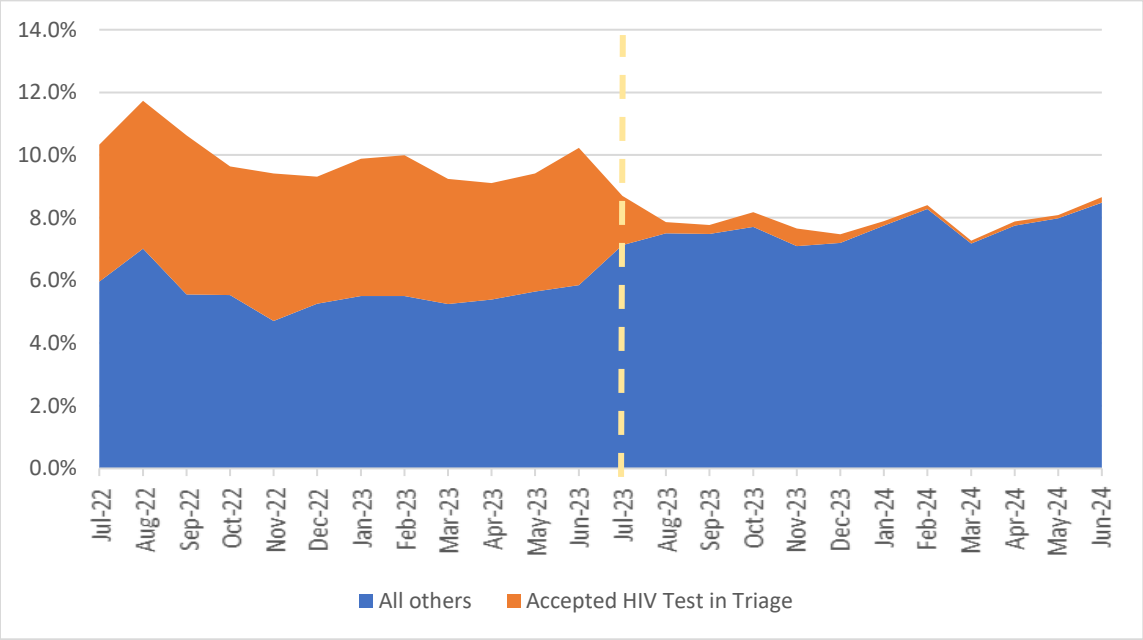


***Table 3: Simple and multivariate linear regressions of HIV tests ordered by removal of HIV question from primary triage.*** *Simple logistic regression showed that the percentage of visits offered HIV testing went down by 1.9% after the removal of the HIV question from primary triage. Multivariate regression with all the variables listed in Table 1 as covariates resulted in a similar decrease of 2.0% in visits ordered an HIV test. Based on the R square obtained, the change in HIV questions explained around 7.6% of the change in the proportion of visits with an HIV test ordered.*

| | Simple Linear Regression | | Multivariate Linear Regression | |
|---|---|---|---|---|
| | **Estimate** | **Pr > \|t\|** | **Estimate** | **Pr > \|t\|** |
| **Removal of HIV Question from Primary Triage** | -0.019 | <.0001 | -0.020 | <.0001 |
| **R square** | 0.001 | | 0.076 | |
| **Pr > F** | <.0001 | | <.0001 | |

The significant drop in percentage of visits with an HIV test ordered per month is shown in more detail in Figure 4. The proportion of tests ordered on patients who accepted HIV testing in triage (blue) fell sharply in July of 2023. The proportion of all other patients who had HIV tests ordered (who were offered an HIV test and declined or were not offered an HIV test) (orange) went up gradually around the same time, but the overall percentage of HIV tests ordered did not recover back to the levels before removal of the HIV question from triage.

***Figure 4: Percentage of visits with an HIV test ordered by month and acceptance of HIV test in triage, Grady Emergency Department, Atlanta, July 2022 – June 2024:*** *As the proportion of tests ordered in people who accepted HIV testing in triage decreased, the proportion of HIV tests ordered in all other people went up. Total tests went down slightly.*



### 3. Summary of results

There was a significant drop in HIV tests offered and HIV tests ordered after the removal of the HIV question from primary triage. The percentage of HIV tests ordered among "all others" (people who were offered at test and answered anything other than "accept" or people who were not offered an HIV test) went up after the removal of the HIV question from primary triage but did not make up completely for the overall drop in HIV tests ordered. There was a sharp drop in the proportion of patients offered an HIV test in the ED but not in the Walk-In Clinic.

## CHAPTER V: DISCUSSION

### 1. Discussion

Utilizing a retrospective chart review, we performed an interrupted time series analysis comparing one year of data before and one year of data after the removal of the HIV question from primary triage to secondary triage, to assess its impact on the number of HIV tests offered and ordered in the Grady ED. The percentage of HIV tests offered went down by 90% and HIV tests ordered went down by 27%. The drop in tests ordered would have been higher had it not been for a concurrent increase in HIV tests ordered in patients who did not accept or were not offered an HIV test in triage and had HIV testing later in their visit. We cannot tell from our data what caused the increase in testing in patients who did not accept HIV testing in triage. We hypothesize that it could be due to HIV testing that was clinically indicated, such as in patients with presentations concerning for immunosuppression or patients with possible sexually transmitted infection (STI) exposure. Future work could study if HIV test offers among people who did not accept HIV testing in triage continue to increase and lead to an overall HIV test offer rate similar to those prior to the removal of the HIV question from triage, although this seems unlikely. Another study showed that opt-out testing increased HIV test acceptance rates by 12% (Soh et al., 2022), so we would expect that, at the very least, offering opt-out HIV testing in triage would have a similar effect in the number of HIV tests ordered at Grady.

