HARNESSING THE HEIGHTENED PUBLIC AWARENESS OF CELEBRITY HIV DISCLOSURES: "MAGIC" AND "COOKIE" JOHNSON AND HIV TESTING

James M. Tesoriero, Martin D. Sorin, Karen A. Burrows, and Malcolm L. LaChance-McGullah

This article investigates the impact NBA basketball star Earvin ("Magic") Johnson's HIV disclosure had on changes in demand for HIV counseling and testing services in New York State's 64 Anonymous HIV Counseling and Testing sites. Interrupted time-series analyses were conducted on weekly data from over 84,000 clients seeking anonymous HIV counseling and testing services from January 1991 to June 1992, to determine whether demand for these services changed as a result of the disclosure. Results indicated that immediately following the HIV disclosure, there was a substantial increase in service demand, which transcended all sex, race, age, and most HIV risk-related boundaries. Seven months later, demand had not returned to pre-disclosure levels. The strong impact on females, coupled with additional data analyses in obstetrical settings, suggests that previous research has been too narrow in focus, and that the effect of Johnson's HIV disclosure has been enhanced, in part, by the publicity surrounding his wife and baby. The importance of harnessing the heightened public awareness of celebrity HIV disclosures is discussed.

INTRODUCTION

The announcement by Earvin "Magic" Johnson on November 7th, 1991, of his HIV infection via heterosexual transmission remains the most prominent to date. His disclosure was the first to come from a major sports figure in America, and has overshadowed the celebrity AIDS deaths of Rock Hudson, Liberace, and the disclosures of Paul Gann and Arthur Ashe (Gelber, Wehmeuller, Higgins, & Maxwell, 1992). Magic's HIV disclosure, perhaps more than any celebrity announcement...
before or since, drove home the point that AIDS does not discriminate and that even our counting heroes are not immune.

Johnson's disclosure set off immediate and subsequent repercussions that were felt well beyond the NBA's stock prices of U.S. condom makers and companies engaging in AIDS-related research. News reports, once the announcement was made, speculated that the disclosure would have long-term ramifications in these areas (Culhane, 1993). In Washington, lobbying efforts for increased governmental spending on AIDS were stepped up (David, 1993) and President Bush asked Johnson to fill a vacant seat on the National Commission on AIDS. Johnson's arrangement with Bush administration AIDS policy and his participation in the U.S. Olympic basketball team, and his abrupt attempt to return to basketball kept his name and HIV status before the public for an extended period.

What effect did Magic Johnson's disclosure have in the public health arena? We describe two possible effects: 1) on the public's knowledge, attitudes, and behaviors regarding AIDS and 2) on the demand for HIV counseling and testing services. Since his disclosure, there have been a handful of studies specifically dedicated to these issues. Almost all have focused on the first issue. This article focuses on the second, the effect of Magic Johnson's disclosure on who sought HIV counseling and testing.

PREVIOUS KNOWLEDGE, ATTITUDE, AND BEHAVIOR STUDIES

There have been few published articles and one conference presentation specifically dedicated to exploring the effect that Magic Johnson's HIV disclosure had on the knowledge, attitudes, and behavioral intentions of various populations. The samples included have been quite varied, including a few hundred from through mixed-gender samples in Tucson, Arizona (Siegelman, Muenz, & Perenkowski, 1993), men waiting for the mass rapid tester in Chicago (Kalichman & Haire, 1992), STD clinic patients in Miami and CTCA (1993) and Philadelphia (Gargus, Zimmerman, Hinderaker, & Singh, 1992), and about 500 living in New York City (Raskin, Martell, Texas, & Ortiz-Torre, 1993).

Noptheristhingthatoverdiversesamples, the studies do provide fairly consistent support for a 'Magic Johnson effect' in that an increase in AIDS awareness, and in the perception of risk-related behaviors, was observed. However, given short-term disclosure follow-up periods and the size of our relatively small studies, the duration and generalizability of the Magic Johnson effect is uncertain. It also appears from these studies that those people were least affected by the announcement.

DEMAND FOR AIDS SERVICES RESEARCH

Regarding the issue of Magic Johnson's effect on the demand for HIV counseling and testing services, there is substantial evidence to indicate a large and varied effect, although the exact nature of this effect is not known. Calls from concerned citizens flooded AIDS services in large cities throughout the nation. The CDC reported that calls to most AIDS hotlines increased from an average of 4,000 per day to over 75,000 daily calls in the days following Magic's announcement (Sims, 1993).
Similar increases were reported by AIDS centers in Los Angeles, Portland, New York, and Houston (Harris & Chavez, 1991). A random survey of state health departments by the CDC found increases in testing levels immediately following Magic's announcement (Sures, 1991). A letter to the editor in the New England Journal of Medicine demonstrated that the level of anonymous HIV antibody testing in Orange County, California, increased in the wake of Rock Hudson's and Liberace's deaths, and after Paul Gaita, Magic Johnson, and Arthur Ashe announced they were HIV-positive (Gellert, Weisbrot, Haggis, & Maxwell, 1993).

