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Evaluation of the Hayes E. Willis Health Center in South Richmond – Has It Served Its Targeted Population?

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Abstract

Objective: The Hayes E. Willis Health Center (HWHC) was opened in a neighborhood of South Richmond in October 1993 to remove the barriers that prevented South Richmond residents from accessing primary healthcare services. The major objective of this study was to determine the effectiveness of the HWHC in providing primary care to the South Richmond Community deemed to be in need. An additional objective was to describe the changes in characteristics of clinic users and illnesses seen over time.

Methods: Patient data was compared from the HWHC's first full year of operation in which patient data was collected (1995) to the most current year (2003) to determine if the targeted population of South Richmond had been serviced by the HWHC. A combined total of 20,190 visits occurred in 1995 and 2003 by a total of 7,552 patients. A Pearson chi-square analysis was performed to test whether the observed differences in proportions between the two study groups (1995 and 2003) were statistically different for the variable of patient residence location, as well as the variables of race, sex, age, type of insurance used, and clinic visited.

Results: The patient population living in the original target area of South Richmond has declined from 82.6% in 1995 to 67.1% in 2003. The proportion of patients residing within the metropolitan Richmond area, but outside of South Richmond, has increased from 13.2% in 1995 to 21.1% in 2003. The proportion of clinic patients residing outside of Richmond completely has nearly tripled – from 4.2% to 11.8%.

Conclusions: While the HWHC has gained popularity with non-South Richmond residents, it is clear that it has in fact been successful in offering primary care health services for the residents of South Richmond. The HWHC, and the public health policy that created it, should be viewed as an ideal model for other areas in Richmond, as well as other metropolitan areas across the United States to emulate and implement in their own communities.

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Introduction

Literature Review

Currently, over 43 million Americans are living without health insurance (1). Because the nation's healthcare system is so fragmented and operates without a comprehensive plan to integrate all aspects of healthcare, it depends on a safety net system to provide care to indigent population groups. Although these safety nets serve merely as stop gaps for care, without them millions of Americans would go without any healthcare (2,3). In addition, the inappropriate use of hospital emergency rooms as primary care centers might be much higher than it is today (3). Despite these benefits, however, the future of safety net systems may be in jeopardy as states face fiscal crises. Increasing investments into safety net providers and community health centers could actually save money by reducing the need for high-cost specialty care and eliminating health disparities (2).

A system of safety net providers exists in the state of Virginia and in the city of Richmond. This system includes the Virginia Primary Care Association (VPCA), the VA Association of Free Clinics, and Richmond Enhancing Access to Community Healthcare (REACH). For more than 20 years, the VPCA has assisted communities and organizations to improve access to primary healthcare through private nonprofit community-based systems of services. Its member organizations, with 66 delivery sites, provide care to over 160,000 Virginians (4). The VA Association of Free Clinics is the nation's oldest Free Clinic association and represents and supports Virginia's network of 49 Free Clinics. A Free Clinic is a private, nonprofit, community-based organization that provides healthcare at little or no charge to low-income, uninsured, and underinsured persons through the use of volunteer healthcare professionals and partnerships with other health providers (5). REACH is composed of

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Richmond area organizations dedicated to providing healthcare services for individuals without insurance. These safety net providers care for individuals with limited or no health insurance, as well as many public health insurance recipients (i.e., Medicaid, Medicare, or FAMIS) (6).

Exacerbated by the problem of healthcare access, many of today's healthcare problems are found in medically underserved, poor urban neighborhoods. Certain indigent and vulnerable population groups suffer from disproportionately higher occurrences of premature births, high infant mortality, substance abuse, and high infection rates caused by HIV (7,8). In addition, chronic disorders such as hypertension, diabetes, coronary artery disease, and cancer may be found in as much as 30% of some socio-economically disadvantaged urban neighborhoods (7). These healthcare problems are prevalent in many urban communities, including certain segments of the Richmond Metropolitan Area in Virginia (9).

Understandably, the number one goal of the U.S. Department of Health and Human Services' Healthy People 2010 is to increase quality and years of healthy life. Perhaps surprisingly however, eliminating health disparities is the national initiative's second overarching goal (10). These disparities include health differences occurring by gender, race or ethnicity, education or income, disability, geographic location, or sexual orientation. Since African Americans represent the largest segment of Richmond's population (11), health disparities due to race are especially important in Richmond. Numerous studies have shown that low socioeconomic status, lack of insurance, and lack of a usual source of care represent significant barriers to preventive and primary care for minorities (12,13,14, 15).

Access to quality care is essential to increasing the quality and years of healthy life for all persons in the United States as well as eliminating health disparities, the two overarching goals of Healthy People 2010. As such, the first objective for improving health in Healthy People

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2010 is to improve access to comprehensive, high-quality healthcare services. Supporting safety net systems by expanding community health centers is important in the attainment of this objective because it ensures the availability and access of primary care for vulnerable U.S. populations (16).

The goals and objectives of Healthy People 2010 (and those of Healthy People 2000) were not lost on the healthcare leadership of Virginia. The Commission on Healthcare for all Virginians was created by the Virginia General Assembly to study primary care needs and placement in the Commonwealth. In reports to the Governor and General Assembly, the Commission urged "a refocusing of the state's direction and health policy towards the provision of primary care" (17). Therefore, in 1991, the Commission and General Assembly created Senate Joint Resolution (SJR) 179, mandating that each local district health director be required to determine the primary care service needs of the residents for their district, as well as to develop a community plan for addressing identified problems that impact indigent and underserved population groups (18). The community plan stipulated by SJR No. 179 also required an inventory of available and accessible health manpower, and strategies for bridging any gaps found at the local level. The SJR No. 179 also requested local medical societies, hospitals, medical training programs, community health centers, primary care providers, local governments, and voluntary health agencies to participate with the local department of health in the analysis and development of a plan for the provision of primary care services. Thus, the SJR No. 179 paved the way for the Richmond Urban Primary Care Initiative (RUPCI), which was launched in 1992. This project created a forum to discuss the gaps in the healthcare delivery system in Richmond's Southside community.

