Cervical Cancer Screening Adherence Among HIV Positive Women at a Baltimore City HIV Clinic

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"On my honor, I pledge that I have neither given nor received any unauthorized help on this assignment." *-Mary McQuilkin*

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The Joint AIDS Community Quest for Unique and Effective Treatment Strategies (JACQUES) Initiative is a project of the Institute of Human Virology at the University of Maryland School of Medicine (The Institute of Human Virology, 2014). Founded in 2003, JACQUES was the first center in the U.S. to integrate basic research, epidemiology, and clinical research in an effort to discover diagnostics and therapeutics for deadly viral and immune disorders. JACQUES Initiative aims to provide holistic Human Immunodeficiency Virus (HIV) care for an urban population, delivered in a safe environment that addresses stigma. Services include case management, an integrated pharmacy, and observed therapy to increase medication adherence (The Institute of Human Virology, 2014).

The purpose of this paper is to provide an overview of HIV and Human Papilloma Virus (HPV) co-infection and how cervical cancer screening adherence is relevant to the community served by JACQUES Initiative. Data on JACQUES Initiative patients was collected and analyzed to determine if recommendations for cervical cancer screening are being met and to explore possible solutions to improve care delivery.

Background

HPV

HPV epidemiology. HPV is the most prevalent sexually transmitted infection, with a prevalence of up to one in four women globally (Belhadj, Rasanathan, Denny, & Broutet, 2013). Half of women in the U.S. will be infected with HPV at some point during their lifetimes (Lambert, 2013). Most women become infected shortly after sexual debut (Belhadj et al., 2013). Genital HPV infections are usually asymptomatic and resolve on their own within a few years in

healthy women (Lambert, 2013). There are more than 100 different HPV genotypes, 15 of which are known to cause cervical and other cancers (Belhadj et al., 2013). Globally, 70% of cervical cancer is caused by HPV types 16 and 18 (Belhadj et al., 2013).

In a heterosexual encounter in which one partner is infected with HPV, the risk of transmission is at least 20%, and can occur with nonpenetrative sex (Belhadj et al., 2013). Because of skin-to-skin transmission, condoms only provide partial protection from HPV. Circumcision of HIV negative men reduces the risk of HPV infection, although the same effect is not seen with men who are HIV positive (Belhadj et al., 2013).

Cervical cancer epidemiology. Risk of cervical cancer is increased with persistent HPV infection (Lambert, 2013). The average latency between HPV infection and development of cervical cancer is 20 years (Belhadj et al., 2013). In 2008, the global incidence of cervical cancer was 530,000, and the cervical cancer mortality was 275,000 (Belhadj et al., 2013). Of these cases, 80% occurred in developing countries (Lambert, 2013). Screening for cervical cancer is highly effective, with an incidence rate reduction of 60-90% seen with screening implementation in a naïve population within the first three years (USPSTF, 2012). Studies in Europe and North America have attributed a 20-60% decrease in cervical cancer mortality to widespread screening. In the U.S., the cervical cancer incidence rate is 6.6 per 100,000 women, with an age-adjusted mortality rate of 2.4 per 100,000. Incidence is higher among Black and Hispanic women, 10 and 11.1 per 100,000 respectively, compared to White women, who have an incidence rate of 7.4 per 100,000. Women age 35-55 are at highest risk. While cervical cancer is relatively rare, abnormal cytology is found on 3% of pap smears from low-income, underserved women (USPSTF, 2012).

In addition to being immunocompromised, other risk factors for HPV and cervical cancer include smoking, giving birth to three or more children, and using oral contraceptives for more

than five years (Lambert, 2013). Early stages of cervical cancer are typically asymptomatic, while late stage disease may cause vaginal bleeding between periods, after intercourse, with pelvic examinations, or bleeding after menopause (Lambert, 2013).

Screening. Papanikolaou (pap) smear is the most widely used cancer screening test (Chernecky & Berger, 2008). Epithelial cells are scraped from the uterine cervix for cytologic examination to identify atypical squamous cells of undetermined significance (ASCUS), mild, moderate, or severe dysplasia, low or high grade squamous intraepithelial lesion (SIL), cervical intraepithelial neoplasia (CIN), or carcinoma in situ. The test can either be done using the traditional glass slide with alcohol method or the newer liquid Pap method which removes mucus and debris from the scrapings to improve visualization under the microscope. HPV DNA can be tested for and typed using in situ hybridization if a pap smear is being done at the same time, or by serum sample (Chernecky & Berger, 2008).

There are a number of factors associated with cervical cancer screening compliance. Older age is associated with poor pap smear compliance, especially in women over age 50 (Lambert, 2013). This trend is seen across geographic regions in the U.S. and Canada. Interestingly, some studies of HIV positive women did not find that older women had lower adherence. For Black women, being HIV positive is associated with lower pap smear compliance, while being HIV negative is associated with higher compliance compared to White or Hispanic women. Women who smoke, currently or previously used drugs, or have less than a high school education are less likely to be compliant with cervical cancer screening recommendations. Lack of health insurance and inability to pay for services has been associated with poor pap smear compliance among HIV positive women, but studies of the general population have yielded

mixed results. HIV positive women with a CD4 count less than 200 cells/mm^3 have been found to be less likely to get a pap smear (Lambert, 2013).

Prevention. Two vaccines are available to prevent infection with HPV types 16 and 18 (Lambert, 2013). Gardasil is effective against HPV types that cause genital warts, while Cervarix is specific to types 16 and 18. The CDC recommends vaccination for youth 11-12 years old, with a minimum age of 9. Gardasil is licensed by the U.S. Food and Drug Administration for both males and females, while Cervarix is only licensed for females (Lambert, 2013).

HIV

Epidemiology. Globally, 15 million women are living with HIV, 11.8 million of whom are in Sub-Saharan Africa (Belhadj et al., 2013). About one fourth of the 1.1 million Americans living with HIV are women (Pantanowitz & Michelow, 2010). About 16% of Americans with HIV are unaware of their status (CDC, 2014). Of Americans newly infected with HIV in 2010, 44% were African American, 21% were Hispanic, and 31% were White. Of new transmissions, 63% were men who have sex with men (MSM), 25% were heterosexual contact, and 8% were injection drug use. Young MSM accounted for 72% of new infections, and 13-24 year olds accounted for 26% of new infections even though this age group is only 16% of the U.S. population. Incidence is highest in the Northeast, and rates are highest in large metropolitan areas. In Maryland, 428.1-3,365.2 per 100,000 people are living with HIV (CDC, 2014). The risk of HIV transmission per heterosexual encounter ranges from 2.5-4% (Belhadj et al., 2013). Male circumcision has been shown to reduce HIV incidence in men, which has an indirect effect on HIV incidence in women (Belhadj et al., 2013). The risk of acquiring HIV has increased for women in recent years because heterosexual contact is becoming a primary mode of transmission

(Pantanowitz & Michelow, 2010). African American women have a 1 in 32 chance of being diagnosed with HIV in their lifetime (CDC, 2014).

