Beyond the IT Magic Bullet: HIV Prevention Education and Public Policy

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Abstract

Analytic applications are vital in the assessments of public health and surveillance as these applications can drive resource allocation, community assessment and public policy. Using a dataset of nearly 90,000 patient hospital encounters, the number of instances with an ICD code of HIV and co-morbidities was identified. Blacks accounted for 75 percent of HIV hospital encounters in the dataset. While business analytic applications informed this study of cross-tabulations and interaction effects among race, age and gender, there appears to be a significant relationship among HIV diagnoses and substance abuse. Payer data is informed by the Healthcare Cost and Utilization Project (HCUP), and these findings indicate significant service utilization among those insured by Medicare. More importantly, these issues raise more salient implications among the current health and public policy among HIV care delivery, in general, and among the Black community, in particular. Attention to health and public policy warrants further investigation given that this discourse has shifted to a focus on curvative medicine and away from prevention and education.

Keywords

African Americans; Analytics; HIV; HIV infections – Treatment; HIV-positive persons; HIV (Viruses); ICT; Medical statistics; Public Policy; Substance Abuse

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ABSTRACT

Analytic applications are vital in the assessments of public health and surveillance as these applications can drive resource allocation, community assessment and public policy. Using a dataset of nearly 90,000 patient hospital encounters, the number of instances with an ICD code of HIV and co-morbidities was identified. Blacks accounted for 75 percent of HIV hospital encounters in the dataset. While business analytic applications informed this study of cross-tabulations and interaction effects among race, age and gender, there appears to be a significant relationship among HIV diagnoses and substance abuse. Payer data is informed by the Healthcare Cost and Utilization Project (HCUP), and these findings indicate significant service utilization among those insured by Medicare. More importantly, these issues raise more salient implications among the current health and public policy among HIV care delivery, in general, and among the Black community, in particular. Attention to health and public policy warrants further investigation given that this discourse has shifted to a focus on curvative medicine and away from prevention and education.

Keywords: HIV, Substance Abuse, Public Policy, ICT, Analytics

INTRODUCTION

Public health is defined as the "distribution and determinants of health-related states and events in a specific population and works to understand how the acquired information can be applied to control health problems" (Tan, et al, 2005, p 130). Information and communication technologies (ICT) play a significant role as the industry increases its implementations of health information networks with a diversity of stakeholders. Public health informatics suggests the use of ICT and other interconnected systems to protect and promote the health and well-being. In addition, more extensive dynamics manifest themselves via relationships among populations of interest and health services (Tan, et al, 2005). Health services should be inclusive of and tailored to address chronic diseases, health risks, infected and affected populations and community assessments. The objective of this research is to uncover patterns within an HIV infected population based on demographic, payer and substance abuse data.

HIV is a chronic, ongoing health condition that has dramatic impacts well beyond the individuals infected. Enormous economic, societal, and treatment costs are incurred during the care of affected and infected persons often resulting in the loss of human resources essential to building economies and infrastructure. Access to data is a necessity for hospitals, clinics and physicians to provide quality care. Providing the correct diagnosis and procedures is critical for the patient's care. With the high costs associated with HIV procedures, medications and physician consultants, the integration of ICT can potentially offset these costs and improve efficiencies in care delivery. Factors, such as cost of care and length of stay, continue to drive health service delivery, resource availability and quality of care. These and other key performance measures can be determined through statistical modeling via analytic software applications.

Yet, statistical significance and analyses void of public policy will not address the complexities associated with HIV, substance abuse and other chronic illnesses - given the behavioral, socio-economic and cultural dimensions associated with these diseases. Hence, the research question guiding this study is: What are the patterns in the dataset for persons diagnosed with HIV?

In this paper, this question is addressed by first reviewing major trends in the health care information systems (IS) and health disparities research. Findings from a de-identifiable patient dataset are discussed. Public health and policy issues are presented and augment this discourse. Lastly, a discussion of findings relative to national data, along with implications, and a conclusion are provided.

Literature Review

Health Care IS

Much promise is thought to result from the adoption of ICT and advanced information technologies, such as business analytics/intelligence applications in the health care sector (Payton, 2003; Miller et al, 2004; RAND Corporation, 2005). The Kaiser Family Foundation (2006) reported that electronic medical records (EMR) technology would reduce medical errors and costs, lead to personalized medicine and strengthen the infrastructure to enable health information networks – thereby, enabling hospitals, providers, insurers and employers to track patients' encounters as well as clinical and financial data (Kovak, 2005; Payton and Ginzberg, 2001). One universal driver is cost reduction enabled by technology innovations (Kaiser Family Foundation, 2006; Medical Records Institute, 2006).

The much anticipated hopes of IT's impact on the healthcare system can be seen in the US Department of Health and Human Services (2000) Healthy People 2010 directive which concluded:

> *Often people with the greatest health burdens have the least access to information, ommunication technologies, healthcare, and supporting social services. Even the most carefully designed health communication programs will have limited impact if underserved communities lack access to crucial health professionals, services, and communication channels that are part of a health improvement project.*

Despite this "silver-bullet" notion of IT's impact on the health care sector (Payton and Tan, 2009), Satcher (2006) succinctly articulates the continual "health" disparities impacting Black America at the cultural, socio-economic and disease levels.