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An SJR No. 179 Committee, established by the Richmond City Health Director, found that while sufficient facilities and healthcare personnel were available in Richmond, their geographic distribution did not provide for appropriate access and availability to needed services. Furthermore, the area of the city south of the James River (which posed a formidable transportation barrier for the poor) needed special study (18). The Virginia General Assembly provided funding to conduct a survey of South Richmond to more accurately assess the health needs of the area. Within the South Richmond community, the committee surveyed those census tracts that contained the majority of the poorer population, with incomes below 200% of federal poverty guidelines. In addition, the survey focused on non-pregnant individuals between the ages of 18 and 65. These specific tracts and individuals were selected because they were not eligible for either Medicaid or Medicare, and they were unlikely to have employer-provided health insurance. Thus, they represented the most vulnerable population group.

The survey of the healthcare needs of the selected neighborhoods revealed that even with existing healthcare facilities and providers, a significant proportion of this population did not receive needed primary care services. Major barriers to primary care services included lack of insurance, lack of ability to pay for medicines, and lack of transportation.

To remove these barriers, the South Richmond Health Center (later renamed the Hayes E. Willis Health Center) was opened in a neighborhood of South Richmond in October 1993 with funding from the Robert Wood Johnson Foundation, along with grants from the Theresa Thomas Foundation, the Greater Richmond Foundation, the Virginia Healthcare Foundation, the Virginia Commonwealth University Health System, the Richmond City Health Department, and the General Assembly of Virginia. This location was easily accessible to the many impoverished

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communities in South Richmond and was at the transportation hub of the community, thus improving potential access.

Justification of Study

Because the nation's healthcare system is so reliant upon safety net clinics and health centers to provide care to indigent and underserved population groups, the need exists to evaluate these safety net systems and determine what programs or components perform successfully. Those safety net systems that successfully deliver care to the uninsured and underinsured should be exemplified and modeled in other communities. Likewise, those safety net systems that fail to deliver needed healthcare to vulnerable populations should be restructured to improve healthcare access and delivery.

The Robert Wood Johnson Foundation, the largest philanthropy devoted exclusively to health and healthcare in the United States [19], has sponsored the Community Tracking Study (CTS), a large-scale longitudinal investigation of health system change and its effects on people. The study is tracking 60 communities (51 metropolitan areas and 9 non-metropolitan areas) to investigate the ways in which community health systems, including hospitals, health plans, physicians, and safety net providers, are restructuring their systems to provide healthcare coverage and access to care for their populations [20]. Unfortunately, the metropolitan area of Richmond, Virginia was not selected to be included in the CTS. This study, therefore, is essential to evaluate a portion of the Richmond safety net provider system since no other similar evaluation system currently exists in Richmond. The Hayes E. Willis Health Center (HWHC) in South Richmond was built to serve the needs of the South Richmond population. Currently, it is not known if this health center has in fact successfully served this population group.

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Purpose

This study will determine if the HWHC has successfully served its targeted population group of South Richmond. The specific aims of this research will be to determine the effectiveness of the HWHC in providing primary care services to the South Richmond Community deemed to be in need. To accomplish this study, patient data will be compared from the HWHC's first full year of operation in which patient data was collected (1995) to the most current year (2003) to determine if the targeted population of South Richmond has in fact been serviced by the HWHC. The project will also describe the changes in characteristics of clinic users and illnesses seen over time.

If the results of this study show that the HWHC has successfully served its targeted population, then it can be used as a model for other communities with similar underserved population areas to emulate and follow. If the study shows that the HWHC has not successfully served its targeted population, then it will be necessary to study the reasons behind this failure. An additional needs assessment will be required to evaluate the current health needs of the South Richmond targeted population.

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Methods

Study Population

The study population consists of all patient visits to the Hayes E. Willis Health Center (HWHC) during calendar years 1995 and 2003. A combined total of 20,190 patient visits occurred in 1995 and 2003; 8,034 in 1995, and 12,156 in 2003. These visits represented 3,579 patients in 1995 and 3,973 patients in 2003. Inclusion criteria for the analysis of demographic variables, and all other variables excluding patient diagnosis codes, only allow the patients' first visit to the HWHC to be included in the study population. These strict criteria permit each patient to be included only once in the population. Inclusion criteria for the analysis of diagnosis codes allow every single visit to the center to be included in the study population (rather than every patient – i.e. one patient may have multiple visits). Exclusion criteria prohibit visits for non-medical purposes (eg., follow-up visits for laboratory tests or x-rays only).

All socio-demographic data used in this study, including age, race, sex, and type of insurance, was collected by staff at the HWHC.

Study Variables

Since the purpose of this study is to determine if the HWHC effectively provided care to its targeted population in South Richmond, the main variable of interest is the location of patient residence. The original South Richmond Health Survey determined the need for primary care services for the South Richmond community based on census tract data for where the greatest need existed. Census tracts 601-605 and 607-608 were determined to contain residents with the greatest need. Complete address data was available for patients seen in the HWHC in 2003, so census tract data could be determined for these patients. Unfortunately, complete address data

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was not available for patients seen in the HWHC in 1995. Therefore, only zip code data on patients seen in 1995 was available. In order to maintain consistent methods for determining patient residence location in both 1995 and 2003, zip codes were used in this study to serve as a proxy for census tract location. The South Richmond zip codes of 23224, 23225, and 23234 were ascertained to contain the targeted census tracts as determined by the South Richmond Health Survey (appendix A contains the map of Richmond census tracts overlayed by zip codes which was used to determine the target zip codes). The proportion of clinic patient residing in these target zip codes, as well as in other Richmond city zip codes, Richmond metropolitan area zip codes (Henrico and Chesterfield County), and other non-Richmond zip codes will be compared to determine which zip codes contain the largest proportion of HWHC patients as well as to determine the change in proportions from 1995 to 2003.

Other variables included in the study were race, sex, age, type of payment or insurance, specific clinic visited within the HWHC, and diagnosis.

Statistical Analyses

Because this study does not involve the typical outcome variable such as a disease, it is a descriptive study, and all analyses will be descriptive in nature.

Descriptive statistics. SPSS version 11.0 was used to calculate frequencies and proportions of all variables by year seen in the clinic (1995 and 2003). These variables included race (Black, White, Other), sex (male, female), age (<1, 1-4, 5-19, 20-29, 30-49, ≥50), residence location (zip code), type of payment or insurance (indigent, Medicaid, self-pay, private insurance, Medicare), clinic visited (Family Practice, Women's Health, Pediatric clinic), and diagnosis group. For the race variable, Asian, Hispanic, and American Indian/Native American

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patients were combined and classified as "other" because these separate races had too few numbers for statistical analysis.