Pathophysiology. HIV eventually progresses to Acquired Immunodeficiency Syndrome (AIDS), and without antiretroviral treatment, the life expectancy is about ten years (Lambert, 2013). HIV replication compromises immune function by depleting CD4 lymphocytes (CDC, 2014). Opportunistic infections such as pneumocystis pneumonia, tuberculosis, and toxoplasma gondii encephalitis become common as CD4 cell count falls below 200 cells/mm^3 (CDC, 2014). In women, gynecological complaints in the form of candida vaginitis, menstrual disorders, or pelvic inflammatory disease are often the presenting symptoms (Pantanowitz & Michelow, 2010). People are most infectious during the acute phase of HIV, so early diagnosis and partner notification are important to decrease transmission (CDC, 2014).

Screening. HIV screening is typically done using conventional or rapid enzyme immunoassay (EIA) and positive results are confirmed using Western blot, indirect immunofluorescence, or a virologic test such as HIV-1 RNA assay (CDC, 2014). Within three months of infection, HIV antibody can be detected in greater than 95% of cases. The U.S. Preventive Services Task Force (USPSTF) recommends screening everyone age 15-65, with screening of individuals younger or older who are at an increased risk (CDC, 2014).

Treatment. Antiretroviral therapy is used to suppress viral replication, preserve immune function, and prevent opportunistic infections (Chisholm-Burns et al., 2010). A combination of three or more drugs is used to decrease the risk of developing resistance. Drug classes include nucleoside reverse transcriptase inhibitors, nonnucleoside reverse transcriptase inhibitors, nucleotide reverse transcriptase inhibitors, protease inhibitors, fusion inhibitors, CCR5 inhibitors, and integrase inhibitors. Therapy effectiveness is measured with CD4 lymphocyte absolute count

and percentage, and plasma HIV RNA. A rapid decline in HIV RNA is typically seen 16-24 weeks after initiation of therapy. In 80-90% of patients, regimens decrease HIV RNA to less than 50 copies/mL. Treatment is lifelong and adherence is vital to prevent resistance, but short-term interruptions may be unavoidable due to illness or drug toxicity (Chisholm-Burns et al., 2010).

HIV and HPV Co-Infection

Epidemiology. HIV positive women account for 70% of cervical cancer cases in the U.S. (Bynum et al., 2013). The risk of acquiring HPV and developing cervical cancer is 5-6 times higher in women with HIV (Belhadj et al., 2013). Co-infection with HIV and HPV is common in part because the two viruses share risk factors (Belhadj et al., 2013). Sexual contact is the most common route of transmission for both infections, and HIV positive women are at a higher risk of becoming infected with HPV due to their immunocompromised status (Lambert, 2013). The immune systems of HIV positive women are less able to clear HPV infections, so the risk of persistent HPV is increased (Lambert, 2013). This increases the risk of cancer development, and low-grade squamous intraepithelial lesions (SIL) progress to high-grade SIL more rapidly in women with HIV (Pantanowitz & Michelow, 2010). Compared to women without HIV, co-infected women develop invasive cervical cancer 10-15 years earlier (Pantanowitz & Michelow, 2010). Surprisingly, the increased CD4 counts seen with antiretroviral therapy are not associated with a slowed progression or decreased severity of HPV-related cancers (Belhadj et al., 2013). Cervical cancer is considered an AIDS-defining cancer in HIV positive women (Lambert, 2013).

Of women co-infected with HIV and HPV, up to 20% will develop a SIL of the cervix within three years of being diagnosed with HIV (Pantanowitz & Michelow, 2010). The presence of CIN is significant in co-infected women because it increases viral shedding of HIV (Pantanowitz & Michelow, 2010). Co-infected women with a CD4 count less than 200 cells/mm^3

are at risk of poor outcomes (Lambert, 2013). One study found that 90% of women with CD4 counts below 200 cells/mm^3 had recurrence of CIN after treatment (Pantanowitz & Michelow, 2010). This high rate of recurrence may be related to the high frequency of endocervical extension of CIN seen in HIV positive women (Pantanowitz & Michelow, 2010).

Screening. There is some evidence that the sensitivity and specificity of HPV testing is lower in HIV positive women compared to the general population (Pantanowitz & Michelow, 2010). This is likely related to the high prevalence of infection with oncogenic HPV types among HIV positive women. There is little consensus on how HPV testing should be used in HIV positive women. One study found it was most clinically beneficial and cost effective to do HPV testing along with two pap smears in the year following HIV diagnosis, and base the need for future testing on the results. If HPV testing was positive, pap smears were done every six months, compared to annually if HPV testing was negative (Pantanowitz & Michelow, 2010).

Incidence of abnormal pap smears is about 179 per 1000 person-years in HIV positive women, compared to 75 per 1000 person-years in HIV negative women (Pantanowitz & Michelow, 2010). There is some evidence that pap smears of HIV positive women have low positive predictive value and high rates of false negatives. One study found only one out of thirteen CIN found with colposcopically directed biopsy were detected by pap smear of the same women. Although, more recent studies have found no difference in pap smear positive predictive value based on HIV status. Overall, literature suggests false negative pap smear results are more likely in HIV positive women with CD4 counts <500 cells/mm^3 (Pantanowitz & Michelow, 2010). Women with an abnormal pap smear who are HIV positive are more likely than HIV negative women with abnormal pap smears to have CIN 2 or worse (Curry, Sage, Vragovic, & Stier, 2012). This indicates that minimally abnormal pap smear results are associated with worse

outcomes for HIV positive women. Of HIV positive women with mild cytologic atypia, one study found 38% had concomitant CIN, compared to 9% of HIV negative women. Similarly, a prospective natural history study of co-infected women found a CIN2+ prevalence of 31% on colposcopy, and a similar study found 32% of cervical cytology specimens from HIV positive women were abnormal. Of women with a CD4 count less than 200, only about one in four is likely to have a negative pap smear (Curry et al., 2012).

Prevention. While preliminary data on the safety of HPV vaccination of HIV positive women have been promising, the efficacy of vaccination is still not precisely known (Belhadj et al., 2013). While HPV can be spread through skin to skin contact, male latex condoms can reduce HPV transmission by 72% (Kaplan et al., 2009). Many HIV positive women do not receive pap screening or follow-up care in accordance with the CDC guidelines, which increases their risk of developing cervical cancer (Lambert, 2013).

Current Clinical Practice Guidelines

For women without HIV, the U.S. Preventive Services Task Force (USPSTF) (2012) and the American Congress of Obstetricians and Gynecologists (ACOG) (2012) recommend against screening women under age 21 or over 65 who are not at high risk for cervical cancer. HPV testing is not recommended for women younger than 30 (USPSTF, 2012). Women ages 21-30 should be screened using a pap smear every 3 years, and those 30-65 should receive a pap smear and HPV testing every 5 years (USPSTF, 2012; ACOG, 2012). Screening should be performed regardless of a woman's HPV vaccination status (USPSTF, 2012; ACOG, 2012). Women who have had a hysterectomy with removal of the cervix are not at risk for cervical cancer and should not be screened (USPSTF, 2012; ACOG, 2012).

Evidence-based HPV screening guidelines need to be modified to take into account the unique vulnerabilities of HIV positive women (Belhadj et al., 2013). While research on HPV in HIV positive women is ongoing, the World Health Organization is currently in the process of revising guidelines to emphasize the need to screen women presenting with HIV for HPV and vice versa. Revisions to guidelines include the need for cervical cancer screening to be integrated into sexual and reproductive health care (Belhadj et al., 2013). Currently, there are no clinical guidelines on HPV vaccination or HPV testing for triage of HIV positive women with normal cervical cytology (Kaplan et al., 2009).