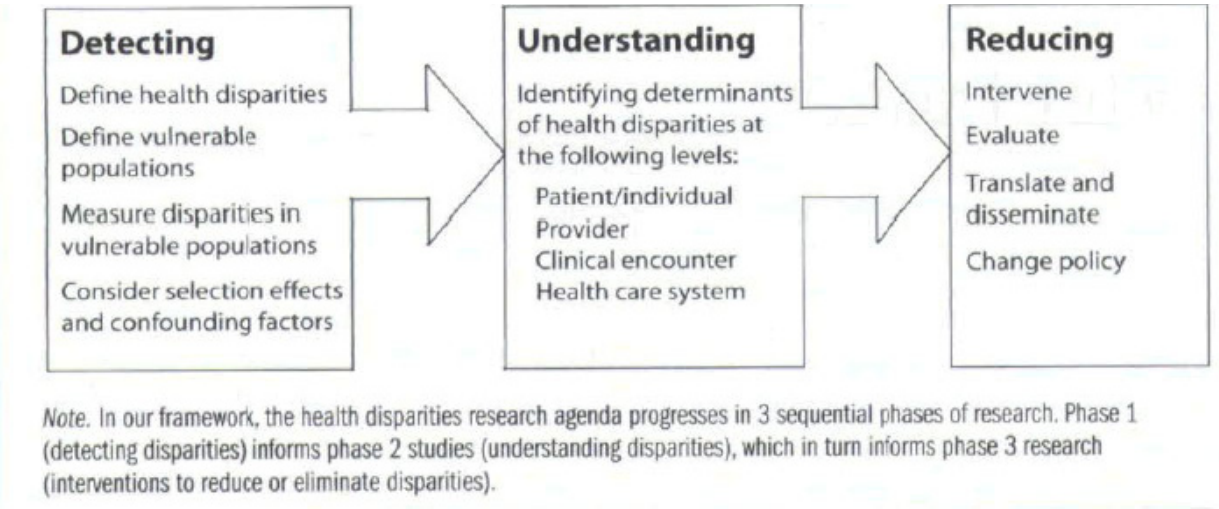
Health Disparities Frameworks

In a survey of 2,664 adult patients from an urban teaching hospital from 1998 to 1999, Hicks, et al (2005) determined that Blacks and Latinos reported significant differences in the degree to which they encountered care services and in their interactions with physicians and other providers in comparison to majority populations. Moreover, relative to patient preferences, coordination of care, information and education and physical comfort, these groups reported differences in level of respect from providers and hence these determinants impacted treatment and service delivery. These findings are critical in chronic episodes of illnesses where treatment plans often require

detailed clinical information, awareness of behavioral practices, cultural competency and continual care and education. Hence, any profile of patients should be cognizant of the broader socio-economic policy and dimensions impacting disease outcomes, care delivery and service utilization.

As discussed in Payton and Kiwanuka-Tondo (2009), ICT can play a critical role in information dissemination associated with health disparities, yet a broader conceptualization with multilevel approaches can better enable policymaking, community engagement and care delivery (Kilbourne, et al, 2006). Kilbourne, et al (2006) propose that a clearer picture of health disparities centers on three sequential pillars: Detecting, Understanding and Reducing as shown in Figure 1.

Figure 1: The 3 Phases of Disparities Research Agenda. Adopted from Kilbourne, et al (2006)



Note. In our framework, the health disparities research agenda progresses in 3 sequential phases of research. Phase 1 (detecting disparities) informs phase 2 studies (understanding disparities), which in turn informs phase 3 research (interventions to reduce or eliminate disparities).

Detecting focuses on taxonomy, measurement, and effects and confounding factors. In this stage, assumptions about a given population are often unstated though these assessments impact data collection, interpretation and policy formation. In Stage 2, Understanding should transpire. The research contributions are framed around the foci of patient and health care system, including additional awareness of the patient level determinants, health care payer options, co-morbid conditions and the policy issues that shape this discourse. Figure 2 captures the determinants of each level in Understanding stage, namely patient factors (e.g., age, gender, disease presence, co-morbidities) and health care system factors (e.g., financing, delivery, payer). Moreover, Figure 2 illustrates that the factors impacting health disparities overlap and should not be studied isolated.

Figure 2: The 3 Phases of Disparities Research Agenda. Adopted from Kilbourne, et al (2006).

METHODS

Data Description

A de-identified, secondary patient dataset of nearly 90,000 hospital encounters (observations) with 50 variables from a large Southeastern urban teaching hospital was used for this study. The data were collected by the teaching hospital and provided to me for analyses. The data were void of any patient identifiers and was not accompanied with a data dictionary. Data standards from the Healthcare Cost and Utilization Project (HCUP, 1995, 2008) were used to determine how several of these variables were coded. A listing of variables used for this research is shown in Table 1.