Evidence suggests that HIV counseling and testing programs were ill prepared for the increased demand for services stemming from Johnson's disclosure. Counseling and testing centers in Los Angeles and contiguous counties reported that they were out of testing funds even though the fiscal year was only half over. Magic Johnson's announcement was blamed for this shortage (Harris, 1991). Despite the evidence suggesting an enormous impact on demand for HIV services following Magic's announcement, we found only one published study which has attempted to assess the size, nature, and duration of this effect (Tesorero & Sorin, 1992). This study analyzed workload data from New York State's HIV Anonymous Counseling and Testing sites. Results indicated that calls to AIDS hotlines more than doubled after the disclosure. Appointment backlog for HIV counseling increased 81% following the disclosure, while available clinic hours increased only 21% to accommodate this increased demand. Testing rates increased nearly 40% following the disclosure, while HIV seropositivity decreased 24%, suggesting that those affected by Magic's disclosure were low-risk individuals. The effect on females was slightly stronger than for males. A full four months after the disclosure, only hotline call levels showed any signs of returning to pre-intervention levels (Tesorero & Sorin, 1992). Given the nature of the data for this study, however, it was not possible to determine if the effects of Johnson's announcement differed by race, age, or HIV risk factor.

Existing literature, either by its design (e.g., wording of questions) or through its attribution of the findings, has focused on the effect of Magic Johnson's HIV disclosure. The impact from the attention surrounding Johnson's wife, Earitha ("Cookie") Johnson, pregnant at the time, might have had on public attitudes and demand for testing has not been investigated. This is despite evidence suggesting that women were strongly affected by the disclosure. We return to this issue shortly.

The importance of unraveling the effects of celebrity HIV disclosures on HIV counseling and testing demand cannot be overestimated. Given the incredible surge in public awareness that can result from such events, knowledge of precisely who will be affected (and to what degree) could be an invaluable tool for policymakers. Yet we know very little about these things. One study notes that "Only rarely have the effects of celebrities' announcements of their own health problems been evaluated" (Siegelman, Miller, & Dzenowsky, 1993:155).

This study begins to fill this void by analyzing New York State Anonymous Counseling and Testing Program data to answer the following specific questions: 1) Exactly who was prompted to seek testing following Magic Johnson's HIV disclosure? Were there differences by age, sex, socioeconomic status, risk factor, or any combination of these factors? 2) How long did Magic Johnson's effect on testing rates and seropositivity last? 3) What was the overall impact of Johnson's disclosure on HIV testing and seropositivity rates? How many people were prompted to seek testing and how many seropositive clients were identified due to Johnson's announcement? 4) Since female demand for HIV counseling and testing services
increased more than male demand in the wake of the HIV disclosure, is there evidence to suggest that the media attention surrounding Johnson's pregnancy was driving that trend among females?

Would the fact that Johnson is black and that popular black media such as Jet magazine and the Arsenio Hall Show dedicated considerable time and space to his HIV disclosure lead a proportionately higher number of blacks to seek counseling and testing services?

What caused female demand for counseling and testing to rise even more than male demand? Were women responding to other circumstances surrounding the disclosure, namely, that fact that Johnson was recently married and that his wife was pregnant and HIV negative at that time? Mr. Johnson's emphasis on the traditional values of home, marriage, husband, and father may have drawn attention away from his proclivity and focused concern on the innocent wife and child (Rowe, 1994). Mrs. Johnson's simultaneous disclosure of not being infected may have simulated interest among women to seek HIV testing. Would her wife eventually test positive? Was their baby infected? Considerable attention was given by popular media to the impact, health-related and otherwise, of Johnson's disclosure on his wife and unborn baby.

One of the major reasons Magi Johnson, who said he was infected through heterosexual sex, went public with his HIV status was to convey the message that "anybody can get AIDS." (Giglio, Miller, & Derenowski, 1992:54). Did this lead to an increase in testing among low-risk heterosexuals? This would be consistent with the results of previous research finding a decrease in stigmatization in the wake of the disclosure.

DATA AND METHODS

SAMPLE POPULATION

The primary data set consisted of individual-level reports from all sixty-one AIDS Institute Anonymous Counseling and Testing sites in all four New York State counties from January 1991 through June 1992. Virtually all cases originate from an initial hotline call to one of the program's AIDS Hotlines. Appointments are immediately scheduled and clients are given an interview date to receive pretest counseling. This counseling consists of providing basic information about AIDS, including discussion of the behaviors associated with an increased risk of acquiring HIV, a description of the HIV test, and a discussion of services available to HIV-infected individuals. Clients are aware of their anonymous status, approve of New York State law regarding the confidentiality of test results and virtually all agree to test for HIV antibodies.

Requests for test results are required to fill out a detailed report, including


Note: for example, no 4, 6 (29 November, 1991:16-17), 6, no 2 (20 July, 1992:16-17) and the following Arts magazine 51, no 6 (25 November, 1991), 51, no 17-18, 82, no 13 (20 July, 1992:54-55).
demographic risk, and testing information on each client counseled. Reports are sent to the central office in Albany, and are merged into one data base. Over 20,000 reports were submitted in 1991, and another 14,400 were submitted in the first 6 months of 1992. These individual-level records were aggregated into 78 weeks of data, covering January, 1991 through the end of June, 1992. This aggregation was necessary to facilitate study of Johnson's disclosure on counseling and testing levels over time.