For women with HIV, ACOG and the American Cancer Society (ACS) currently recommend annual pap smears for women 21-30, then every 2-3 years for women >30 if three consecutive pap tests have been negative (ACOG, 2012). The USPSTF recommends for HIV positive women to get two pap smears in the first year following HIV diagnosis, then annually if results are normal. If a pap smear result is ASCUS, low or high grade SIL, or worse, the woman should be referred for colposcopy (USPSTF, 2012). Because of studies reporting low accuracy of pap smears in HIV positive women and the rapid progression to cervical cancer seen with positive pap smears in this population, the British Society for Colposcopy and Cervical Screening recommends annual pap smears with colposcopy for HIV positive women (Pantanowitz & Michelow, 2010).

The British HIV Association recommends HIV positive women who receive abnormal pap smear results be referred for colposcopy (Pantanowitz & Michelow, 2010). ACOG and the Centers for Disease Control and Prevention (CDC) recommend colposcopy with directed biopsies for all HIV positive women who have an abnormal pap smear, regardless of viral load (Curry et al., 2012). The American Society for Colposcopy and Cervical Pathology (ASCCP)

recommends use of HPV testing to determine treatment, as is recommended for HIV negative women, but women with LSIL should be referred for colposcopy (Curry et al., 2012).

There is currently no evidence to support more aggressive treatment of HIV positive women with CIN (Pantanowitz & Michelow, 2010). CIN confirmed by tissue biopsy may be treated with ablative methods and excision. Because HIV positive women more frequently have incompletely excised endocervical margins related to glandular involvement, adjunctive therapy with topical 5-fluorourscil may be helpful in decreasing recurrence rates (Pantanowitz & Michelow, 2010).

Methods

An electronic chart review was conducted by searching the JACQUES Initiative database for the medical record number of each woman who received a pap smear in 2013. For each chart, age, race, date pap smear was done, and date pap smear was initially scheduled were recorded. This data was collected to determine if age and race were correlated with time delay from when the most recent pap smear was scheduled to when it was actually performed. The appointment list in each chart was visually scanned for pap smears or colposcopies scheduled from 2010-2013. For all pap smears and colposcopies, the date the procedure was done and the date it was originally scheduled were recorded and time delays were calculated. The number of times each procedure was cancelled, bumped, or the patient did not show up was also recorded. When an appointment is “bumped,” JACQUES Initiative moved the appointment because of their scheduling needs. When a patient did not arrive for their appointment or cancelled the appointment, this was recorded as “cancelled” or “no show.” Cancelled and no show appointments were grouped together to contrast delays the patient was responsible for, versus the organization. This data was separated by procedure to determine whether the delay differed for

pap smears and colposcopies. The same process was carried out for women who received pap smears in 2012, 2011, and 2010 to reach a sample of 99 women. Data from 2014 was not included because it is not a complete year.

Results

Patient Population Data

All patients seen by JACQUES Initiative are HIV positive (Rock, 2013). For the general patient population in 2013, transmission occurred through heterosexual contact for 42% of patients, 30% were MSM, 19% was through injection drug use, and 6% was either heterosexual contact or injection drug use. The 2013 patient population was 59% male, 39% female, and 2% transgender. Heterosexuals comprised 70% of the patient population, 21% were homosexual, and 8% were bisexual. The race composition was 11% White, 3% other, and 86% Black. Two percent of patients were 60-69 years old, 36% were 50-59 years old, 29% were 40-49 years old, 17% were 30-39 years old, 15% were 20-29 years old, and 1% were 13-19 years old. More than 42% had less than a 12^{th} grade education, 37% had a GED or high school diploma, 18% had some college or an associate's degree, and 3% had a bachelor's degree. About 46% were unemployed on disability, 29% were unemployed not on disability, 12% were employed part time, and 13% were employed full time (Rock, 2013).

In 2013, 220 different women were seen at JACQUES Initiative (Rock, 2013). In 2012, 267 were seen, in 2011, 282 were seen, and in 2010, 197 were seen. Of those seen in 2013, 74% had a history of substance abuse, 60% had a mental health diagnosis, 51% lacked permanent housing, and 84% did not have health insurance. Some women who receive HIV care at JACQUES Initiative see a gynecologist at an external agency, so the number of women who received pap smears at JACQUES Initiative may underestimate the rate of pap smears in the

patient population. Pap smears are done by a nurse practitioner on site, but women who need a colposcopy are given a referral to University of Maryland Women's Center (Rock, 2013).

Cervical Cancer Screening Procedures

The clinic was recently relocated from the University of Maryland Medical Center campus to Midtown. At the old building, they had a student every semester who put pink sticky notes on charts that needed to schedule a pap smear. JACQUES Initiative recently switched to Epic electronic health records system (EHR), but there is no specific reminder system for pap smears set up yet. A medical assistant (MA) is supposed to call to remind patients about appointments because there is no automated appointment reminder system. If a patient fails to arrive for an appointment, they are called two or three times. If the patient is not heard from, they are referred to an external agency that does street outreach (A. Rock, personal communication, June 5, 2014).

Before an appointment, a MA is supposed to do a chart audit to see what health maintenance is overdue. Ideally, MAs should enter health maintenance data into the EHR before patients are seen by the provider, but this has not always been done consistently due to their other work demands. If data such as when they received a pap smear last is not entered, there is no EHR reminder for providers that a pap smear needs to be done. A registered nurse was hired in June 2014 to work on increasing compliance with documentation including health maintenance required by the clinic's funders, Ryan White, and Centers for Medicare and Medicaid Services (CMS) (A. Rock, personal communication, June 5, 2014).

Chart Review

The records of 99 unique women who received a pap smear at JACQUES Initiative in 2010, 2011, 2012, or 2013 were reviewed (see Appendix A for spreadsheet data). The age range

was 24-64, with a median of 47 and mean age of 45.5. African Americans made up 91.9% of the sample and 6.1% were White. There was one French-Speaking African and one Hispanic woman.

In addition to being a group of HIV positive women in a country with a prevalence among women of about 2%, the sample differs in several ways from the general population (U.S. Census Bureau, 2014). The U.S. is 13.1% Black and 77.9% White, while the sample was 91.9% Black and 6.1% White. More than 85% of U.S. adults had a high school diploma or GED in 2009, compared to 57% of the sample. Over 28% of the U.S. had a bachelor's degree or higher, compared to 3% of the sample. The mean age of women in the U.S. is 38.9, while the mean age of the sample was 45.5 (U.S. Census Bureau, 2014). The sample also had high rates of substance abuse, mental illness, and homelessness. All of these demographic differences have been shown in some cases to impact adherence to cervical cancer screening guidelines. Of uninsured U.S. women age 30-64 who had not had a hysterectomy, 68.7% had not received a pap smear in the past three years (CDC, 2013). Because 84% of the women seen by JACQUES Initiative in 2013 were uninsured, women in the sample are high risk for not getting pap smears in accordance with guidelines.

Data on 187 completed procedures was extracted from the charts of the 99 women. Both pap smears and colposcopies were included, even though the colposcopies were completed at University of Maryland Medical Center Women's Center, an affiliate of JACQUES Initiative. Of the pap smear appointments scheduled, 46.1% did not take place on the scheduled day. Of the colposcopies, 42.3% did not take place on the scheduled day. This comparison was of interest both to see if women were more likely to delay getting a colposcopy compared to a pap smear due to fear of a more invasive procedure, or if additional delays were created by not offering colposcopies on-site. Neither of these hypotheses are supported by the data (Figure 1).