Table 1 – Dataset Description

ATTRIBUTE	DESCRIPTION
Race	1-white 2-black 3-5 (unknown)
Gender (Sex)	1-male 2-female
Age	if age<=20, Value=1 if 21<=age<=30, Value=2 if 31<=age<=40, Value=3 if 41<=age<=50, Value=4 if age>=51, Value=5
DX	Diagnosis: up to 16 per record
ICD-9	International Classification of Diseases-9th Division
Substance Abuse	Indicators of Substance Abuse: Cocaine, Alcohol, Opioid, etc.
Primary and Secondary Expected Payer	Type of payers: Medicare, Medicaid, PPO, HMO, Self, No Charge

Using Statistical Analysis Software 8.2 (SAS), I sought to profile patients with HIV associated with an International Classification of Diseases-9th Division (ICD) code of 042. This profile produced a table that consisted of 1,564 hospital encounters of persons with HIV.

Statistical Data Analysis

Using PROC FREQ in SAS, the preliminary analysis used frequency distributions and univariate statistics to describe the population of interest. Marginal, cross and conditional proportions were calculated using cross-tabulations to better determine frequencies in categories, such as gender by race. To assess interaction effects, PROC CORR in SAS was used, and the Chi-Square (PROC CHISQ) was used to further validate correlation results for independence among variables noted in Table 1. To determine the proportions and significance within categorical variables (e.g., male to female), the estimate and p-values from the CHISQ were used. Statistical significance was established at the $p<0.5$ level

RESULTS

As shown in Table 2, men comprise 62% while women represent 38% of the total number of encounters. Roughly twenty-four percent of the total number of encounters were interactions among Whites while 75% were among Blacks. Those of other races were less than one percent (0.83%) of the total.

Table 2 – Frequency by Race and Gender

Table of RACE by SEX			
ATTRIBUTE Frequency Percent Row Pct Col Pct	SEX(I:Sex)		
Race(Race uniform)	1-male	2-female	
1 (white)	233 14.91 62.13 23.90	142 9.09 37.87 24.15	375 23.99
2 (black)	731 46.77 62.21 74.97	444 28.41 37.79 75.51	1175 75.18
4 (others)	11 0.70 84.62 1.13	2 0.13 15.38 0.34	13 0.83
Total	975 62.38	588 37.62	1563 100.00
Frequency Missing = 1			

An examination of the cross-proportions shows the following:

- White men, white women, black men and black women encompassed 15%, 9%, 47% and 28% of the total hospital visits, respectively. Note that nearly 50% of interactions were among black males while roughly 30% were black women. Blacks, however, represent 12 to 13% of the U.S. overall population.
- Among the males, 24% of the occurrences were among Whites, and 75% are black. Among the female hospital encounters, 24% were white, and 75% were black.

Findings

Based on the above initial results from the data, an examination of interaction effects along with substance abuse among the entire number of occurrences was sought given the implications of health policy researchers (Hicks, et al, 2005; LaVeist, 2005). Below Table 3 shows the results of the test race*sex interaction:

Table 3 – Pearson Correlation Coefficients

Prob > |r| under H0: Rho=0 Number of Observations		
	Race	**Sex**
RACE (Race(uniform)	1.00000	-0.02704
		0.2854
	1563	1563
SEX(I:Sex)	-0.02704	1.00000
	0.2854	
	1563	1564

From PROC CORR, the large p-value=0.2854 indicates that the interaction between race and sex is not significant. Using the statement of CHISQ in Table 4, the p-value of chi-square test is 0.2513, which also supports the conclusion of no interaction.

Table 4 – Statistics for Table of RACE by SEX

Statistics for Table of RACE by SEX			
Statistic	**DF**	**Value**	**Prob**
Chi-Square	2	2.7626	0.2513
Likelihood Ratio Chi-Square	2	3.1542	0.2066
Mantel-Haenszel Chi-Square	1	0.5487	0.4589
Phi Coefficient			0.0420
Contingency Coefficient			0.0420
Cramer's V			0.0420
Effective Sample Size = 1563 Frequency Missing = 1			

As shown in Table 5 below, an examination of the race*age variables shows the marginal proportions below. Those age 31 to 40 (Category 3) compose 47% while those age 41 to 50 (Category 4) are 36% of the occurrences.

Table 5 – Race by Age Marginal Proportions

Table of RACE by AGE						
RACE Frequency Percent Row Pct Col Pct	age_gr					Total
	1	2	3	4	5	
1 (white)	2 0.13 0.53 100.00	57 3.65 15.20 34.97	186 11.90 49.60 25.48	108 6.91 28.80 19.32	22 1.41 5.87 20.18	375 23.99
2 (black)	0 0.00 0.00 0.00	105 6.72 8.94 64.42	537 34.36 45.70 73.56	446 28.53 37.96 79.79	87 5.57 7.40 79.82	1175 75.18
3 (other)	0 0.00 0.00 0.00	1 0.06 7.69 0.61	7 0.45 53.85 0.96	5 0.32 38.46 0.89	0 0.00 0.00 0.00	13 0.83
Total	2 0.13	163 10.43	730 46.71	559 35.76	109 6.97	1563 100.00
Frequency Missing = 1						

Using the CHISQ procedure in SAS as shown in Table 6, the resulting p-value of chi-square test is 0.0008, which indicates there is an interaction between race and age.