To record diagnoses from patients of the HWHC, the clinic used the Clinical Classification Software (CCS) developed by the Agency for Healthcare Research and Quality [21]. CCS is based on the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM), a uniform and standardized coding system. Over 12,000 diagnosis codes and 3,500 procedure codes from the ICD-9-CM are collapsed into a smaller number of clinically meaningful categories (260) that are sometimes more useful for presenting descriptive statistics than are individual ICD-9-CM codes. To simplify the statistical analysis even further, these 260 codes were collapsed and recoded into the following 16 major disease groups based on the ICD-9: (1) infectious and parasitic diseases, (2) neoplasms, (3) endocrine, nutritional and metabolic diseases, and immunity disorders, (4) diseases of the blood and blood-forming organs, (5) mental disorders, (6) diseases of the nervous system and sense organs, (7) diseases of the circulatory system, (8) diseases of the respiratory system, (9) diseases of the digestive system, (10) diseases of the genitourinary system, (11) complications of pregnancy, childbirth, and the puerperium (12) diseases of the skin and subcutaneous tissue, (13) diseases of the musculoskeletal system, (14) congenital anomalies, (15) injuries, poisoning, and violence, and (16) miscellaneous [22].

Comparison statistics. For the discrete, categorical variables (race, sex, age, zip code, type of payment, clinic visited, and diagnosis), a Pearson chi-square test was performed to test whether the observed differences in proportions between the two study groups (1995 and 2003) were statistically different. If any statistical differences were detected between the major diagnosis/disease groups for 1995 and 2003, those condensed groups were expanded to their

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original codes under the CCS so that a more in-depth analysis of specific diseases within those groups could be performed.

While age was used as an ordinal variable in the chi-square test, it was used as a continuous variable as well. A t-test was used to compare the mean ages of the two independent study population groups (1995 and 2003) and test if the mean difference was statistically significant.

Institutional Review Board. The study design and analysis plan were approved by the Virginia Commonwealth University/Medical College of Virginia Institutional Review Board (IRB) under an exempt review. IRB approval was necessary because the data was not available for public use, however, an exempt review was allowed because the data contained no personally identifiable information.

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Results

Descriptive Statistics.

Frequency Distributions and Comparison Statistics – Demographic Variables.

The distribution of patients in 1995 and 2003 according to the variables of race, sex, age, residence location, type of insurance, and clinic visited are shown in Table 1. A Pearson chi-square test was performed to test whether the observed differences in proportions between the two study groups (1995 and 2003) were statistically different across the discrete variables of race, sex, age, residence location, type of insurance, and clinic visited. Table 1 displays the study variables according to year with the Pearson chi-square and p-value results. For all study variables, chi-square values were large, ranging from 11.11 for sex to 695.24 for type of insurance. In addition, all p-values for these variables were significant.

Major differences in the 1995 and 2003 study populations include an increase in patients classified as "other" race from 213 in 1995 (6.0% of the total 1995 population) to 512 in 2003 (12.9%); a decrease in patients under the age of 30 (from 77.6% in 1995 to 53.1% in 2003), and an increase in patients aged 30 and older (from 22.4% to 46.9%). When age was analyzed as a continuous variable, the mean age of patients in 1995 and 2003 were 19.38 (SD=17.34) and 29.06 (SD=22.14), respectively, giving a mean difference (increase) of 9.69. These means were compared using a t-test analysis. Since the Levene test for equal variance was significant ($F=458.83$, p-value <0.0001), an un-equal variance t-test was performed. The results of this test showed that the mean ages for 1995 and 2003 were significantly different ($t=21.28$, p-value <0.0001).

The distribution of patients by sex shows that in both years, females comprised the majority of all patient visits: 72.9% in 1995, and 69.4% in 2003.

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In addition, the proportion of indigent patients has almost doubled, while the proportion of self-pay patients has decreased 19.2%. Medicaid patients have decreased 2.4%, whereas patients using Medicare has increased 8.1%. Patients seen in the family practice and pediatric clinics have increased 2.4% and 5.4%, respectively, while patients seen in the women's health clinic have decreased 7.8%.

Diagnosis Code Variables.

Table 2 shows the distribution of all patient visits in 1995 and 2003 by diagnosis groups. The differences seen within diagnosis groups for all visits from 1995 and 2003 were significant except for visits coded under blood disorders, skin diseases, and congenital anomalies. The largest differences seen in the diagnosis groups were in the following categories: (1) pregnancy and childbirth – decreasing 17.2% (of total cases) from 1995 to 2003, (2) endocrine and immunity disorders – increasing 13.1%, (3) miscellaneous diseases – decreasing 10.8%, (4) diseases of the circulatory system – increasing 8.6%, (5) genitourinary system – decreasing 5.6%, and (6) infectious disease – increasing 4.1%.

The specific diseases within these diagnosis groups that are causing these big differences are displayed in Table 3. It shows the distribution of patient visits in 1995 and 2003 by specific diseases from the diagnosis groups that showed the largest differences – pregnancy and childbirth, endocrine and immunity disorders, circulatory system, genitourinary system, and infectious disease. In addition, musculoskeletal disorders are listed because of that category's high chi-square value. Note that the percentages listed in Table 3 are total percentages (representing the proportion of specific illnesses among all illnesses seen in the HWHC), where

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as the percentages reported in the paragraph below represent the proportion of specific illnesses among the illnesses seen within their respective disease group.

A decrease in cases of normal pregnancy and/or delivery accounted for the largest difference within the pregnancy and childbirth diagnosis group – from 2,140 (or 44.6% of all pregnancy and childbirth cases in 1995) to 1,397 (or 29.1% of all pregnancy and childbirth cases in 2003). Cases of diabetes mellitus accounted for the largest difference among endocrine and immunity disorders – increasing from 88 (4.3%) in 1995 to 1,272 (61.5%) in 2003. Hyperlipidemia cases also increased from 3 (0.1%) in 1995 to 178 (8.6%) in 2003. Among diseases of the circulatory system, the largest differences seen were increases among cases of coronary atherosclerosis (from 6 (0.3%) to 91 (5.2%)), congestive heart failure (from 6 (0.3%) to 25 (1.4%)), hypertension (with and without complications – from 241 (13.8%) to 1,253 (71.9)). Among disorders of the genitourinary system, urinary tract infections increased from 33 (0.4%) to 170 (1.4%). Female genital disorders (other than breast, menstrual, and menopausal) decreased from 1,250 (49.3%) to 865 (34.1%), while menopausal disorders increased from 4 (0.2%) to 34 (1.3%). HIV infection accounted for the largest difference within the infectious disease group – increasing from 83 cases (7.9%) to 474 (45.2%). Among musculoskeletal disorders, back problems increased from 21 (6.5%) to 105 (32.6%), and other joint problems increased from 20 (6.2%) to 123 (38.2%).