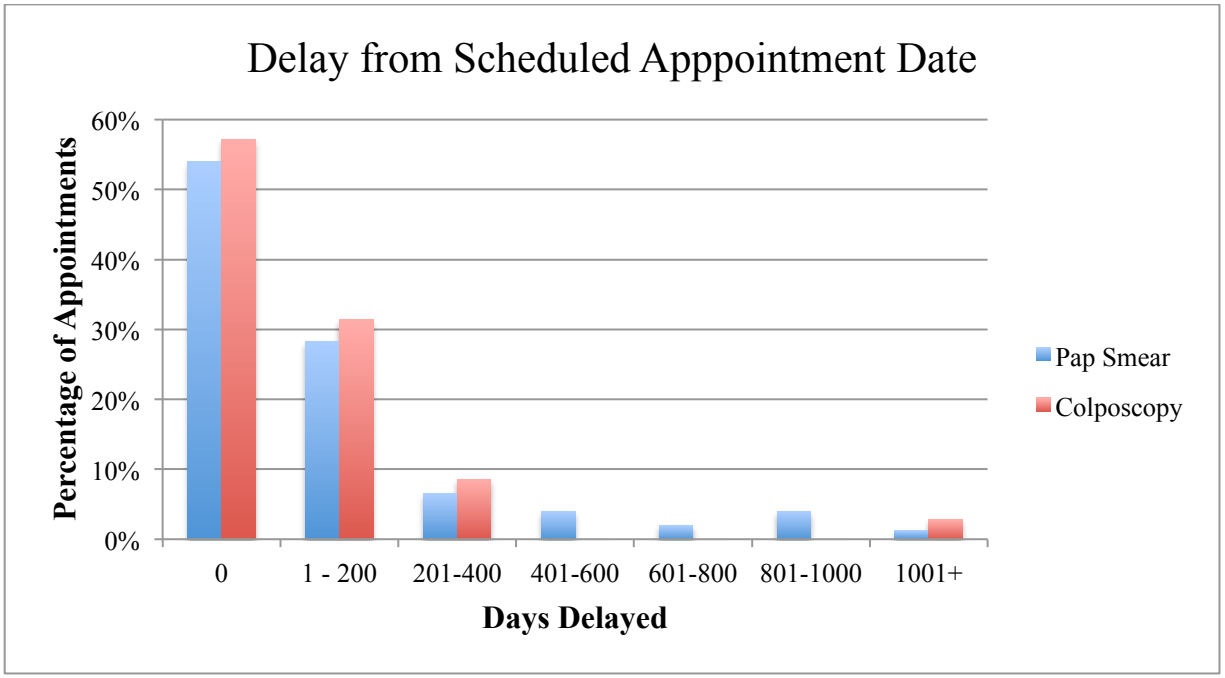

Figure 1. Delay between date procedure was scheduled and date completed.

The average delay between when the appointment was scheduled to when the procedure was completed was 125.8 days for pap smears and 73.4 days for colposcopies. Having an appointment delay of 1-200 days was common, especially for pap smears (Figure 1). This is likely an area that could be targeted for improvement to increase adherence with recommended screening guidelines. It is important to note that patients who missed or cancelled multiple appointments and never had the procedure done were not included in this data set because each data point started with a procedure that was actually completed.

Interestingly, the percentage of procedures that were delayed from the original appointment date is comparable between pap smears and colposcopies. On the other hand, the length of the delay is much larger for pap smears compared to colposcopies. This implies that JACQUES Initiative has been successful in prioritizing the more clinically important procedures, assuming that colposcopies are being scheduled due to abnormal pap smear results.

Data on appointments that were bumped, cancelled, or no show were grouped by race of the patient, then by age to look for trends. Because nearly all of the patients were Black, it could not be determined whether there were any correlations between patient race and delay between date appointment was scheduled and date the procedure was completed.

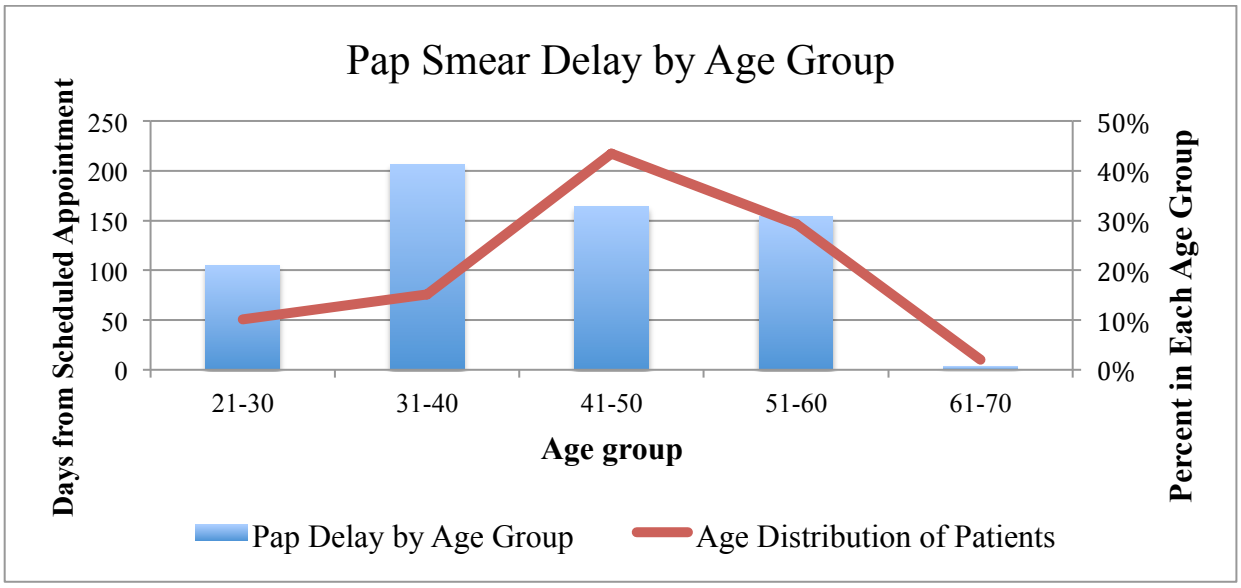

Figure 2. Delay from scheduled pap smear to completed date by age.

When patient age is broken into quintiles of equal length to look at pap smear delay from scheduled appointment by age group (Figure 2), the 31-40 year olds have an average delay of over 200 days, compared to almost no delay for the 61-70 year olds. The 61-70 year old category was a very small sample, only two women, so they may not be representative of all women in this age group. The next lowest average delay was the 21-30 year olds, with a sample size of 10, so this also may be an artifact from small sample size rather than a true difference.

When age is broken into quintiles to graph type of appointment delay, the 20-30 year olds have a disproportionate percentage of bumped appointments for their share of the patient population (Figure 3). Because a bumped appointment occurs when JACQUES Initiative has double booked or there are insufficient providers, and a staff member decides which patient to

reschedule, this difference may represent bias based on age. It appears that younger patients are bumped more frequently than older ones, which may be medically appropriate if younger patients are lower risk. Women age 41-50 have a lower proportion of bumped appointments for their share of the patient population (Figue 3). Women age 35 to 55 are at highest risk of developing cervical cancer (USPSTF, 2012), so it does appear that JACQUES Initiative has been successful in prioritizing screening for those at highest risk. The 61-70 year old quintile has a very low rate of cancelled and no show appointments (Figure 3). This could mean that older women in this population are more likely to keep scheduled appointments, but the sample size is small, so their data may not be representative of the larger patient population.