Table 6 – Statistics for Table of RACE by AGE

Statistic	DF	Value	Prob
Chi-Square	8	26.7633	0.0008
Likelihood Ratio Chi-Square	8	26.5069	0.0009
Mantel-Haenszel Chi-Square	1	13.6512	0.0002
Phi Coefficient			0.1309
Contingency Coefficient			0.1297
Cramer's V			0.0925

The interaction between sex*age shows a resulting p-value of chi-square test is less than 0.0001, which indicates there is an interaction between sex and age. Tables 7 and 8 show these results.

Table 7 – Gender By Age Interaction with Chi-Square

SEX Frequency Percent Row Pct Col Pct	age_gr					Total
	1	2	3	4	5	
1 (male)	0 0.00 0.00 0.00	60 3.84 6.15 36.81	424 27.11 43.44 58.08	401 25.64 41.09 71.61	91 5.82 9.32 83.49	976 62.40
2 (female)	2 0.13 0.34 100.00	103 6.59 17.52 63.19	306 19.57 52.04 41.92	159 10.17 27.04 28.39	18 1.15 3.06 16.51	588 37.60
Total	2 0.13	163 10.42	730 46.68	560 35.81	109 6.97	1564 100.00

Table 8 – Statistics for Table of SEX by AGE

Statistic	DF	Value	Prob
Chi-Square	4	95.5083	<.0001
Likelihood Ratio Chi-Square	4	97.6675	<.0001
Mantel-Haenszel Chi-Square	1	92.1479	<.0001
Phi Coefficient		0.2471	
Contingency Coefficient		0.2399	
Cramer's V		0.2471	

To determine if a difference between Blacks and Whites is significant, Tables 9 and 10 are used. Below, the proportion of interactions among Blacks is larger by 51% than the proportion of Whites. The p-value is less than 0.0001, which indicates that the difference between the two proportions is highly significant.

Table 9 - Contrast Estimate Results (Chi Square white-black)

Contrast Estimate Results	
Label	ChiSq white-black
Estimate	-0.5118
Standard Error	0.0154
Alpha	0.05
Confidence	-0.5420
Limits	-0.4817
Chi-Square	1109.7
Pr>ChiSq	<.0001

Table 10 - Contrast Estimate Results (Chi Square Male-Female)

Contrast Estimate Results	
Label	ChiSq Male-Female
Estimate	0.2481
Standard Error	0.0173
Alpha	0.05
Confidence	0.2141
Limits	0.2820
Chi-Square	205.14
Pr>ChiSq	<.0001

The proportion of male encounters is larger by 25% than the proportion of female. The p-value is less than 0.0001, which indicates that the difference between the two proportions is highly significant.

The proportion of hospital visits of age_gr3 is larger by 11% than the proportion of age_gr4. The p-value is less than 0.0001, which indicates that the difference between the two proportions is highly significant.

Table 11 - Contrast Estimate Results (Chi Square AGE_gr3-AGE_gr4)

Contrast Estimate Results	
Label	age_gr3-age_gr4
Estimate	0.1087
Standard Error	0.0175
Alpha	0.05
Confidence	0.0744
Limits	0.1430
Chi-Square	38.60
Pr>ChiSq	<.0001

Variables: Substance-related Abuses

The proportions of each type of substance abuse in the icd042 group are given in Table 12. In the group of icd042, 13% of instances show those diagnosed with cocaine abuse, 11% with opioid abuse, and so on. Approximately 26% (412) of the HIV hospital encounters were diagnosed with substance-related abuse.

Using Table 13, an examination of the distribution of 412 interactions by persons with HIV and substance abuse indicates that (using marginal proportions) Whites make up 30% of these cases. Blacks occupy 70%, and others account for 0.24%. While men compose 60% of the instances in the group, women occupy 40%. Using crossed proportions, interactions by white men, white women, black men and black women represent 17%, 13%, 43% and 27%, respectively. Based on conditional proportions and among instances by Whites who were diagnosed with substance abuse, men represent 57% and women occupy 43%. Black men comprise 62% while black women represent 38% of the hospital encounters.