To investigate the possibility that the news surrounding Magic Johnson's wife and baby caused the increased demand for counseling and testing among women, data from the New York State Department of Health's Preventive Care Assistance Program (PCAP) and from the AIDS Institute's Obstetrical Initiative (OBI) were also examined. OBI offers women in hospitals located in high HIV-infection areas (primarily New York City) HIV counseling and testing services shortly after they give birth. PCAP offers services to similar women during their pregnancies.

**MEASUREMENT OF VARIABLES**

Table 1 lists the variables included in the main analysis. Provided are a description of how each variable was computed, as well as each variable's percentage of the total series (when appropriate), its mean, standard deviation, and minimum and maximum values for the entire time series. Due to decreased program activity and limited hours of operation, small vacations, and probable low client-responsive rates, Christmas week and both New Year's weeks were excluded from the analyses, reducing the time series to 75 weeks. In order to standardize the variables, we adjusted for the number of working days per week, when appropriate. Table 1 reveals that the AIDS Institute tested an average of 469.7 clients per week, with extremes ranging from a low of 505 blood submissions to a high of 730 submissions per week.

A major goal of this analysis was to determine if the Magic Johnson effect was uniform across all demographic groups. Therefore, separate time series by client sex, age, and risk factor were created. This was done both for blood submissions and for seroreactivity.

Table 1 describes the total client population served. It reveals that, on average, the program tested males at slightly higher rates than females. Whites, heterosexuals, and persons under 40 years of age comprised the bulk of the Anonymous Counseling and Testing Program's workload for the time frame covered. Average seroreactivity for the total client population over the 75-week period was 4.1%. This varied widely by sex, race, age, and risk factor, with males, minorities, injecting drug users (IDUs), and persons between the ages of 21 and 50 having the highest rates.

Initial plots of these time series (presented below) suggested that an independent variables coding scheme consisting of two variables would be appropriate for most of the series. The last variables in Table 1 (MAGIC 1 and MAGIC 2) represent dishonorable intervention variables. MAGIC 1 was coded to measure the

"Excluding Christmas and New Year's weeks from the analysis is one way to adjust for these factors. The other method would have been to model these weeks into the time series, resulting in negative effects coefficients of the time series. However, because of these weeks would not suggest the importance of Magic Johnson's announcement, we decided to exclude these periods from the analysis."

|MAGIC 1 and MAGIC 2 represent dishonorable intervention variables. MAGIC 1 was coded to measure the
<table>
<thead>
<tr>
<th>Variable Coding of Variable</th>
<th>Percent</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Min</th>
<th>Max</th>
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<tbody>
<tr>
<td>Blood abstinence1</td>
<td>100%</td>
<td>100.0</td>
<td>0.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Year</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Male distribution</td>
<td>55%</td>
<td>275.5</td>
<td>7.9</td>
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<td>361</td>
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<td>Female distribution</td>
<td>45%</td>
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<td>301</td>
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<tr>
<td>White</td>
<td>74%</td>
<td>193.5</td>
<td>19.4</td>
<td>207</td>
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<td>Black</td>
<td>18%</td>
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<td>16.6</td>
<td>140</td>
<td>190</td>
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<tr>
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<td>51.9</td>
<td>21.1</td>
<td>27</td>
<td>75</td>
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<td>0-0.99 years old</td>
<td>47%</td>
<td>232.0</td>
<td>55.3</td>
<td>180</td>
<td>275</td>
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<td>1-4.99 years old</td>
<td>32%</td>
<td>155.1</td>
<td>46.6</td>
<td>97</td>
<td>239</td>
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<tr>
<td>5-9.99 years old</td>
<td>16%</td>
<td>68.4</td>
<td>16.6</td>
<td>41</td>
<td>107</td>
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<tr>
<td>Varying years old</td>
<td>6%</td>
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<td>9.5</td>
<td>9</td>
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<td>82%</td>
<td>286.5</td>
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<td>18%</td>
<td>305</td>
<td>83</td>
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<tr>
<td>Homosexual</td>
<td>15%</td>
<td>70.6</td>
<td>19.5</td>
<td>41</td>
<td>108</td>
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<tr>
<td>Bisexual</td>
<td>10%</td>
<td>94.0</td>
<td>106</td>
<td>55</td>
<td>137</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homosexual</td>
<td>6%</td>
<td>50.0</td>
<td>15.5</td>
<td>41</td>
<td>96</td>
</tr>
<tr>
<td>Bisexual</td>
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<td>64.0</td>
<td>45</td>
<td>55</td>
<td>137</td>
</tr>
<tr>
<td>Varying years of puberty</td>
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<td>94.0</td>
<td>106</td>
<td>55</td>
<td>137</td>
</tr>
</tbody>
</table>

1Adjusted for the number of working days per week.
2Data are not mutually exclusive (i.e., not mutually exclusive categories).
immediate (2-week) effect of the HIV disclosure on testing and seropositivity rates while MAGIC 2 measures any subsequent change in these rates.

STATISTICAL METHODS
Sets of interrupted time-series analyses measuring the impact of Magic John-
son's HIV disclosure on blood submissions and seropositivity were estimated for the
total sample, and by sex, age, and risk factor. More specifically, the intervention
analysis developed by Box and Tiao based on the Box-Jenkins autoregressive,
Integrated, Moving average (ARIMA) time-series modeling technique was employed
(Box and Jenkins, 1976; Box and Tiao, 1975).