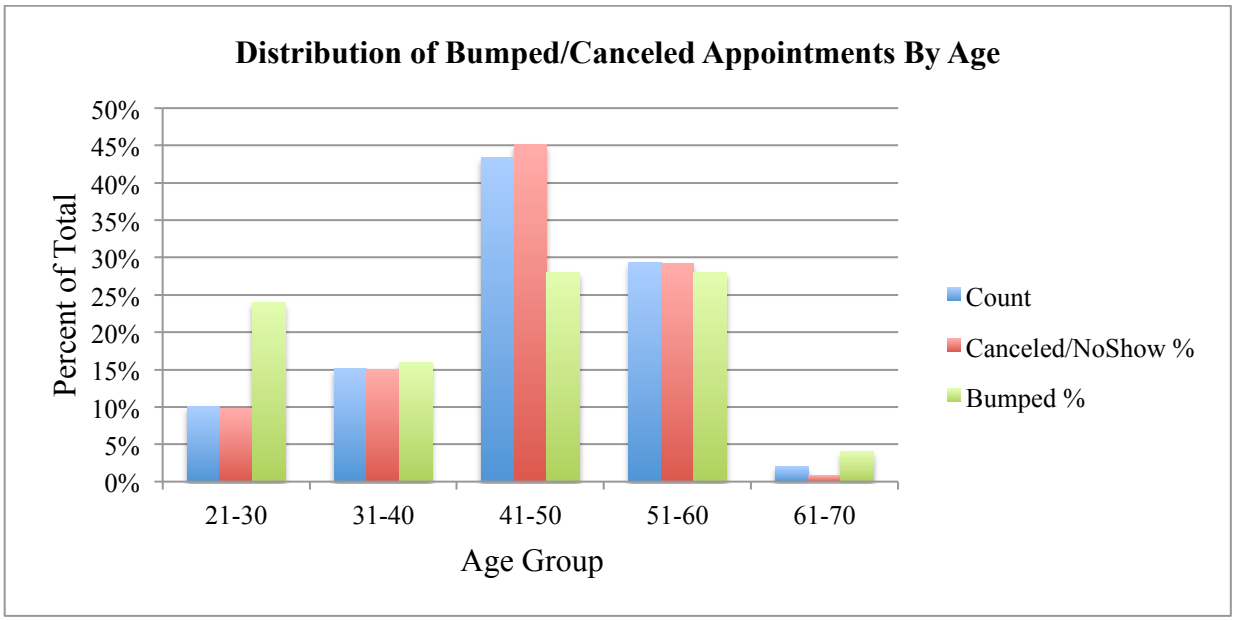

Figure 3. Distribution of appointments that were bumped or cancelled by age.

None of the 21-30 year olds received an annual pap smear in accordance with ACOG (2012) guidelines. Two pap smears were done for 20% of the 21-30 year olds, and 80% received one pap smear across the four years. It is possible that some women had pap smears at external agencies while receiving HIV care at JACQUES Initiative, so these data may underestimate compliance with screening guidelines. Of the women over age 30, 3% had an annual pap smear,

16% had three pap smears, 27% had two pap smears, and 54% had one pap smear from 2010-2013. The 46% of women who received one pap smear during the four years may be compliant with guidelines if they had a pap smear in 2009 or 2014. Results of pap smears were not collected for this chart review, so it cannot be determined whether cases of pap smear frequency exceeding the recommendations were clinically warranted. Based on these data, it appears that women who ever received a pap smear are being screened at least as frequently as recommended. The possibility remains that some women who receive HIV care at JACQUES Initiative may not be getting cervical cancer screening at all, so they would not have been included in the data set.

Implications for Clinical Practice

Women should receive two pap smears in the year following HIV diagnosis, and a pap smear annually thereafter if results are negative (USPSTF, 2012; Bynum et al., 2013). A colposcopically directed cervical biopsy should be performed if a pap smear is positive (Kaplan et al., 2009). Co-infected women should be counseled that their antiretroviral therapy will not control their HPV infection so they will need regular screening to prevent cervical cancer (Belhadj et al., 2013). Women who test positive for cervical cancer or HPV should be screened for HIV and vice versa (Belhadj et al., 2013). HIV and cervical cancer screening should be integrated into sexual and reproductive healthcare along with information on contraceptives and other sexually transmitted infections (Belhadj et al., 2013). The International Federation of Gynecology and Obstetrics recommends promoting health information systems to track patients from HPV vaccination to screening and treatment (Belhadj et al., 2013).

Implications for Public Health

Pap smears have been a great public health success, with a 70% decline in cervical cancer mortality in the U.S. since the 1950s (Daley et al., 2013). Morbidity and mortality from cervical

cancer have also been reduced by HPV vaccination and testing. Despite these successes, knowledge of HPV and cervical cancer remains low. Beliefs that pap smears test for vaginal infections, gonorrhea, herpes, HIV, and pregnancy are common. Women have reported needing more information about prognosis of pap smear results, the meaning and consequences of abnormal pap smears, the purpose of pap smears, and other women's health conditions. Confusion about pap smears may negatively impact reproductive health if women think they do not need additional testing for other reproductive issues if they get a pap smear. Clear and consistent communication is needed to ensure women know the purpose, meaning, timing, and consequences of cervical cancer screening. Health communication is critical to empower high-risk women to take control of their reproductive health (Daley et al., 2013).

Health information needs to be communicated in a way that is culturally competent and easy for women to understand. Low health literacy is a barrier for 25-30% of people with HIV and is associated with low rates of screening utilization, low levels of cancer awareness, and low rates of follow-up care (Bynum et al., 2013). About 23% of HIV positive women do not receive annual pap smears, and only 25-36% of women report having been tested twice in the year following their HIV diagnosis (Bynum et al., 2013).

Role of the Advanced Practice Public Health Nurse Practitioner

Advanced practice public health nurses can fill a unique role in addressing cervical cancer screening among HIV positive women by aligning clinical practice with public health communication and policy. By using EHR systems to collect cervical cancer screening records from individuals and populations, *Domain 1;4* of the Public Health Nursing Competencies is addressed (The Quad Council of Public Health Nursing Organizations [Quad Council], 2011). Using population-level data in conjunction with epidemiologic data and research on cervical

cancer screening outcomes allows for development of quality improvement strategies, which addresses *Domain 2;12*. Disseminating information about cervical cancer screening in a culturally competent manner addresses *Domain 3;4* and *Domain 4;7*, respectively. *Domain 5;10* is addressed by advocating for policy change to increase access to cervical cancer screening for populations of high risk women, such as those with HIV (Quad Council, 2011).

The nurse practitioner (NP) independent practice competency is addressed by providing "health promotion, disease prevention, health protection, anticipatory guidance, counseling, and disease management" to individuals (The National Organization of Nurse Practitioner Faculties [NONPF], 2012). NPs also provide evidence-based, patient centered care that recognizes cultural diversity. For example, NPs should talk with every HIV positive woman about cervical cancer screening and ensure that they understand the purpose of pap smears and how often they should be screened. Developing "new practice approaches based on the integration of research, theory, and practice knowledge" addresses the *Scientific Foundation Competency* (NONPF, 2012).