Table 12 - Substance Used by Those with HIV Diagnosis

Substance	Frequency	Percent	Note
coc_abu	200	12.80	Cocaine
opi_abu	179	11.45	Opioid
alc_abu	118	7.55	Alcohol
nic_abu	100	6.40	Nicotine
oth_abu	49	3.13	Inhalant, phencyclidine, other substance or caffeine
can_abu	11	.70	Cannabis
sed_abu	4	.26	Sedative, hypnotic, or anxiolytic
hal_abu	0	0.00	Hallucinogen
amp_abu	0	0.00	Amphetamine
abuse	412	26.36	All types of substance-related abuse

Table 13 – Substance Abuse By Race and Gender

	Table 2 of RACE by SEX Controlling for abuse=1		
RACE(Race (uniform)) **Frequency** **Percent** **Row Pct** **Col Pc**	**SEX(I:Sex)**		**Total**
	1(male)	**2 (female)**	
1 (white)	69 16.75 56.56 27.82	53 12.86 43.44 32.32	122 29.61
2 (black)	178 43.20 61.59 71.77	111 26.94 38.41 67.68	289 70.15
4 (others)	1 0.24 100.00 0.40	0 0.00 0.00 0.00	1 0.24
Total	248 60.19	164 39.81	412 100.00

The proportion of people diagnosed with substance-related abuse in icd042 group classified by race and sex are given in Table 14. Among the instances of 233 white males in the icd042 group, 69 (30%) of them are diagnosed with substance-related abuse. This number is 53 (37%) for white females. While 178 (24%) black men fall into this category, 111 black women (25%) are diagnosed with substance-related abuse.

Table 14 – Persons with Substance Abuse by Race By Gender

Table 2 of RACE by SEX Controlling for abuse=1			
RACE **# of substance abuse** **# of persons in icd042** **Percent**	**SEX**		**Total**
	1(male)	**2 (female)**	
1 white)	69 233 29.62	53 142 37.32	122 375 32.53
2 black)	178 731 24.35	111 444 25	289 1175 24.6
4 (others)	1 11 9.09	0 2 0	1 13 7.69
Total	248 975 25.44	164 588 27.89	412 1563 26.36

Using Table 15, occurrences by Blacks make up 70% (n=289) of the 412 with HIV and substance abuse diagnoses while Whites are 30% of the group. Substance abuse by race and age for the 412 patient encounters with HIV indicate that 44% of the population falls into an age range of 31 to 40. In addition, 40% range in age from 41 to 50. Among Whites, 5%, 16% and 8% range in age from 21 to 30, 31 to 40 and 41 to 50, respectively. For these three age categories, Blacks occurrences present 6%, 28% and 32%, respectively. Further, conditional proportions for Whites indicate 16% fall between 21 and 30; 52% are between 31 and 40, and 27% between 41 and 50. In comparison to Blacks, conditional proportions for age ranges of 21 to 30, 31 to 40, and 41 to 50 are 9%, 40% and 46%, respectively. In general, these results are consistent among Whites and Blacks in the sample indicating that the largest group with HIV and substance abuse are between ages 31 and 40.

Using Table 16, 60% of the 412 hospital encounters are by males while 40% are from females. Most males are between 31 and 50 with marginal proportions of 25% and 26%. For females, these figures are 19% between 31 and 40 while 14% are between 41 and 50. Conditional proportions are similar for men and women with most of the 412 ranging in age from 31 and 50. For women, however, slightly 48% of population are between 31 and 40.

Payer Details Among Population

I used the Healthcare Cost and Utilization Project (HCUP, 1995, 2008) standardized payer nomenclature to interpret payment codes. Table 17 shows the uniform values for expected payers 1 and 2 among those with a HIV diagnosis within this dataset.

I checked the effect of pay1 (Medicare) by race in the cross-tabulations shown in Table 18 below.

From Table 18 and from the total number of patient hospital visits associated with HIV, 23% of Whites are covered by pay1=1 or Medicare while 59% are insured by pay1=2 or Medicaid. Conversely, 17% of Blacks are covered by Medicare while 66% are insured by Medicaid. Hence, more Blacks in the sample population of this study are Medicaid dependent. Medicaid generally covers low-income individuals, families who cannot afford health care costs and persons with disabilities.

Table 15 – Substance Abuse by Race and Age

Table 2 of RACE by AGE Controlling for abuse=1						
RACE(Race(uniform)) Frequency Percent Row Pct Col Pct	age_gr					Total
	1	2	3	4	5	
1 (white)	1 0.24 0.82 100.0	19 4.61 15.57 42.22	64 15.53 52.46 35.16	33 8.01 27.05 20.00	5 1.21 4.10 26.32	122 29.61
2 (black)	0 0.00 0.00 0.00	26 6.31 9.00 57.78	117 28.40 40.48 64.29	132 32.04 45.67 80.00	14 3.40 4.84 73.68	289 70.15
4 (other)	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.24 100.00 0.55	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.24
Total	1 0.24	45 10.92	182 44.17	165 40.05	19 4.61	412 100.00

Table 16 of SEX by AGE Controlling for abuse=1

SEX Frequency Percent Row Pct Col Pct	age_gr					Total
	1	2	3	4	5	
1 (male)	0 0.00 0.00 0.00	17 4.13 6.85 37.78	104 25.24 41.94 57.14	108 26.21 43.55 65.45	19 4.61 7.66 100.00	248 60.19
2(female)	1 0.24 0.61 100.00	28 6.80 17.07 62.22	78 18.93 47.56 42.86	57 13.83 34.76 34.55	0 0.00 0.00 0.00	164 39.81
Total	1 0.24	45 10.92	182 44.17	165 40.05	19 4.61	412 100.00