ARIMA modeling allows one to estimate the type of intervention impact ex-
pected. For example, one might expect the magic johnson HIV disclosure to have an
immediate impact on the number of people deciding to test for the presence of HIV,
but one would probably not expect this impact to last long. One would then
estimate an "above-stochastic" impact pattern. This provides an estimate of not
only the size of the initial intervention effect, but also permits forecasting beyond
the current time series to predict when the effect of the intervention will com-
pletely disappear.

FINDINGS
Figures 1-7 plot blood submissions for the total client population, and by sex,
age, race, and HIV risk factor, for the 75 weeks of data used in this analysis. Due to space
limitations and less discernable trends, seropositivity plots are not presented here.
It is clear from Figure 1 that total blood submissions rose sharply immediately follow-
ing the HIV disclosure, then dropped rapidly a few weeks later, leveling off at a rate
significantly higher than pre-intervention levels. There is no indication that total
blood submissions were returning to their pre-intervention level a full 7 months
after Magic's disclosure.

With a few exceptions this general trend persists when separate series are
plotted by sex, age, race, and risk factor (see Figures 2-7). One exception concerns
females (Figures 4, 5), in which the overall trend appears to apply to whites only. For
blacks and Hispanics, there is an immediate and sharp increase in tests following
the disclosure; but the subsequent drop in blood submissions is sharper, leveling off at
rates close to pre-intervention levels than for whites. Similarly, although the general
pattern holds for heterosexuals (Figure 7), trends in blood submissions are less clear
for IDA/ homosexuals/ bisexuals, and persons engaging in risky sexual practices.

These plots do not consider naturally occurring trends or drifts in the series. To
correct for this, and to obtain numerical estimates of the intervention effects, ARIMA

Individual client data were grouped into weekly data based on the date the client was
participant recruited and tested. Data was collected in two-week matching periods between the initial appointments and the
actual counseling and testing sessions. Throughout, the magic johnson impact variables were used each
week. For example, the HIV disclosure was matched during week 45 of the time series, but the impact
variable started at week 45: since all week 44 (and many week 43) clients were actually pre-Magic.

For a complete discussion of interrupted time-series analysis, see McNeely, D., McNeely, B. McNeel-
time series modeling was conducted, the results of which are reported in Tables 2 and 3. Table 2 reports the interrupted time-series results for the blood donation models. For each time series modeled (Column 1), the following statistics are presented: average blood submissions per week before staticelnma's HIV disclosure (Column 2), per week estimates of the immediate (1-week) impact of the announcement (Column 3), any subsequent change in weekly blood submissions (Column 4), the overall per week impact of the HIV disclosure on blood submissions for the 51 weeks following the announcement (Column 5), and the number of estimated blood submissions attributable to the announcement (Column 6).

It should be noted that some of the series were properly represented by an
Figure 3. Blood submissions by age.

"Abrupt-temporary" impact pattern. In other words, the Magic Johnson effect, although experiencing a sharp decline in most of the series (accounted for in Column 4) did not disappear in the 7 months following the announcement. This was true even for blacks and Hispanics, where the subsequent decline left the series near (but not at) pre-intervention levels.

Table 2 reveals that total blood submissions, which averaged about 400 per week before the HIV disclosure, nearly doubled immediately following the week of the disclosure, peaking at an average of 722 weekly submissions for these weeks. There was a subsequent decrease in submissions by an average 150 per week.

Figure 4. Blood submissions by race/ethnicity for blacks and Hispanics.
Figure 6. Blood submissions by race/ethnicity for whites.

Column 4), such that the overall impact of the disclosure throughout the 31-week post-intervention time period was an increase of 45% (Column 5).

The immediate impact was greater for females (+12%) than for males (+5%). Comparing the subsequent decrease in blood submissions, the overall impact was still higher for females (+57%), compared to males (+32%). As expected, the initial impact was strongest for white males, whose blood submissions increased from 82 per week before the announcement to 145 per week immediately following it (+79% increase). Blood submissions by whites also in

Figure 6. Blood submissions by risky sex partners, IDUs, and homosexuals/bisexuals.

See also Travers and Stein (1992), p. 221.
Figure 7. Blood submissions by race, heterosexuals.

The findings regarding risk factor were equally striking. As expected, heterosexual submissions were most affected, doubling in the weeks immediately following the disclosure (Table 2). Injection drug users' submissions also increased as a result of the Magic Johnson HIV disclosure, although the increase was relatively small (approximately 15% increase in 1982). Similarly, blood submissions for persons with risky sexual partners increased as a result of Magic Johnson's disclosure (approximately 15%). Overall, increase of 27% in rates of heterosexual blood submissions did not change following the disclosure.

The disclosure and subsequent media coverage appears to have affected all age groups, although the effect was stronger for younger clients. As one proceeds from the under-30 age group to the over-50 age group, the immediate intervention effect drops from a 50% increase to a 34% increase. However, once any subsequent changes in rates are considered, the tendency was weaker (Table 2).