Recommendations

An automated appointment reminder system should be created so patients can choose to receive a phone call, letter, email, or text message about their upcoming appointment. This has been shown to be an effective strategy for increasing cervical cancer screening rates (The Community Guide, 2012). Automating this process using the EHR system would take the burden off of MAs and improve consistency of communication.

Media distributed both to individuals and the public can increase cervical cancer screening (The Community Guide, 2012). For the Baltimore City HIV positive community, radio advertisements and posters in bus shelters and in waiting rooms may be effective. Media should focus on what pap smears are for and why cervical cancer is important (Daley et al., 2013).

With the passage of the Affordable Care Act, coverage of cervical cancer screening tests is now mandated. The majority of women seen by JACQUES Initiative in 2013 were still uninsured, so it may be helpful to refer them to healthcare.gov if they have internet access or to Maryland Health Connection (Maryland Health Connection, 2014). Supporting policy that increases access to cervical cancer screening and spreading awareness about how to access services would be helpful to increase screening.

Assessing providers' success rates for screening patients for cervical cancer has been shown to be an effective way to increase screening (The Community Guide, 2012). For JACQUES Initiative, it also may be beneficial to improve the scheduling system to decrease the rate of bumped patient appointments. Adding automated reminders to the EHR so providers are alerted when a woman is due for a pap smear has been shown to increase screening (The Community Guide, 2012). This can be done in EPIC by completing the "health maintenance" section for each patient and updating it at every visit.

Conclusion

With HPV vaccination, screening, treatment, and follow-up care, HPV-related cancers can be prevented (Belhadj et al., 2013). HIV positive women are at high risk for cervical cancer, especially low-income African American women such as those served by JACQUES Initiative. By implementing a more comprehensive patient reminder system for appointments and adding overdue pap smear reminders to the EHR to alert providers, JACQUES Initiative may be able to improve patient adherence to cervical cancer screening guidelines for HIV positive women. Additionally, a public health communication campaign focused on the importance of cervical cancer screening and the purpose of pap smears may be an effective intervention at the population level.

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Appendix A

Chart Review Data from JACQUES Initiative Patients Who Received Pap Smears 2010-2013

Table A1

Data By Individual Patient: Pap Smears

ID #	#Times Bumped	# Cancelled	# No Show	Race	Age	# Paps 2010	# Paps 2011	# Paps 2012	# Paps 2013	Total Paps 2010-2013	Most Recent Pap	Original Pap Date	Pap Delay
1		4		AA	60				2	2	12/6/13	12/6/13	0
2	2	2		AA	55				1	1	2/8/13	10/14/11	483
3		1		AA	49		1		1	2	12/8/13	5/13/11	940
4		1		AA	43		2		1	3	1/11/13	12/7/12	35
5		3	3	AA	42		2		1	3	5/24/13	5/17/13	7
6				AA	45				2	2	7/19/13	7/19/13	0
7			2	AA	45			1	1	2	8/16/13	8/16/12	365
8	1		2	AA	42				1	1	7/19/13	7/22/11	728
9				AA	55				1	1	10/18/13	10/18/13	0
10		1		W	35		1	1	1	3	6/14/13	4/19/13	56
11		2		AA	58		1	1	1	3	6/14/13	6/14/13	0
12			2	AA	60				1	1	5/24/13	3/15/13	70
13				AA	27				1	1	1/11/13	1/11/13	0
14	1			AA	46				1	1	5/24/13	11/15/13	-175
15		2		AA	24				1	1	8/16/13	8/16/13	0
16			1	AA	39				1	1	3/15/13	7/20/12	238
17			2	AA	52				1	1	6/21/13	4/22/11	791
18				AA	41				1	1	6/21/13	6/21/13	0
19		2	1	AA	48		1		1	2	9/20/13	4/15/11	889
20		1	1	AA	37				1	1	8/16/13	1/15/10	1309
21				AA	46				1	1	7/26/13	7/26/13	0
22		1		AA	49		1		1	2	3/15/13	2/8/13	35
23	1	1	2	AA	50		2	1	1	4	12/6/13	11/15/13	21
24			2	AA	50				1	1	4/19/13	3/15/13	35
25				AA	40				1	1	10/18/13	10/18/13	0
26			3	AA	54				1	1	8/16/13	3/15/13	154
27		2	1	AA	53			1	1	2	7/19/13	2/8/13	161
28				AA	49		1		1	2	1/11/13	1/11/13	0
29	1		1	AA	32				1	1	6/21/13	11/14/11	585
30		1	1	AA	32				1	1	10/18/13	6/14/13	126
31				AA	37	no data			1	1	9/20/13	9/20/13	0
32				AA	48				1	1	7/19/13	7/19/13	0
33			1	AA	44	1	1		1	3	10/18/13	8/24/12	420
34				AA	50		1	1	1	3	7/19/13	7/19/13	0
35		3	1	AA	54				1	1	1/11/13	8/13/10	882
36	1			AA	55		1		1	2	1/11/13	1/11/13	0

37	1	2	1	AA	28	1			1	2	1/11/13	12/23/11	385
38				AA	47			1	1	2	7/26/13	7/26/13	0
39			1	AA	27				1	1	10/18/13	9/20/13	28
40			1	AA	54				1	1	10/18/13	10/15/10	1099
41		1	2	AA	46		1		1	2	10/18/13	9/20/13	28
42	1			AA	35				1	1	12/6/13	11/15/13	21
43				African (French)	52				1	1	1/11/13	1/11/13	0
44				AA	47				1	1	9/20/13	9/20/13	0
45				AA	59				1	1	8/16/13	8/16/13	0
46	1	1		AA	64	1					11/19/10	11/12/10	7
47				AA	63	1					10/15/10	10/15/10	0
48				AA	58		1	1	1		6/14/13	5/1/13	44
49				AA	57		1				10/28/11	10/28/11	0
50	2	1		AA	55	1			1		2/8/13	10/14/11	483
51	1			AA	55		2		1		1/11/13	1/11/13	0
52		1		AA	55		1	1			8/24/12	8/24/12	0
53			1	AA	55		1				4/22/11	4/22/11	0
54		1		AA	54		1				7/8/11	7/8/11	0
55				AA	54	1	1				5/13/11	5/13/11	0
56	1			AA	54	1					3/12/10	8/14/09	210
57				AA	53		1				2/11/11	2/11/11	0
58		1	1	AA	53		1	1			12/7/12	11/9/12	28
59				AA	52	1	1				3/25/11	3/25/11	0
60		1		AA	51			1			11/9/12	10/19/12	21
61				AA	51		1				2/25/11	2/25/11	0
62		2		AA	51	1					8/13/10	8/6/10	7
63		1		AA	51			1			11/9/12	10/19/12	21
64	1	1	2	AA	50		2	1	1		12/6/13	11/15/13	21
65	1			AA	50		1				7/29/11	7/22/11	7
66				AA	50		1	1	1		7/19/13	7/19/13	0
67				AA	49		1		1		1/1/13	1/1/13	0
68				AA	49			1			12/7/12	12/7/12	0
69	1		1	AA	49		1		1		12/20/13	12/20/13	0
70		3		AA	49	1	1				2/25/11	2/25/11	0
71			1	AA	49		1				3/11/11	6/11/10	273
72		1		AA	49		1		1		3/15/13	2/8/13	35
73		1	1	AA	49		1		1		9/20/13	4/15/11	889
74				AA	47		1	1	1		7/26/13	7/26/13	0
75				AA	47	1	1				5/27/11	5/27/11	0
76				AA	47		1				1/14/11	1/14/11	0
77		2	1	AA	46		2		1		10/18/13	3/25/11	938
78		1	1	AA	46	1					6/11/10	5/13/10	29
79	1	1		AA	46	1					10/15/10	10/15/10	0
80				AA	44		1	1			12/7/12	12/7/12	0
81			1	AA	44	1	1		1		10/18/13	8/24/12	420