Table 17 – HCUP Expected Primary Payer Codes

Variable	Description	Value	Value Description	Value	Value Description
PAY1_N	Expected primary payer, nonuniform	1	Medicare (mixed)	9	Worker's Comp
		2	Medicaid	10	CHAMPUS, CHAMPVA
		3	Blue Cross, Blue Cross PPO	11	Other Government
		4	Commercial, PPO (mixed)	12	Other
		5	Private HMO	.	Missing
		6	Self-pay	.A	Invalid
		7	No charge	.B	Unavailable from source (coded in 1988-1997 data only)

Table 18 – Pay1 (Medicare) Expected Payer by Race

PAY1 Frequency Percent Row Pct Col Pct	RACE(Race (uniform))			Total
	1 white	2 black	4 other	
1	87 5.57 30.10 23.20	199 12.73 68.86 16.94	3 0.19 1.04 23.08	289 18.49
2	221 14.14 22.14 58.93	771 49.33 77.25 65.62	6 0.38 0.60 46.15	998 63.85
3	25 1.60 26.88 6.67	68 4.35 73.12 5.79	0 0.00 0.00 0.00	93 5.95
4	40 2.56 22.60 10.67	133 8.51 75.14 11.32	4 0.26 2.26 30.77	177 11.32
6	2 0.13 33.33 0.53	4 0.26 66.67 0.34	0 0.00 0.00 0.00	6 0.38
Total	375 23.99	1175 75.18	13 0.83	1563 100.00

From Table 19, there are several notable observations. Of the HIV Medicare patients between 31 and 40, Medicaid (pay1=2) appears to be the primary source of healthcare coverage while only 4% of this age group is insured by a preferred provider organization (PPO) where pay1=3. Moreover, 56% of those greater than 51 are insured by a private HMO where (pay1=5) while 20% of those in this group are covered by a PPO. As age increases among those insured by a commercial PPO (pay1=4), fewer are insured by this expected primary payer.

Table 19 – Medicare Covered HIV Patients By Age

	Table of PAY1 by AGE					
PAY1 **Frequency** **Percent** **Row Pct** **Col Pct**	**age_gr**					**Total**
	1	**2**	**3**	**4**	**5**	
1	0 0.00 0.00 0.00	13 0.83 4.50 7.98	129 8.25 44.64 17.67	130 8.32 44.98 23.26	17 1.09 5.88 15.60	289 18.49
2	2 0.13 0.20 100.00	108 6.91 10.82 66.26	484 30.97 48.50 66.30	343 21.94 34.37 61.36	61 3.90 6.11 55.96	998 63.85
3	0 0.00 0.00 0.00	12 0.77 12.90 7.36	31 1.98 33.33 4.25	28 1.79 30.11 5.01	22 1.41 23.66 20.18	93 5.95
4	0 0.00 0.00 0.00	30 1.92 16.95 18.40	85 5.44 48.02 11.64	55 3.52 31.07 9.84	7 0.45 3.95 6.42	177 11.32
6	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.06 16.67 0.14	3 0.19 50.00 0.54	2 0.13 33.33 1.83	6 0.38
Total	2 0.13	163 10.43	730 46.71	559 35.76	109 6.97	1563 100.00

With regard to Medicaid patients, Tables 20 and 21 show similar results. Notably, 77% of Blacks have pay2="", while 70% of Whites choose pay2 at that level. This would suggest that these patients are Medicaid ineligible or possibly uninsured. Medicaid eligibility is predicated, in part, on low income though child status and financial resources are among other factors taken into consideration. In addition, 12% and 13% of the hospital visits are associated with Blacks, respectively, fall into this category. As age increases, fewer people have pay2="", and this corresponds with Medicaid age eligibility criterion. A greater percent of Medicaid population have coverage via (pay2=4) a PPO.

Table 20 – Pay2 (Medicaid) Expected Payer by Race

	Table of PAY2 by RACE			
PAY1 **Frequency** **Percent** **Row Pct** **Col Pct**	**RACE(Race (uniform))**			**Total**
	1 white	**2 black**	**4 other**	
.	261 16.70 22.21 69.60	904 57.84 76.94 76.94	10 0.64 0.85 76.92	1175 75.18
1	4 0.26 66.67 1.07	2 0.13 33.33 0.17	0 0.00 0.00 0.00	6 0.38
2	44 2.82 22.34 11.73	152 9.72 77.16 12.94	1 0.06 0.51 7.69	197 12.60
3	22 1.41 88.00 5.87	3 0.19 12.00 0.26	0 0.00 0.00 0.00	25 1.60
4	42 2.69 27.81 11.20	109 6.97 72.19 9.28	0 0.00 0.00 0.00	151 9.66
6	2 0.13 22.22 0.53	5 0.32 55.56 0.43	2 0.13 22.22 15.38	9 0.58
Total	375 23.99	1175 75.18	13 0.83	1563 100.00