The first column of Table 2 reports the estimated number of people who came forward to be tested due to Johnson's HIV disclosure. It represents the difference between the number of observed blood submissions and the number expected had the Magic Johnson incident not occurred. It is important to note that, since blood submissions were returned to their pre-intervention levels following the disclosure, the Magic Johnson effect could be extended beyond the study period. We conservatively limit our estimate of this effect to the time frame under study. Overall, the disclosure brought an estimated 3,845 additional persons forward for testing during the first 12 weeks thereafter, over 3,000 of whom were female. The vast majority
<table>
<thead>
<tr>
<th>Blood Substitutions</th>
<th>Average Blood Substitutions for Weeks 1-5 (HIV-negative)</th>
<th>Average Blood Substitutions for Weeks 6-13 (HIV-negative)</th>
<th>Average Change in Blood Substitutions for Weeks 6-13 vs. 1-5 (HIV-negative)</th>
<th>Overall Impact of Interactions on Blood Substitutions (Weeks 6-26)</th>
<th>Number of Blood Substitutions After 26 Weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Substitutions</td>
<td>4003</td>
<td>3738 (66.6%)</td>
<td>-265 (3.8%)</td>
<td>5.5%</td>
<td>5,085</td>
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<tr>
<td>Male Substitutions</td>
<td>2208</td>
<td>1952 (66.8%)</td>
<td>-256 (11.9%)</td>
<td>14.8%</td>
<td>2,250</td>
</tr>
<tr>
<td>Female Substitutions</td>
<td>1795</td>
<td>1786 (99.5%)</td>
<td>-9 (0.5%)</td>
<td>8.7%</td>
<td>3,035</td>
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<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>White Subscriptions</td>
<td>2811</td>
<td>2700 (96.0%)</td>
<td>-111 (4.1%)</td>
<td>-3.8%</td>
<td>2,179</td>
</tr>
<tr>
<td>Black/Sub comfortably-</td>
<td>622</td>
<td>595 (95.3%)</td>
<td>-27 (4.5%)</td>
<td>10.0%</td>
<td>791</td>
</tr>
<tr>
<td>Other Substitutions</td>
<td>16.5</td>
<td>16.3 (97.6%)</td>
<td>-0.2 (3.2%)</td>
<td>0.8%</td>
<td>240</td>
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<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;40 years old Subscriptions</td>
<td>185.8</td>
<td>177.8 (95.3%)</td>
<td>-8.0 (4.9%)</td>
<td>4.5%</td>
<td>2,729</td>
</tr>
<tr>
<td>40-49 post measurements</td>
<td>153.5</td>
<td>148.5 (95.9%)</td>
<td>-5.0 (3.3%)</td>
<td>0.5%</td>
<td>1,817</td>
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<tr>
<td>50 and above Blood Subscriptions</td>
<td>59.2</td>
<td>54.8 (93.4%)</td>
<td>-4.4 (7.5%)</td>
<td>-7.5%</td>
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<tr>
<td>Other control Subscriptions</td>
<td>24.1</td>
<td>23.6 (97.9%)</td>
<td>-0.5 (2.4%)</td>
<td>0.2%</td>
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<tr>
<td>Hypertension Substitutions</td>
<td>517.7</td>
<td>515.5 (100.0%)</td>
<td>-2.2 (0.4%)</td>
<td>0.4%</td>
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<td>Diabetes mellitus</td>
<td>61.2</td>
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<td>-1.0 (1.6%)</td>
<td>-1.6%</td>
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<tr>
<td>Heart disease</td>
<td>67.4</td>
<td>66.4 (99.0%)</td>
<td>-1.0 (1.6%)</td>
<td>1.6%</td>
<td>0</td>
</tr>
</tbody>
</table>

1. Adjusted for intercountry when appropriate.
2. Measures the impact of the Major Johnson intervention effect for the 2 weeks following the HIV diagnosis. For example, for the 2 weeks following the diagnosis, total blood substitutions (counted by 322 subtractions) to patients 792 per week.
3. Measures the change in the intervention effect occurring the last 2 weeks after the HIV diagnosis to the end of the intervention period. For example, after the major intervention impact, total blood substitutions for the last 2 weeks after the intervention effect were about 500 per week compared to the expected 792 per week.
4. Adjusted for intercountry when appropriate. In the case of 0, no change was obtained.
5. Calculated by regarding the 2 weeks impact while retaining the 26th week impact. For example, total blood substitutions was counted as an average of 15.7 for the 26 weeks following the HIV diagnosis.
6. Numbers within parentheses are significant at p < 0.05.
<table>
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<tr>
<th>Substitution</th>
<th>Pre-HIV Substitution</th>
<th>Post-HIV Substitution</th>
<th>Estimated Number of HIV Positive Substitutions</th>
</tr>
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<tbody>
<tr>
<td>Male</td>
<td>4.5%</td>
<td>5.5% (±2.2%)</td>
<td>71 (13.5%)</td>
</tr>
<tr>
<td>Female</td>
<td>5.5%</td>
<td>4.6% (±1.7%)</td>
<td>58 (11.7%)</td>
</tr>
<tr>
<td>Hook</td>
<td>5.1%</td>
<td>2.6% (±2.6%)</td>
<td>20 (4.1%)</td>
</tr>
<tr>
<td>White</td>
<td>6.3%</td>
<td>1.8% (±3.0%)</td>
<td>20 (3.5%)</td>
</tr>
<tr>
<td>Black</td>
<td>9.3%</td>
<td>7.6% (±1.5%)</td>
<td>22 (4.8%)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>10.0%</td>
<td>No change</td>
<td>25 (10.7%)</td>
</tr>
<tr>
<td>Under 20 years</td>
<td>5.9%</td>
<td>2.6% (±2.3%)</td>
<td>23 (4.6%)</td>
</tr>
<tr>
<td>21-40 years</td>
<td>6.0%</td>
<td>6.0% (±2.5%)</td>
<td>25 (12.3%)</td>
</tr>
<tr>
<td>41-60 years</td>
<td>4.7%</td>
<td>No change</td>
<td>97 (4.4%)</td>
</tr>
<tr>
<td>Over 61 years</td>
<td>2.6%</td>
<td>No change</td>
<td>6 (1.4%)</td>
</tr>
<tr>
<td>Intravenous</td>
<td>3.8%</td>
<td>3.6% (±3.6%)</td>
<td>04 (1.7%)</td>
</tr>
<tr>
<td>Bars</td>
<td>22.3%</td>
<td>No change</td>
<td>13 (2.2%)</td>
</tr>
<tr>
<td>Nonintercourse</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risky partner substitutions</td>
<td>7.5%</td>
<td>No change</td>
<td>0</td>
</tr>
</tbody>
</table>