Patients with Multiple Visits.

While there was a combined total of 20,190 patient visits in 1995 and 2003 (with 8,034 in 1995, and 12,156 in 2003), the number of actual patients seen in both 1995 and 2003 was only 7,552. Out of those patients, 3,290 were seen in 1995 only, and 3,973 were seen in 2003 only.

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A total of 289 patients were seen both years in the HWHC. Table 4 shows the distribution of the number of patient visits by year seen. Single visits decreased 16.4% from 1995 to 2003, as did visits of 10 or more times per patient. Visits between 2 and 9 times per patient increased; the largest increase for 3 visits per patient (up 5.7%).

Patient Residence Variable – Zip Codes.

The patient population living in the original target area of South Richmond (zip codes 23224, 23225, and 23234) has declined from 82.6% in 1995 to 67.1% in 2003. The proportion of patients residing within the metropolitan Richmond area, but outside of South Richmond, has increased from 13.2% in 1995 to 21.1% in 2003. The proportion of clinic patients residing outside of Richmond altogether has nearly tripled – from 4.2% to 11.8%.

Patient rates were calculated by dividing the number of patients seen from individual Richmond-area zip codes by the total population of those zip codes. Population data by zip codes was not available for the years 1995 and 2003, therefore, zip code population data from 1994 was used as an estimate of the 1995 population, and census data from 2000 by zip code was used as an estimate of the 2003 population. Appendices B, C, and D show the patient rates by zip codes for 1995, 2003, and the change from 1995 to 2003, respectively.

Appendix B shows that zip code 23224 had the largest amount of patients per population (with 5.17% of the total population being HWHC patients). 1.92% of the population in zip code 23225 were HWHC patients, and 1.52% of the population in zip code 23234 were HWHC patients. Other Richmond zip codes north of the James River had even smaller patient rates, ranging from 0.02% to 0.32%.

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Appendix C shows that zip code 23224 still had the largest amount of patients per population (with 4.15% of the total population being HWHC patients). However, patient rates per population for zip code 23234 increased to 1.96%. The Richmond zip codes north of the James River that also increased were 23219, 23220, 23222, and 23223.

Appendix D shows the change in patient rates from 1995 to 2003. The zip code showing the largest decrease in patient per population rate was the target zip code 23224 (down 1.01%). The second target zip code 23225 also showed a decrease (down 0.36%), while the third target zip code showed the largest increase in patient per population rate of any Richmond zip code (up 0.44%). All Richmond zip codes north of the James River (with the exception of 23221) showed an increase in patient rates.

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Discussion

Changes in Patient Characteristics.

Race.

The distribution of patients from Hispanic, Asian, Native American, or other racial/ethnic groups is not known because those numbers are lumped together in the race category of "other". The large increase in patients classified as "other" race from 1995 to 2003 could be due to an overall increase in the Hispanic, Asian, or Native American population of Richmond. Evaluation of census data from 1990 to 2000 shows that the proportion of Hispanics and Asians in Richmond has increased (1.6% and 0.4% of the total population, respectively) [23]. These changes suggest that the increase of patients seen in the "other" race category may be due to the Hispanic and Asian population growth. While the black population in Richmond has increased 2.0%, the proportion of black patients seen at the HWHC has decreased 15.5%. The large percentage of patients of "unknown" race in 2003 may account for the decrease in the proportion of black patients seen from 1995 to 2003.

Age.

The decrease in patients seen under age 30, as well as the increase in patients aged 30 and older could be a direct result of the aging baby boomer population. Census data show that the proportion of Richmond residents under 30 years of age has decreased 0.4% from 1990 to 2000, while the proportion of Richmond residents over 30 years of age has increased 0.4% [23]. While these changes are small, they may account for some of the differences seen in ages of patients from 1995 to 2003.

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Another explanation for the change in age may be due, however, to the movement of young adults or young families out of Richmond due to job opportunities or better housing in county suburban areas.

Type of Payment/Insurance.

The increase in the proportion of indigent patients and the decrease in the proportion of self-pay patients may be explained by a change in the classification policy used by the HWHC's to categorize patients according to payment methods. Self-pay patients usually are uninsured and may or may not eventually be able to pay all or a portion of their medical bill. Therefore, patients classified as self-pay in 1995 may have been classified as indigent in 2003 if a majority of self-pay patients never paid their bills. The HWHC administrator confirmed this conclusion, stating that the HWHC staff has improved the screening methods used for determining a patient's ability to pay (24).

The increase in Medicare patients is most likely explained by the aging patient population and, thus, the increase in patients eligible for Medicare. The decrease in patients using Medicaid may be related to the increase in indigent patients, if patients obtain jobs that elevate their income to a level that makes them ineligible for Medicaid, while at the same time not offering health insurance.

Clinic Visited.

The family practice and pediatric clinics have both seen an increase in patient volume, while the women's health clinic has seen a decrease in volume. The decrease in visits under normal pregnancy accounts for the overall decline in visits to the women's health clinic, and,

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according to the HWHC administrator, the decrease in pregnancy visits is a result of reduced staff hours in the women's health clinic (24).

The decrease in the proportion of infants under one year of age seen at the HWHC supports the phenomenon of fewer pregnancies, as the women who sought prenatal care at the HWHC would most likely seek care for their infants at the HWHC as well. An additional reason for some of this decrease may be the assignment of Medicaid women (the only group of adult Medicaid eligible individuals) who were previously seen in health department clinics to private physicians. There has been a significant privatization of this population over the last ten years.

Diagnosis Groups.