82			1	AA	44		1				6/10/11	12/10/10	182
83		1	2	W	43		1				6/10/11	12/10/10	182
84		1		AA	43		2		1		1/11/13	12/7/12	35
85			1	AA	43		1				8/26/11	9/11/09	714
86		1	1	AA	42		2		1		5/24/13	5/17/13	7
87				H	40	1					10/15/10	10/15/10	0
88	1	2	4	AA	38		1				9/23/11	11/19/10	308
89				W	37	1		1			8/24/12	8/24/12	0
90		2		W	35	1	1	1	1		6/14/13	4/19/13	56
91	1			AA	33		1				7/29/11	7/22/11	7
92		1		W	33	1					5/13/10	5/14/10	-1
93			1	AA	32	1					4/9/10	3/13/09	392
94	1	1	1	AA	28	1			1		1/11/13	12/23/11	385
95				W	26		1				8/5/11	8/5/11	0
96	1			AA	25		1				6/10/11	6/10/11	0
97	1			AA	25			1			8/24/12	12/16/11	252
98	1	1		AA	25			1			7/20/12	7/20/12	0
99	1	1	1	AA	24		1				2/11/11	2/11/11	0

Note. For readability, zero was represented by a blank cell.

Table A2

Data By Individual Patient: Colposcopies

ID #	Race	Age	# Colp 2010	# Colp 2011	# Colp 2012	# Colp 2013	Total Colp 2010-2013
1	AA	60					0
2	AA	55					0
3	AA	49					0
4	AA	43					0
5	AA	42				2	2
6	AA	45				1	1
7	AA	45					0
8	AA	42					0
9	AA	55					0
10	W	35					0
11	AA	58		1	3		4
12	AA	60					0
13	AA	27					0
14	AA	46					0
15	AA	24		2			2
16	AA	39		1		1	2
17	AA	52					0
18	AA	41					0
19	AA	48					0
20	AA	37					0
21	AA	46					0
22	AA	49					0
23	AA	50					0
24	AA	50	1				1
25	AA	40					0
26	AA	54					0
27	AA	53					0
28	AA	49					0
29	AA	32					0
30	AA	32					0
31	AA	37	no data				0
32	AA	48					0
33	AA	44					0
34	AA	50					0
35	AA	54		2			2
36	AA	55					0
37	AA	28					0
38	AA	47					0
39	AA	27					0
40	AA	54				1	1

41	AA	46					0
42	AA	35	no data				0
43	African (French)	52				1	1
44	AA	47	no data	no data			0
45	AA	59	no data	no data	no data		0
46	AA	64			1		1
47	AA	63					0
48	AA	58		1	1		2
49	AA	57					0
50	AA	55					0
51	AA	55					0
52	AA	55					0
53	AA	55		2			2
54	AA	54		2			2
55	AA	54					0
56	AA	54		1		1	2
57	AA	53		1			1
58	AA	53		1			1
59	AA	52					0
60	AA	51					0
61	AA	51		1			1
62	AA	51					0
63	AA	51					0
64	AA	50					0
65	AA	50					0
66	AA	50					0
67	AA	49					0
68	AA	49					0
69	AA	49					0
70	AA	49					0
71	AA	49					0
72	AA	49					0
73	AA	49					0
74	AA	47					0
75	AA	47		1			1
76	AA	47					0
77	AA	46					0
78	AA	46					0
79	AA	46					0
80	AA	44		1			1
81	AA	44					0
82	AA	44		1			1
83	W	43		1			1
84	AA	43					0
85	AA	43					0

86	AA	42				2	2
87	H	40					0
88	AA	38					0
89	W	37				1	1
90	W	35					0
91	AA	33					0
92	W	33					0
93	AA	32					0
94	AA	28	1				1
95	W	26					0
96	AA	25		1			1
97	AA	25					0
98	AA	25					0
99	AA	24					0

Note. For readability, zero was represented by a blank cell.

Table A3

Appointment Delay Data By Procedure: Pap Smears and Colposcopies

Procedure #	Procedure	Actual Date	Original Schedule Date	Time Delay	No Show/ Cancel Count	Bumped Count
1	pap	12/6/13	12/6/13	0		
2	pap	8/16/13	8/16/13	0		
3	pap	2/8/13	10/14/11	483	2	2
4	pap	12/8/13	5/13/11	940	1	
5	pap	2/25/11	2/25/11	0		
6	pap	1/11/13	12/7/12	35	1	
7	pap	12/9/11	12/9/11	0		
8	pap	1/14/11	1/14/11	0		
9	colp	9/30/13	7/29/13	63	3	
10	colp	7/22/13	7/22/13	0		
11	pap	5/24/13	5/17/13	7	1	
12	pap	5/13/11	3/11/11	63	1	
13	pap	1/14/11	1/14/11	0		
14	pap	7/19/13	7/19/13	0		
15	colp	6/10/13	6/10/13	0		
16	pap	4/19/13	4/19/13	0		
17	pap	8/16/13	8/16/12	365	2	
18	pap	7/9/12	7/9/12	0		
19	pap	7/19/13	7/22/11	728	2	1
20	pap	10/18/13	10/18/13	0		
21	colp	7/5/12	7/26/12	0	1	
22	pap	11/19/10	11/12/10	7	1	
23	pap	10/15/10	10/15/10	0		
24	colp	10/21/13	10/21/13	0		
25	pap	6/14/13	5/1/13	44	1	
26	colp	11/19/12	11/26/12	0	1	
27	pap	7/20/12	7/20/12	0		
28	colp	5/23/11	5/23/11	0		
29	pap	3/25/11	3/25/11	0		
30	pap	10/28/11	10/28/11	0		
31	pap	2/8/13	10/14/11	483	3	2
32	pap	1/11/13	1/11/13	0		
33	pap	12/9/11	12/9/11	0		
34	pap	7/29/11	7/22/11	7		1
35	pap	8/24/12	8/24/12	0		
36	colp	8/18/11	8/18/11	0		
37	colp	7/28/11	7/25/11	3		1
38	pap	4/22/11	4/22/11	0		
39	pap	7/8/11	7/8/11	0		
40	colp	9/22/11	9/22/11	0		