1. Calculated for men who use methamphetamine when appropriate.
2. Percentage of men who used the substance at least once per week.
3. Calculated by comparing the number of persons expected to be methamphetamine-positive at the time the last injection per week with past injecting patterns and injecting patterns at the time the last injection per week.
4. Persons with injecting patterns per week and injecting patterns in the past injecting patterns for calculating the expected number of new injecting patterns.
5. Of the new injecting patterns, 56% were of the new injecting patterns, 25% were of the new injecting patterns, and 25% were of the new injecting patterns.

These new injecting patterns were white, heterosexual, and under the age of 20 (last column of Table 2).

Having demonstrated a significant increase in HIV counseling and testing (skewed substitucations) following the November 7th announcement, the question of whether these new injecting patterns were lower risk individuals is examined. Further, reporting the ARMs model of the injecting patterns, the dormant estimable decrease in injecting patterns, when the dormant pattern was defined as injecting patterns, was estimated. The estimated effect of Johnson's announcement on injecting patterns (Column 1) and the estimated number of injecting patterns identified (and their estimated injecting patterns) due to the announcement (Column 1).
disclosure. The rate of decline was a little stronger for females (20% decrease, compared to 10%, decrease for males). While seroreactivity decreased by 24% following the disclosure, while the drop in positive Black test rates was 19%. Hispanic seroreactivity rates did not change as a result of the Magic Johnson disclosure. Seroreactivity decreased about 35% for persons 40 years of age and under, but did not change for those over 40 (Table 3).

Table 3 reveals that seroreactivity did not change for injecting drug users (IDUs), homosexual/bisexuals, and for persons engaging in risk sexual practices. A little surprising was the large 24% decrease observed in heterosexual seroreactivity following the disclosure. Thus, not only did heterosexuals account for the bulk of the post-Magic increase in blood submissions, but the heterosexuals who did come forth were at lower risk than their "pre-Magic" counterparts. The last column of Table 3 reports the estimated number of seroreactive clients identified due to the HIV disclosure. Reported in parentheses are the estimated seroreactivity rates for these "HIV-disclosure clients" (clients who came forward by testing because of Johnson's disclosure). These figures were derived by considering both the increase in blood submissions and the decrease in seroreactivity occurring after the disclosure.

We estimate that a total of 74 seroreactive clients were identified as a result of Magic's announcement, the majority of whom were male, approximately equal numbers of white, black, and Hispanic positives were found due to Johnson's announcement. The vast majority of the HIV-positives identified because of the announcement were under 50 years of age, or between the ages of 41 and 50 (Table 3. We estimate that 76% of the positives were sex partners of high-risk individuals: white 13% were IDUs. The majority of these positive must have been heterosexuals. 81 heterosexual positives were identified (recall, from the bottom of Table 1, that risk is not a mutually exclusive category).

REGIONAL AND INTERACTION EFFECTS

To determine if there were any geographic differences in the Magic Johnson effect, we repeated the analyses, separating New York City cases from those located elsewhere in New York State. Previous results held within both categories (tables not shown).

In order to control for possible interaction effects, especially sex-x-age interactions, a series of larger specified ARIMA models were estimated. For example, we estimated separate equations for each race-age combination (i.e., white males, while females, black males, etc.) Results were consistent with lower-order effects such that added elaboration was deemed unnecessary.

EXPLORING A "COOKES-JOHNSON EFFECT"

Given the larger increase in women's rates of coitusing and testing after Magic's HIV disclosure, the possibility that it was the news surrounding Magic's wife and family, rather than Magic himself, that was driving this trend among women was explored. A population of women who could be expected to respond to Mrs. Johnson's situation was identified, namely personal and parent-client clients. The AIDS Institute's Obstetrics Initiative (OBI), offers women most of whom

It may be premature to assume that any growth of worry would be so gloomy.
are black and Hispanic. In 24 hospitals located in high HIV infection areas (primarily New York City) HIV counseling and testing services are often offered in the same hospitals. Table 4 below summarizes findings from these programs.

Upon examination of OBI data, the most striking increases in agreement to counseling following Johnson's HIV disclosure were found. However, the percentage of OBI clients who indicated that they had already been counseled about AIDS during their pregnancies rose sharply in the post-disclosure time frame, from 51% in the 44 weeks prior to the disclosure, to 66% in the 11 weeks following it. This trend held for white, black, and Hispanic women (data not shown). Moreover, this trend began within one month after the disclosure, which would be consistent with the time it takes for PCAP clients to begin reaching OBI counselors.