As is expected with an aging population of patients, the proportion of patients seeking care for more chronic diseases, rather than acute illness, has increased from 1995 to 2003. This phenomenon explains the increases in diabetes mellitus, hyperlipidemia, hypertension, coronary atherosclerosis, congestive heart failure, and increased back problems. The increase in visits for HIV infections is a result of an increase in Arthur Ashe state funding in 1996 and Title III federal funding in 1999 to the HWHC to increase their treatment for patients who were HIV positive (24).

Target Population.

The decline in the patient population living in the original target area of South Richmond and the almost doubling of the proportion of patients residing outside of South Richmond suggest that, while there is still a need for primary care in South Richmond, the need exists in other localities of Metropolitan Richmond area as well. Patients are coming from all over the Richmond area seeking primary care services at the HWHC. This result is surprising because

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Richmond has several other safety net clinics and health centers that offer primary care health services to low-income, uninsured, or underinsured individuals at reduced (or no) fees. These safety net providers include the Cross-over Ministry Health Clinic (also in South Richmond), the Fan Free Clinic, and the Vernon J. Harris Health Center in Churchill.

It is unknown why individuals who reside in areas other than South Richmond, who could obtain healthcare in other clinics, would instead choose to obtain care at the HWHC. Several possible explanations exist for this phenomenon: (1) individuals in low socioeconomic status move frequently and, as a result, the addresses recorded by the health center at the time of patients' visits could be wrong or misleading, (2) patients who once resided in South Richmond and used the HWHC for healthcare developed strong and trustful patient-physician relationships that they did not want to leave even if moving away from the area was necessary for financial or other reasons, or (3) the services offered at the HWHC (and/or the facility itself) are viewed as superior to the services offered by any other safety net provider in the Richmond area and patients purposefully seek care at the HWHC despite the availability (and perhaps convenience) of other health centers.

Strengths and Limitations

A major strength of this study is that it is the first in-depth evaluation of a safety net provider in Richmond, Virginia. Only be assessing the performance of safety net provider systems can these systems be improved to provide care to underinsured and uninsured vulnerable population groups. This study can be used as an example for additional studies assessing the success of other safety net provider clinics within the greater Richmond metropolitan area.

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Another strength of this study is that the dataset created specifically for this study has numerous possibilities for additional analyses. For example, additional studies looking at how the number of visits (and/or the various diagnoses) varies by race, sex, age, and type of insurance can be conducted.

Because the need for the HWHC was based on a survey of South Richmond patients in specific census tracts, the lack of full address data on HWHC patients (which prevented the attainment of census tract data) represented a major limitation of this study. While zip code proxies estimated the census tract area of patients, they are not truly accurate predictors of census tract locations.

Conclusion

Regardless of the reasons for the apparent popularity of the HWHC with non-South Richmond residents, it is clear that this facility has in fact been successful in offering access to quality healthcare for the residents of South Richmond. It continues to offer primary care, women's health, and pediatric health services to the South Richmond community. The HWHC, and the public health policy that created it, should be viewed as an ideal model for other areas in Richmond, as well as other metropolitan areas across the United States to emulate and implement in their own communities.

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Table 1. Changes in Demographic Characteristics of Clinic Patrons by Year of First Visit.

Variable	1995		2003				
	N	%	N	%	Difference	X2	p-value
TOTAL	3579	100.0%	3973	100.0%			
Race							
Black	2832	79.1%	2529	63.7%	-15.5%	489.09	<0.0001
White	534	14.9%	565	14.2%	-0.7%		
Other	213	6.0%	512	12.9%	6.9%		
Unknown	0	0.0%	367	9.2%	9.2%		
Sex							
Male	969	27.1%	1214	30.6%	3.5%	11.11	0.001
Female	2610	72.9%	2759	69.4%	-3.5%		
Age							
<1	414	11.6%	361	9.1%	-2.5%	564.35	<0.0001
1-4	615	17.2%	497	12.5%	-4.7%		
5-19	932	26.0%	648	16.3%	-9.7%		
20-29	816	22.8%	604	15.2%	-7.6%		
30-49	580	16.2%	1016	25.6%	9.4%		
50+	222	6.2%	847	21.3%	15.1%		
Zip Code							
23224	1667	46.6%	1332	33.5%	-13.1%	458.57	<0.0001
23225	730	20.4%	589	14.8%	-5.6%		
23234	560	15.6%	746	18.8%	3.1%		
Other Rich City Zips	292	8.2%	468	11.8%	3.6%		
Other Metro Rich Zips	179	5.0%	369	9.3%	4.3%		
Non-Richmond Zips	151	4.2%	469	11.8%	7.6%		
Insurance							
Indigent	600	16.8%	1211	30.5%	13.7%	695.24	<0.0001
Medicaid	1528	42.7%	1599	40.2%	-2.4%		
Medicare	82	2.3%	411	10.3%	8.1%		
Private	211	5.9%	178	4.5%	-1.4%		
Self-Pay	1138	31.8%	499	12.6%	-19.2%		
Other	19	0.5%	75	1.9%	1.4%		
Unknown	1	0.0%	0	0.0%	0.0%		
Clinic							
Family Practice	1482	41.4%	1741	43.8%	2.4%	62.18	<0.0001
Women's Health	1123	31.4%	938	23.6%	-7.8%		
Pediatrics	974	27.2%	1294	32.6%	5.4%		

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Table 2. Distribution of Visits by Diagnosis Group, 1995 and 2003.

Variable	1995		2003				
	N	%	N	%	Difference	X2	p-value
TOTAL	8034	100.0%	12156	100.0%			
Diagnosis Groups							
Pregnancy & Childbirth	2742	34.1%	2056	16.9%	-17.2%	115.65	<0.0001
Endocrine & Immunity Disorders	191	2.4%	1876	15.4%	13.1%	137.16	<0.0001
Misc	2306	28.7%	2176	17.9%	-10.8%	163.49	<0.0001
Diseases of the Circulatory System	277	3.4%	1465	12.1%	8.6%	120.12	<0.0001
Diseases of the Genitourinary System	1412	17.6%	1456	12.0%	-5.6%	379.65	<0.0001
Infectious Disease	218	2.7%	830	6.8%	4.1%	118.60	<0.0001
Diseases of the Respiratory System	254	3.2%	808	6.6%	3.5%	62.26	<0.0001
Diseases of the Digestive System	100	1.2%	340	2.8%	1.6%	61.00	<0.0001
Mental Health	87	1.1%	328	2.7%	1.6%	52.60	<0.0001
Diseases of the Nervous System	278	3.5%	247	2.0%	-1.4%	64.23	<0.0001
Musculoskeletal System	89	1.1%	233	1.9%	0.8%	133.90	<0.0001
Injuries	27	0.3%	66	0.5%	0.2%	27.39	0.007
Cancer	10	0.1%	44	0.4%	0.2%	19.58	0.034

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Table 3. Distribution of Visits by Specific Diseases, 1995 and 2003.