Another important finding is that even before the removal of the HIV question from triage, only half of ED patients were being offered HIV tests, compared to greater than 90% in the Walk-In Center. Perhaps this is due to the lower acuity of patients or a higher number of visits for testing for sexually transmitted infections in the Walk-In Center, leading to more standardized sexually transmitted infection testing processes there. This is concordant with our data in which higher acuity was associated with decreased HIV test offers, as were arrival by ambulance, disposition to the operating room, and deceased patients which are all intuitively associated with higher acuity. However, even the lowest acuity patients (ESI 4 and 5) and patients seen in Zones X and 1 (low acuity zones) in the ED were offered HIV tests at much lower rates than in the Walk-In Clinic. Furthermore, except for a select few, in our clinical experience, most high acuity patients (ESI 1 and 2) can consent to HIV testing after initial stabilization. The differences in HIV test offer rates between the ED and the Walk-In center might be due to different workflows and triage processes, a different nursing group, or different nurse training and incentives. In the past, there used to be a coordinator based out of the Walk-In Center who helped connect to follow-up care people newly diagnosed with HIV, and perhaps this left a higher awareness of HIV testing in the Walk-In Center.

Nighttime arrival to the ED was associated with fewer HIV tests being offered. Potential explanations for this include possible fewer lower acuity patients coming at night or perhaps differences in triage practices by night shift nurses. The detention care zone had the lowest offering of HIV tests, which is a missed opportunity given that incarcerated people are at high risk of HIV (Spaulding et al., 2015). Interestingly, though statistically significant, having laboratory work ordered only resulted in a 1% (30% vs. 29%) increase in HIV tests offered, so whether laboratory work is being ordered does not appear to play an important role in whether HIV tests are being offered.

Only 8% of patients offered an HIV test accepted one. This is much lower than reported in other EDs (38-50%) (Felsen et al., 2020; Gillet et al., 2018). It is unclear why the rate of HIV test acceptance is this low. Barriers to acceptance of HIV testing in the ED from the literature include low perceived personal risk and desire to focus on the primary medical complaint (De Rossi et al., 2017). There may be

other barriers specific to the Grady setting, which might include, for example, verbiage when asking the question or privacy when triage is conducted in front of other staff or patients. This requires further study. Another area to explore is that although a great majority of patients who accepted HIV testing had a test ordered, 10% of those who accepted testing did not. Potential barriers could include issues with the electronic medical record interface or patients changing their mind after accepting testing during triage. The electronic medical record only prompts the HIV question during triage for patients who have not had an HIV test in the last 6 months and have never had a positive HIV test in the Grady System. It is possible that a portion of people declining testing in the Grady ED have had HIV testing elsewhere.

**2. Limitations**

Limitations of this study include its pre and post design, in which factors that may not have been captured as covariates might have been different on the pre and post periods and affected the number of HIV tests offered and ordered. Such factors could include triage nursing staff turnover or changs in staff training and policies for the Joint Commission Visit. Patient factors could have contributed as well, such as changes over time in perceptions of risk of HIV or increased stigma around HIV testing. However, Figures 1 and 4 illustrate the drop in HIV tests offered and ordered was sharp and coincides temporally with the timing of the removal of the HIV questions from triage. Further, one author (AP) works in the emergency department, and has not heard of any other significant process changes that would have affected HIV testing starting that same month.

We also lacked data on the rates of completion of secondary triage. Perhaps secondary triage is being completed, but there is some issue that only affects completion of the HIV question. From our data we cannot explain the difference in rates of HIV tests offered in the Walk-In Clinic and the ED. We suspect a combination of different triage processes or training, coupled with high rates of patient seeking STI testing in the Walk-In Clinic. It would be informative to see how the rates of HIV tests offered and ordered changed in people presenting for STI testing.

Despite its limitations, our study provides high quality evidence that decision makers in the Grady ED can use to look at the impact of the removal of the HIV question from triage.

**3. Implications**

Our findings suggest that removal of the HIV question from primary triage was associated with a strong negative impact on the number of HIV tests offered and ordered in the Grady ED. We presented some of the preliminary findings from this study to the Grady ED leadership, which led to the recent reinstatement of the HIV question in primary triage. The final analysis presented here offers even stronger support for this decision. We hope that the return of the triage question to primary triage will lead to increases in HIV tests offered and ordered in the Grady ED to at least pre-removal levels. We have also identified other areas for improvement:

- Only half of patients in the ED were offered HIV testing at baseline, even before removal of the HIV question from triage.
- Only one in twelve patients offered an HIV test in triage accepted one, which is much lower than in other studies in the literature.
- One in ten patients who accepted an HIV test did not have one ordered.

**4. Recommendations**

We offer the Grady ED leadership the following recommendations as next steps to find ways to increase HIV tests offered and accepted in the ED:

- Track rates of HIV tests offered and ordered after return of triage question to primary triage to assess the impact of this and future changes to the HIV screening process.
- Explore barriers to offering HIV tests during triage to all patients in the ED to identify areas for improvement using qualitative or mixed methods approaches.
- Explore what differences in triage processes between the Walk-In Clinic and the ED led to the large differences in HIV tests offered and identify practices that could be implemented to increase the percentage of HIV tests offered in the ED.
- Explore barriers to HIV test acceptance and intervene to increase acceptance rates.
- Explore why some patients who accept HIV testing do not have a test ordered

## 5. Conclusion

The percentages of HIV tests offered and accepted by patients and HIV tests ordered were already low before the removal of the HIV question from primary triage in the Grady ED. The removal of the question was associated with an even lower number of HIV tests offered and ordered. Rates of HIV tests offered were much higher in the Walk-In Center compared to the ED and were not affected by the removal of the HIV question from primary triage. Further work is needed to increase the rates of HIV test offer, acceptance, and ordering in the ED.

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