41	colp	9/8/11	9/8/11	0		
42	pap	5/13/11	5/13/11	0		
43	pap	7/9/10	7/9/10	0		
44	colp	6/3/13	3/4/13	91	2	
45	pap	3/12/10	8/14/09	210		
46	pap	2/11/11	2/11/11	0		
47	colp	3/31/11	3/31/11	0		
48	pap	12/7/12	11/9/12	28	1	
49	colp	8/11/11	8/11/11	0		
50	pap	5/27/11	5/27/11	0		
51	pap	3/25/11	3/25/11	0		
52	pap	4/9/10	4/9/10	0		
53	pap	11/9/12	10/19/12	21	1	
54	colp	4/11/11	7/13/10	272	1	
55	pap	2/25/11	2/25/11	0		
56	pap	8/13/10	8/6/10	7	1	
57	pap	11/9/12	10/19/12	21	1	
58	pap	12/6/13	11/15/13	21		1
59	pap	11/9/12	7/20/12	112	2	
60	pap	8/5/11	8/5/11	0		
61	pap	1/14/11	8/13/10	154	1	
62	pap	7/29/11	7/22/11	7		1
63	pap	7/19/13	7/19/13	0		
64	pap	7/20/12	7/20/12	0		
65	pap	1/1/13	1/1/13	0		
66	pap	5/13/11	5/13/11	0		
67	pap	12/20/13	12/20/13	0		
68	pap	4/15/11	12/10/10	126	1	
69	pap	2/19/10	2/12/10	7	2	
70	pap	3/11/11	6/11/10	273	1	
71	pap	3/15/13	2/8/13	35	1	
72	pap	10/14/11	10/14/11	0		
73	pap	9/20/13	4/15/11	889	1	
74	pap	3/25/11	2/11/11	42	2	
75	pap	7/26/13	7/26/13	0		
76	pap	7/20/12	7/20/12	0		
77	pap	5/27/11	5/27/11	0		
78	colp	8/4/11	10/12/10	296	1	
79	pap	6/10/11	6/10/11	0		
80	pap	10/18/13	3/25/11	938	2	
81	pap	3/11/11	12/10/10	91	1	
82	pap	10/18/13	8/24/12	420	1	
83	pap	7/8/11	7/8/11	0		
84	pap	3/12/10	3/13/09	364	2	
85	colp	9/8/11	8/11/11	28	1	
86	pap	6/10/11	12/10/10	182	1	
87	pap	12/7/12	12/7/12	0		

88	pap	1/14/11	1/14/11	0		
89	pap	6/11/10	5/13/10	29	1	
90	pap	10/15/10	10/15/10	0		
91	pap	12/7/12	12/7/12	0		
92	colp	10/13/11	10/13/11	0		
93	pap	8/5/11	8/5/11	0		
94	colp	9/8/11	8/11/11	28	1	
95	pap	6/10/11	12/10/10	182	1	
96	pap	1/11/13	12/7/12	35	1	
97	pap	12/9/11	12/9/11	0		
98	pap	1/14/11	6/8/09	585	4	
99	pap	8/26/11	9/11/09	714	3	
100	colp	9/30/13	8/5/13	56	2	
101	colp	7/22/13	7/22/13	0		
102	pap	5/24/13	5/17/13	7	1	
103	pap	5/13/11	5/13/11	0		
104	pap	1/14/11	1/14/11	0		
105	pap	10/15/10	10/15/10	0		
106	pap	9/23/11	11/19/10	308	4	
107	colp	2/11/13	11/12/12	91	2	
108	pap	8/24/12	8/24/12	0		
109	pap	1/8/10	5/8/09	245	2	
110	pap	6/14/13	4/19/13	56	2	
111	pap	7/20/12	7/20/12	0		
112	pap	4/22/11	4/22/11	0		
113	pap	9/10/10	9/10/10	0		
114	pap	7/29/11	7/22/11	7		1
115	pap	5/13/10	5/14/10	0	1	
116	pap	4/9/10	3/13/09	392	5	
117	pap	1/11/13	12/23/11	385	1	1
118	pap	10/15/10	8/6/10	70	2	
119	colp	11/29/10	11/29/10	0		
120	pap	8/5/11	8/5/11	0		
121	colp	8/11/11	6/27/11	45	2	
122	pap	6/10/11	6/10/11	0		
123	pap	8/24/12	12/16/11	252		1
124	pap	7/20/12	7/20/12	0		
125	pap	2/11/11	2/11/11	0		
126	colp	10/22/12	10/22/12	0		
127	colp	10/8/12	9/10/12	28	1	
128	pap	7/20/12	7/20/12	0		
129	colp	5/23/11	5/23/11	0		
130	pap	3/25/11	3/25/11	0		
131	pap	5/24/13	3/15/13	70	2	
132	pap	1/11/13	1/11/13	0		
133	pap	5/24/13	11/15/12	190		1
134	pap	8/16/13	8/16/13	0		

135	colp	11/29/11	11/15/11	14	2	
136	colp	7/12/11	7/12/11	0		
137	pap	3/15/13	3/15/13	0		
138	colp	6/17/13	7/20/12	332	1	
139	colp	3/8/11	3/8/11	0		
140	pap	6/21/13	4/22/11	791	2	
141	pap	6/21/13	6/21/13	0		
142	pap	9/20/13	4/15/11	889	1	
143	pap	3/25/11	2/11/11	42	2	
144	pap	8/16/13	1/15/10	1309	2	
145	pap	7/26/13	7/26/13	0		
146	pap	3/15/13	2/8/13	35	1	
147	pap	10/14/11	10/14/11	0		
148	pap	12/6/13	11/15/13	21		1
149	pap	11/9/12	7/20/12	112	2	
150	pap	8/5/11	8/5/11	0		
151	pap	1/14/11	8/13/10	154	1	
152	pap	4/19/13	4/19/13	0		
153	colp	9/23/13	9/28/10	1091	2	
154	pap	10/18/13	10/18/13	0		
155	pap	8/16/13	3/15/13	154	3	
156	pap	7/19/13	2/8/13	161	1	
157	pap	12/7/12	11/9/12	28	1	
158	pap	1/11/13	1/11/13	0		
159	pap	5/13/11	5/13/11	0		
160	pap	6/21/13	11/14/11	585	1	
161	pap	10/18/13	6/14/13	126	1	
162	pap	9/20/13	9/20/13	0		
163	pap	7/19/13	7/19/13	0		
164	pap	10/18/13	8/24/12	420	1	
165	pap	7/8/11	7/8/11	0		
166	pap	3/12/10	3/12/10	0		
167	pap	7/19/13	7/19/13	0		
168	pap	7/20/12	7/20/12	0		
169	pap	3/25/11	3/25/11	0		
170	pap	1/11/13	8/13/10	882	3	
171	colp	5/16/11	12/28/10	139	2	
172	pap	1/11/13	1/11/13	0		
173	pap	12/9/11	7/22/11	140		1
174	pap	1/11/13	12/23/11	385	1	1
175	pap	10/15/10	8/6/10	70	2	
176	pap	7/26/13	7/26/13	0		
177	pap	7/20/12	7/20/12	0		
178	pap	10/18/13	9/20/13	28	1	
179	colp	11/26/13	11/26/13	0		
180	pap	10/18/13	10/15/10	1099	1	
181	pap	10/18/13	3/25/11	938	2	

182	pap	3/11/11	12/10/10	91	1	
183	pap	12/6/13	11/15/13	21		1
184	pap	1/11/13	1/11/13	0		
185	colp	3/25/13	3/25/13	0		
186	pap	9/20/13	9/20/13	0		
187	pap	8/16/13	8/16/13	0		

Note. For readability, zero was represented by a blank cell.