Variable	1995		2003			
	N	%	N	%	Difference	Total
TOTAL	8034	100.0%	12156	100.0%		
Pregnancy & Childbirth						
Normal Pregnancy and/or Delivery	2140	26.6%	1397	11.5%	-15.1%	3537
Endocrine & Immunity Disorders						
Diabetes Mellitus	88	1.1%	1272	10.5%	9.4%	1360
Hyperlipidemia	3	0.0%	178	1.5%	1.4%	181
Diseases of the Circulatory System						
Essential Hypertension	214	2.7%	856	7.0%	4.4%	1070
Hypertension w/ Complications	27	0.3%	397	3.3%	2.9%	424
Coronary Atherosclerosis	6	0.1%	91	0.7%	0.7%	97
Congestive Heart Failure	6	0.1%	25	0.2%	0.1%	31
Genitourinary System						
Other Female Genital Disorders	1250	15.6%	865	7.1%	-8.4%	2115
Urinary Tract Infections	33	0.4%	170	1.4%	1.0%	203
Infectious Diseases						
HIV Infection	83	1.0%	474	3.9%	2.9%	557
Musculoskeletal Disorders						
Back Problems	21	0.3%	105	0.9%	0.6%	126
Other Joint Problems	20	0.2%	123	1.0%	0.8%	143

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Table 4. Distribution of Number of Patient Visits, 1995 and 2003.

Variable		1995		2003			
		N	%	N	%	Difference	Total
TOTAL		3579	100.0%	3973	100.0%		
Number of Visits							
	1	1888	52.8%	1444	36.3%	-16.4%	3332
	2	654	18.3%	801	20.2%	1.9%	1455
	3	338	9.4%	600	15.1%	5.7%	938
	4	191	5.3%	418	10.5%	5.2%	609
	5	149	4.2%	272	6.8%	2.7%	421
	6	88	2.5%	169	4.3%	1.8%	257
	7	66	1.8%	98	2.5%	0.6%	164
	8	46	1.3%	74	1.9%	0.6%	120
	9	24	0.7%	42	1.1%	0.4%	66
	10	39	1.1%	17	0.4%	-0.7%	56
	11	25	0.7%	14	0.4%	-0.3%	39
	12	22	0.6%	5	0.1%	-0.5%	27
	13	11	0.3%	2	0.1%	-0.3%	13
	14	15	0.4%	10	0.3%	-0.2%	25
	15	7	0.2%	5	0.1%	-0.1%	12
	16	4	0.1%				4
	17	4	0.1%	1	0.0%	-0.1%	5
	18	2	0.1%				2
	19	2	0.1%				2
	20			1	0.0%		1
	21	2	0.1%				2
	23	1	0.0%				1
	29	1	0.0%				1

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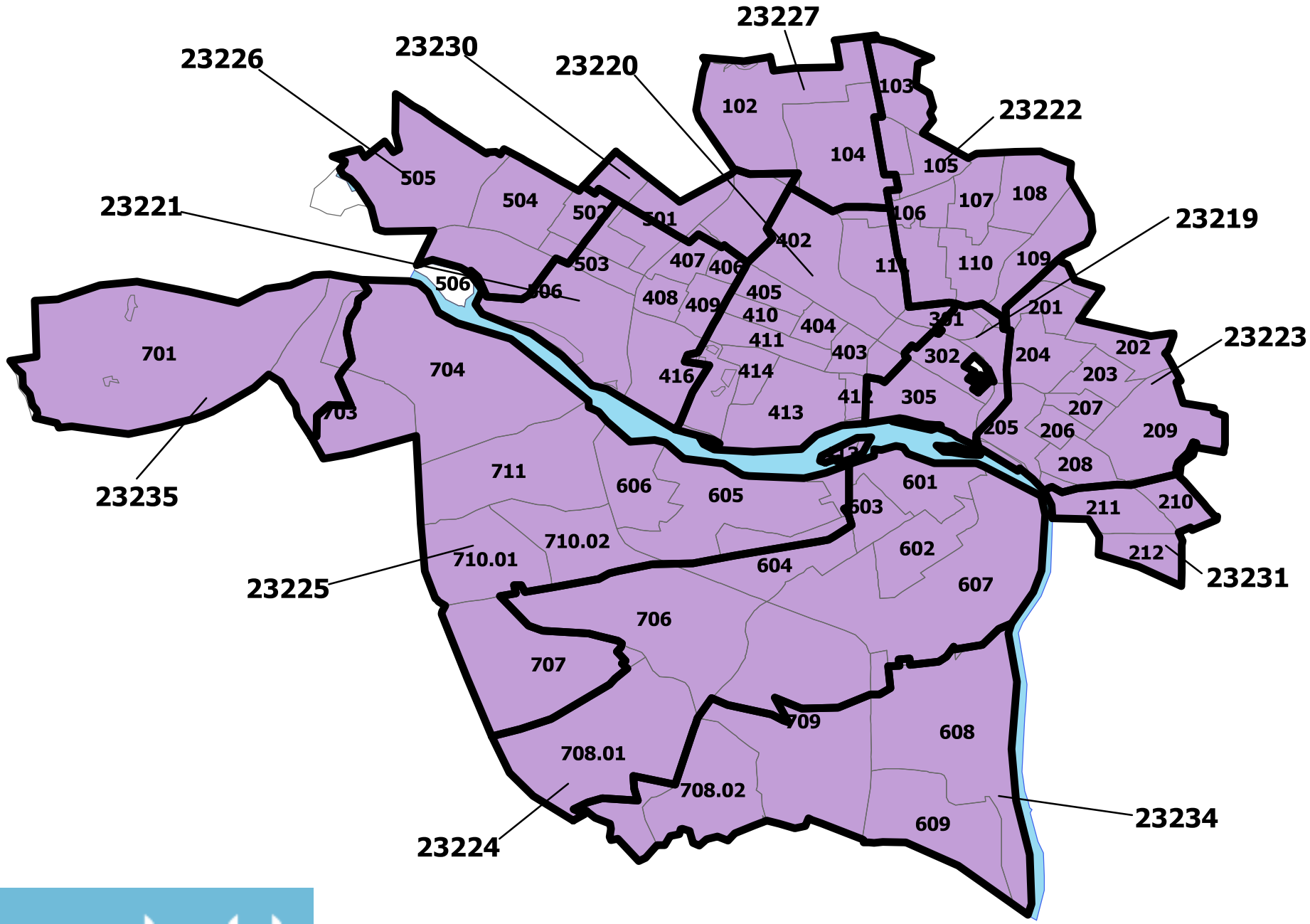
Richmond City Census Tracts Overlayed by Zip Codes