Thus it appeared that other observational programs, such as PCAP, which reaches women before the OBI does were bearing the brunt of the disclosed impact. Examination of PCAP data supported this assertion. The percentage of prenatal clients in that program who agreed to HIV counseling rose from an average of 46% in the ten months prior to the HIV disclosure, to over 71% in the seven months following it. Examination of late trimester data revealed a 26% increase in counseling acceptance in the months following the disclosure, then a continued rise until it leveled off at a rate nearly 6% higher than pre-disclosure levels. Seven months following the disclosure, the rate was still at this increased level (data not shown).

These findings suggest a substantial increase in prenatal clients' propensity to accept HIV counseling following the disclosure. One could argue that those women were driven to seek counseling because of Magic Johnson, but it seems more reasonable to attribute this impact to the coverage surrounding Mrs. Johnson and her baby.

**DISCUSSION/POLICY IMPLICATIONS**

Given the retrospective, non-experimental design of this study, since causation is difficult to assess, since clients were never asked about their motivation for testing, the possibility exists that some of the increase in testing demand was due to factors other than Magic Johnson's HIV disclosure and subsequent media coverage. The long-lasting impact of the disclosure's effects are particularly vulnerable to competing explanations. However, given the range of the study design and the lack of any competing explanations we are reasonably confident that the disclosure was the major cause.

**Table 4. Summary of Prenatal and Prenatal Care Data**

<table>
<thead>
<tr>
<th>OBI DATA</th>
<th>PCAP DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>54 weeks before disclosure</td>
<td>51 weeks before disclosure</td>
</tr>
<tr>
<td>10 weeks before disclosure</td>
<td>10 weeks before disclosure</td>
</tr>
<tr>
<td>% agreeing to counseling</td>
<td>% agreeing to counseling</td>
</tr>
<tr>
<td>88.0%</td>
<td>87.5%</td>
</tr>
<tr>
<td>87.5%</td>
<td>84.6%</td>
</tr>
<tr>
<td>40.6%</td>
<td>71.1%</td>
</tr>
</tbody>
</table>

% already counseled during pregnancy
51.4%
56.3%
The context to which these findings can be generalized is uncertain outside New York State. There is also unknown, although there is no reason to believe the New York region's possess special connections to Magic Johnson. In fact, based on performance, proximity alone, we could reasonably hypothesize that states in the western part of the country might have been more influenced by the disclosure.

Finally, the extent to which groups as high as 42% (39% in Chicago, e.g., indicated in drug treatment programs) decrease stocks, etc. A stock in any treatment for HIV infection was least affected by the disclosure. This conclusion that groups at especially high HIV rates (e.g., HIV/AIDS advocates) would be even more important. It may be misleading, therefore, to generalize the findings of this article to clusters of high-risk individuals, such as prisoners, or groups involved in drug treatment programs.

One of the main objectives for this article was to include demographic and risk-related differences in the impact of Magic Johnson’s HIV disclosure on anonymous counseling and testing levels and acceptability. We found that the disparate, although varied in magnitude, demonstrated all age, race, and risk levels.

Moreover, the Magic Johnson effect on testing was stronger for whites rather than for blacks.

Nonetheless, evidence exists that the importance of reference group or peer influence, and findings call into question that the importance of celebrities as peer influences. That the efficacy of using demographic and risk factors to target and lead psychological support groups, the extent of this approach to reduce sexual and behavioral risk information is critical to the prevention of AIDS, can be provided by a source that is credible or by a source that is peer group and sexual behavior (Brown, 1988).

We observed that Magic Johnson’s disclosure had the least impact on Hispanic testing rates, and no impact on Hispanic acceptance rates. This is unfortunate because Hispanic testing rates have the highest rate of noncompliance at 36%, of all the other ethnic groups using the program. No clear link is apparent between the level of HIV risk and Hispanic conformance, but this signal possibility is significant in that Hispanic participation is strongly correlated with the level of AIDS risk information and acceptance of this information (Brown & Marin, 1988).

In a way, the results would support that Magic Johnson’s disclosure, but it was clear that future research would be well designed. In fact, results were reported in HIV counseling were not significant after the disclosure, but was hypothesized that there was a substantial effect on the exposure and influence surrounding Johnson’s refusal to allow his research findings of Magic and Marin, into that Hispanic community suggests figures to be similar, the best credible sources of information is available (Brown & Marin, 1988).

Our results indicate that the attitude of HIV acquisition may be an important indicator of who is influenced. Magic Johnson made it clear from the outset that he
contacted the AIDS virus through heterosexual contact. It is probably not coincidental that the only group unaffected by his disclosure was homosexuals/bisexuals, and that he suspected homosexuals strongest. This, too, is consistent with the social influence view mentioned above.

Another objective of this study was to determine if and when the effect of Johnson's announcement ended. Our results indicate that, a full seven months later, testing rates and seropositivity had not reached their pre-disclosure levels. Perhaps Magic's confined commitment to AIDS education, and the sustained media coverage surrounding him, the victimization of his service on the National Commission on AIDS, and of his basketball career, are causing a continued interest in AIDS issues several months after the initial disclosure. Related to this, events occurring since Magic's HIV disclosure, such as former tenant star, Arthur Ashe's AIDS disclosure and subsequent death, may be serving to help sustain public interest in HIV counseling and testing.