Table 21 – Medicaid Covered HIV Patients By Age

	Table of PAY2 by AGE					
PAY1 Frequency Percent Row Pct Col Pct	age_gr					**Total**
	1	**2**	**3**	**4**	**5**	
.	2 0.13 0.17 100.00	138 8.83 11.74 84.66	569 36.40 48.43 77.95	398 25.46 33.87 71.20	68 4.35 5.79 62.39	1175 75.18
1	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.06 16.67 0.14	2 0.13 33.33 0.36	3 0.19 50.00 2.75	197 12.60
2	0 0.00 0.00 0.00	11 0.70 5.58 6.75	104 6.65 52.79 14.25	69 4.41 35.03 12.34	13 0.83 6.60 11.93	197 12.60
3	0 0.00 0.00 0.00	0 0.00 0.00 0.00	4 0.26 16.00 0.55	19 1.22 76.00 3.40	2 0.13 8.00 1.83	25 1.60
4	0 0.00 0.00 0.00	14 0.90 9.27 8.59	50 3.20 33.11 6.85	65 4.16 43.05 11.63	22 1.41 14.57 20.18	151 9.66
6	0 0.00 0.00 0.00	0 0.00 0.00 0.00	2 0.13 22.22 0.27	6 0.38 66.67 1.07	1 0.06 11.11 0.92	9 0.58
Total	2 0.13	163 10.43	730 46.71	559 35.76	109 6.97	1563 100.00

DISCUSSION

Comparison of Findings to National Data

Despite the gains in pharmaceutical innovations supporting HIV and heightening awareness, due in part, to public figures and political agenda-setting, much of the discourse continues to converge on sub-Saharan Africa. On the twenty-fifth anniversary marking the disease, there was an estimated 800,000 to 900,000 people living with HIV in the U.S., with approximately 40,000 new HIV infections occurring in the U.S. every year. More than half of newly affected HIV cases occurred among Black

Americans, though this subpopulation represents 12 to 13 percent of the United States total population. Blacks, whites and Hispanics represent 54%, 26% and 19%, respectively, of the annual new HIV cases by race.

An even more astounding statistic shows that Black women accounted for 72 percent of all new diagnosed HIV cases in America. The HIV diagnosis rate for Black men was nearly eleven times greater than their white male peers, and this rate is twenty-three times greater for black women in comparison to white women (Centers of Disease Control and Prevention, 2005; LaVeist, 2005).

In this study, Blacks account for over 75% of those infected with HIV and 70% of the 412 with HIV and substance abuse diagnoses. Data from the Drug and Alcohol Services Information System (The DASIS Report, March 1, 2002) reported that although Blacks compromise 12 to 13 percent of the U.S. population, this group consist of 23 percent of admissions to publicly funded treatment facilities. The admissions data are reported below in Table 22. Despite a noticeable downward trend, these data do not account for private admissions nor does the data capture the use of smoked (crack) cocaine which is prevalent in the black community. The 1999 Treatment Episode Data Set (TEDS) data reported that crack cocaine was the method of use "among 81 percent of black men and 86 percent of black women". However, these figures were 71 and 77 percent for black men and women, respectively. This would further suggest that these data do not account for a significant number of African Americans who do not receive treatment for a myriad of reasons (e.g, socioeconomic, lack of medical insurance or underinsured, stress, mental illness, impact of crack cocaine). Table 23 shows the substance of choice among those Black males and females between 1994 and 1999.

Table 22: Black Admissions to Substance Abuse Treatment

	1994	1995	1996	1997	1998	1999
Admissions (Thousands)	431	425	401	374	382	366

Source: 1999 SAMHSA Treatment Episode Data Set (TEDS).

Table 23: Black Admissions to Substance Abuse Treatment by Gender & Substance Choice

Substance of Choice	Male	Female
Alcohol	35%	27%
Cocaine	28%	40%
Opiates	14%	18%
Marijuana	19%	10%
All Other	4%	5%

Source: 1999 SAMHSA Treatment Episode Data Set (TEDS).

In this dataset, those age 31 to 40 (Category 3) compromise 47% while those age 41 to 50 (Category 4) are 36% of the population. Though data from the National Institute on Drug Abuse (2006) shows a rise in HIV instances among adolescents and young adults between ages of 13 to 24, the findings, herein, suggest that late disease detection is evident with over 81 percent of the population ranging in age between 31 and 50. Data from the 1995 HCUP show the mean age for HIV patients is 37 with mean charges for the nationwide sample totaling $18,938 and average length of

stay of 10 days. In comparison to this research, this would imply that cost shifting from those in the population is probable given the cyclic risk behaviors associated with the co-morbidities of HIV and substance abuse.