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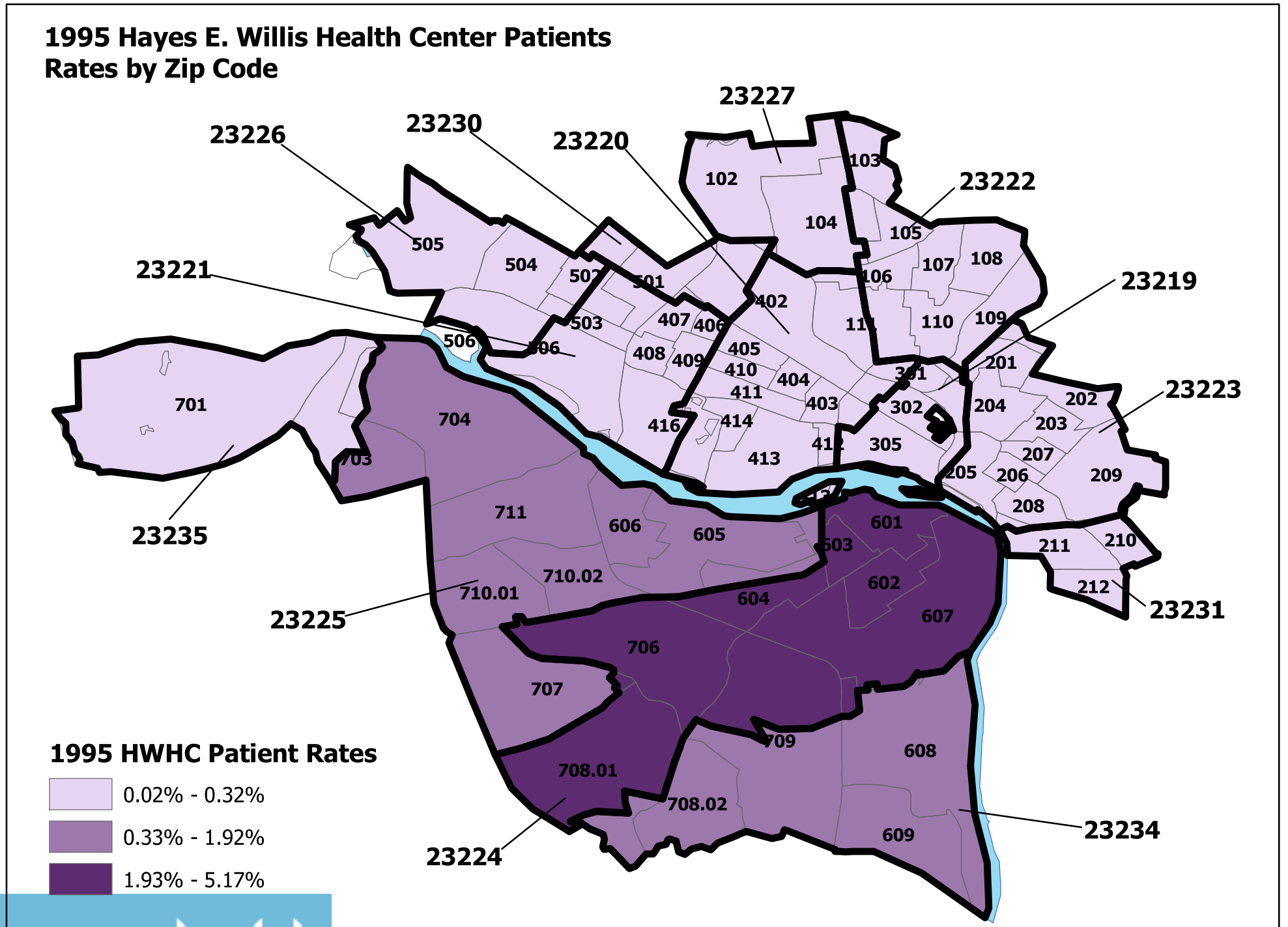