We also investigated the possibility that additional personnel were added to staff the anonymous counseling and testing program in the wake the disclosure. The extent to which staffing levels remain high could be accounting for the failure of testing rates to return to pre-disclosure levels. Program administrators informed us that staffing levels have, in fact, decreased following Magic's disclosure, creating more work for remaining counselors.

We found that the percentage of positive test results decreased in the wake of Johnson's disclosure. In an earlier article, we speculated that this decrease was due primarily to a rise in heterosexual (and thus lower-risk) blood submissions. Our results demonstrate that, indeed, heterosexual blood submissions did rise sharply following the announcement. Our subsequent serositivity analysis revealed that the explanation was, however, too simplistic. Serositivity also decreased within the heterosexual subgroup following Magic's announcement. Thus, total seropositivity in the post-Magic time period was driven not only by an increase in heterosexual testing, but also by an increase in testing of lower-risk heterosexual clients. It is likely that the Johnson announcement heightened fears among heterosexuals of their risk of HIV from unprotected sex, thereby generating an increased demand from this population.

There is no question that Johnson's HIV disclosure, and all that came with it, had a substantial impact on anonymous counseling and testing levels in New York State. Did it have a beneficial impact? That clearly depends on how one defines the term "beneficial." In terms of primary prevention, we have demonstrated that his disclosure transgressed all age, race, sex, and risk-relevant boundaries. We estimated that over 5,000 people, who otherwise might not have come forward for counseling and testing services, did so because of Magic's disclosure. This also resulted in an estimated 71 clients learning that they are HIV infected. Moreover, even though most of those prompted to come forward were lower-risk individuals, to the extent that these people pass their new knowledge on to their sexual partners, friends, and family members, some of whom will be higher-risk individuals, the overall prevention effect of Magic's announcement could be large.

On the other hand, one could point to the fact that the seropositivity rate among these specific individuals is estimated to be 3.9%, which contrasts with a 9.5% HIV "typical" program clients. In terms of raw numbers, whites, females, and heterosexuals.

1To address this possibility, we controlled for the date of arrival among HIV disclosure in our testing and seropositivity models. Our substantive results remained unchanged.
Although the exact circumstances surrounding Magic Johnson's situation are rare (e.g., recently married, wide program) and are unlikely to be replicated, one can reason that such high-profile persons in the future. The Centers for Disease Control and Prevention, as well as health departments nationwide, must prepare to respond to future celebrity disclosures which result in heightened public awareness of AIDS issues. Contingency planning facilitates a rapid response to such disclosures and maximizes the beneficial consequences of heightened public awareness.

Such contingency planning should include the training of staff by community and public officials (e.g., state and county health departments, family planning, prenatal care, substance abuse, and violence and prevention programs) in the identification of space to expand awareness and confidential counseling and testing, identification of commercial associations to new educational (e.g., schools) and mobile vans to mobile additional staff and other resources into heavily affected localities. It could also draw upon a variety of sources of resources and information. In an ideal manner, some of these things have been done in New York State following several outbreaks by health care workers. Finally, published literature from the field of health promotion, communication, public opinion, market, and advertising public relations. Should be summarized regarding the likely impact of disclosures by any other celebrity and celebrity belonging to various combinations of demographic and risk-exposure groups. This would allow the preparation of contingency plans for adaptation to the strategies emerging from celebrities making future disclosures are based on experience of targeted AIDS campaigns. The scope of planning should be unpredictable events is not new. For example, the Federal Emergency Management Administration (FEMA) provides emergency resources for unexpected natural disasters.

An example of a quick response was the celebrity disclosure occurred when the Dallas County Health Department's (DCHD) HIV testing division took advantage of the expertise in media coverage given by Magic Johnson's announcement (and in another, too AIDS-related story). The DCHD was a designated HIV Demonstration Project for the CDC, specializing in training both the community and the media in a coordinated, measured effort to facilitate behavior change. A 14-day media campaign began with a press conference, announcing an additional effort to handle the increased number of calls Radio, television, and newspaper attention the new one biologically throughout the course of the campaign. Additionally, posters and handouts were produced which gave the new hotline number and HIV clinic information. Within the community people, specifically trained volunteers served as press liaisons to six specific neighborhoods. Health department outreach, along with community volunteers, distributed over 5000 posters and 12,000 handouts during the two-week period. The public's response was immediate. During a seven
day period of the campaign; media reports quadrupled, inquiries by street outreach teams went up 2½ times and requests for HIV clinic appointments at the DCHD rose by 62 percent (Krepsko, Semetker, Freeman, & Afaro, 1995). The success of the campaign was no doubt due to the Dallas County Department of Health’s planning, which allowed a timely response to the unexpected events. There is evidence to suggest that AIDS education can produce positive effects on an individual’s attitudes and even behaviors regarding high-risk sexual and drug-related activities (Jennett, Jennett, & Geffrey, 1992; Kelly, Hood, & Broder, 1989; Solomon & Delong, 1989). To the extent that this occurred for the “Magic and Cookie Johnson clients,” it is hoped that their disclosure and subsequent impact were more than superficial.

REFERENCES