Implications

Notwithstanding ICT innovations and the impacts at the organization levels, the issues, herein, suggest the need for public policy to address a broader digital divide which results in the continuing health gap in the underserved communities. Accordingly, research has demonstrated that the Internet can offer worthwhile health education and communication messaging to those with stigmatized illnesses, such as HIV (Berger, et al. 2005; Kalichman, et al, 2002). Despite this observation, HIV interventions should be based on cultural relevant dimensions, such as ethnicity (Mize, Robinson, Bockting and Scheltema, 2002).

Despite the agenda-setting associated with political posturing, this research can inform public policy and clinical delivery by inclusion of the salient cultural dynamics that stand to shape care practices. When IT designers and sponsors engage predefined notions of social norms void of user-centered culture, receptivity is limited. By recognizing these pitfalls, health care and public policy can be developed to better enable the design and dissemination of medical education, in general, and to targeted, highly vulnerable populations, in particular. Moreover, this can further shift the health disparities work to the Reducing stage of the Kilbourne, et al (2006) model. This insinuates that the field should embrace public policy as technology continues to broaden in scope, focus and ubiquitous nature.

Consequently, issues of empowerment, power structures, governance and social (dis)order that will affect populations (e.g., gender, race, socio-economic, literacy rates, regional locations, religion, cultural practices, just to name a few) differently, and often with unanticipated consequences. A coupling of informative medical content and cultural dimensions (without imposition of what is the norm) could heighten AIDS/HIV awareness by informing behaviors among African-American women, thereby escalating receptivity.

Assessments of ICT can serve to reformulate public policy and continue to challenge national groups. The current body of work offered by the the National Institutes of Health (NIH) deduced recently that health disparities (such as alarming rates of HIV cases among minority women) are multidisciplinary problems whereby no single field has the overarching solution(s). When the issues are investigated by research solios, unattended health disparities remain unaddressed, and the ripple effect is the economic impact of rising health care costs for all members of society (Harvard School of Public Health, 2006).

The statistics and findings of this study fail to capture the socio-economic, cultural and geographical determinants that affect the Black community. These variables were not included in the dataset described for this research and thus, limit the interpretation of results. Future studies should examine and model relationships among HIV, hospital charges, other chronic diseases, length of stay and medical procedures by race, gender and age.

Given the findings in this research, there is a comprehensible need to focus on health information dissemination and public policy to facilitate and direct national action. This is particularly the case among those most affected and infected with HIV including those in minority US communities. Future studies should investigate the linkages among technology use, cultural relevance and effectiveness to dissemination HIV prevention and intervention communication.

CONCLUSION

In its May 2006 article, "Does Class Trump Race?, Kim suggested that to understand health outcomes and disparities, one must not ignore socio-economic status (SES). This translated into those whom have the highest propensity to be uninsured or underinsured, namely Blacks, Hispanics and those living in impoverished rural areas. According to Isaacs (2004), many of those living in lower SES are Black or other ethnic minorities.

Further, much of the healthcare system is based largely on one's educational training and the ability to navigate treatment, service delivery and a host of payer guidelines and policies, all of which warrant some degree of adequate financial and educational resources. Oftentimes, these resources preclude those infected and affected by HIV in the black community. Healthcare researchers (LaVeist, 2005; Shi and Stevens, 2005) liken these outcomes to race/ethnicity disparities where adequate measures, such as cultural factors and measures of discrimination, have not been developed or implemented. Ultimately, "we are left with race/ethnicity measures serving as relatively inaccurate proxies" (Shi and Stevens, 2005, p 35).

While analytic applications can increase our comprehension of the correlations among variables in question, community determinants of vulnerability among chronic disease episodes merit consideration (Aday, 1994). These vulnerable diseases or health conditions link to both the community and individual levels of resources. The community resources encompass cohesiveness among people and neighborhood characteristics (e.g., presence/absence of violence, unemployment rates, access to physical recreation) while the individual level points to social and human capital, social status and health needs.

Aday (1994) suggests that there exist nine subpopulations that encompass vulnerability among persons living with HIV. Hence, while the dataset used in this exploratory research study, herein, informs us of demographics and attributes correlated to medical costs, it is not without imperfections with regard to the vulnerabilities noted by health disparities researchers.

The policy issues abound within the context of HIV in the U.S. Black community. Namely, one has to inquire: where is the strategic plan? This is particularly warranted given the alarming rates in cities with significant Black populations (e.g, Atlanta, New York, Washington, D.C.) and the climbing episodes in the rural South. The strategy plan should be inclusive of policies regarding HIV education dissemination via multiple communication modalities (Kiwanuka-Tondo and Payton, 2009) testing and overcoming social and cultural stigmas.

Given the findings in this research, there is a comprehensible need to focus on health information dissemination and public policy to facilitate and direct national action. This is particularly the case among those most affected and infected with HIV including those in minority US communities. Future research should examine and model relationships among HIV with hospital charges, procedures, length of stay, and disposition as a function of age, race, and gender. In doing so, recommendations for a national strategy can be valuable for policymakers and care providers, alike.

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