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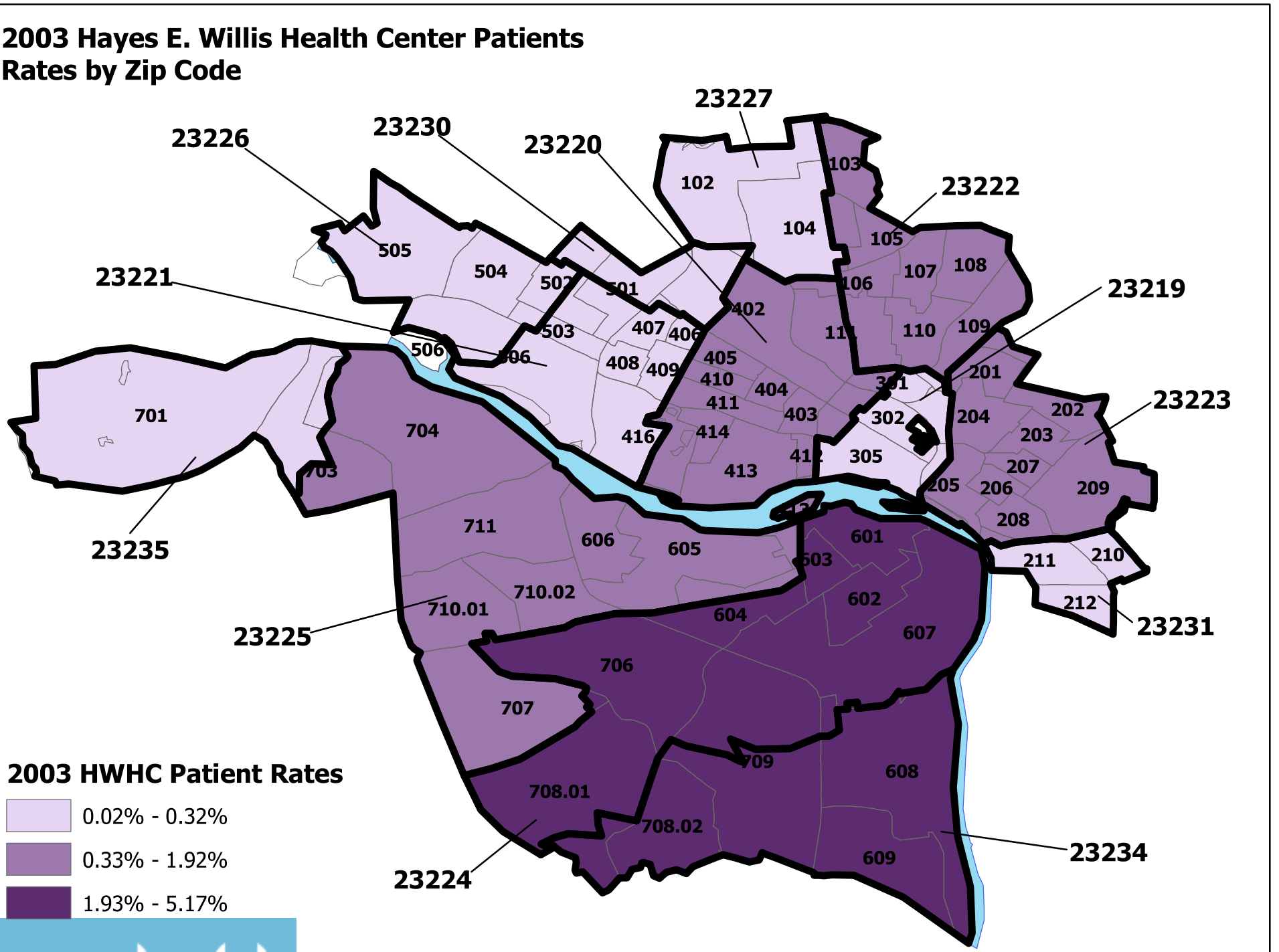

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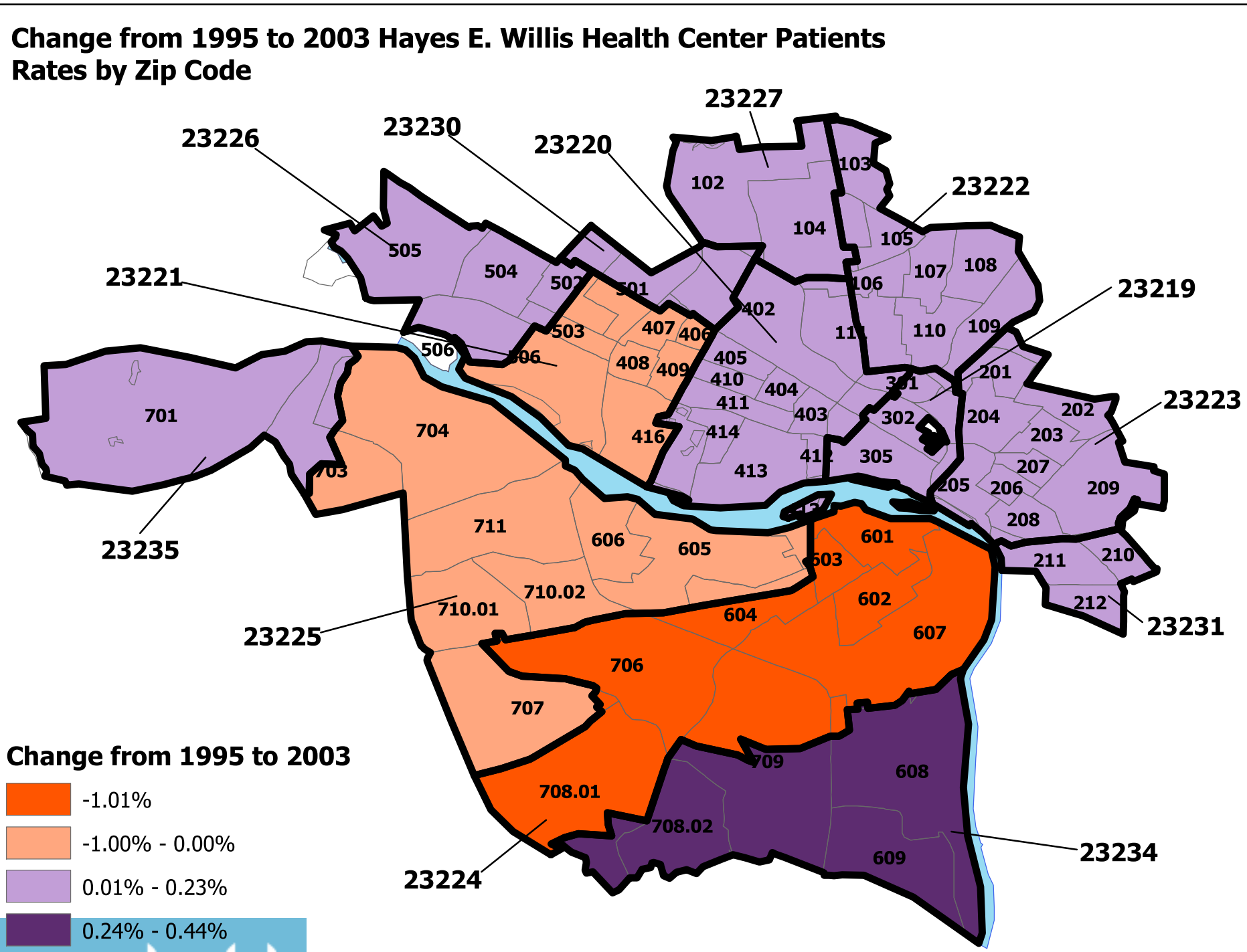

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