

Michigan Medical Monitoring Project 2009 Data Summary

Based on Medical Record Abstractions and Interviews
Conducted During the 2009 MMP Cycle



Table of Contents

What is the Medical Monitoring Project (MMP)?	4
MMP in Michigan	4
MMP Medical Record Abstraction.....	4
Comparison between MMP participants, MMP sample, and persons living with HIV/AIDS in Michigan during the 2009 cycle (data from eHARS).....	8
Patient Demographic Information*	10
Comparison between self-reported race/ethnicity from the MMP interview and race/ethnicity from the medical record:	10
Sources of Medical Coverage/Insurance	11
Mutually-exclusive categories for medical coverage/insurance	12
Retention in Care	12
Laboratory Test Results	13
Comparison between self-reported lowest CD4 count from the MMP interview and MRA data (n=147):	13
Laboratory Tests Summarized for the Surveillance Period	14
Antiretroviral Therapy (ART).....	17
Ever prescribed ARV medicines by lowest CD4 count:.....	17
Viral suppression (n=121)*:.....	17
Interview self-report: Doctor advised to delay treatment (n=7):	17
HIV ART Resistance Testing.....	19
Prophylaxis	21
PCP prophylaxis by lowest CD4 count	21
MAC prophylaxis by lowest CD4 count.....	21
AIDS Defining Opportunistic Illnesses (AIDS OI)	22
Inpatient Visits during Surveillance Period	22
Infectious Disease Testing and Results	23
Physician Diagnosis: Hepatitis, infectious, not drug-induced.....	23
Hepatitis A Testing.....	24
Hepatitis B Testing.....	24
Hepatitis C Testing.....	25
Toxoplasma Testing	25
Tuberculosis (TB) Testing.....	26
Immunizations	27
Hepatitis A Immunization	27
Hepatitis B Immunization	27

Combination Hepatitis A/B Immunization (N=149).....	28
Pneumococcal immunization	29
Influenza immunization (information collected during the 12 month surveillance period only) (n=149)	29
Influenza immunization comparison between interview and medical records (n=148):	29
Pregnancy.....	29
Cervical and Anal Cancer Screening.....	29
Frequently Repeated Tests for Routine Health Care Maintenance	30
Fasting blood glucose (FBG)	30
Lipid profile	31
Liver Function Tests	32
Other Medications	33
Lipid-lowering medications	33
Antidepressants	33
Gastrointestinal medications.....	33
Hypoglycemic agents (diabetes medications)	33
Drugs for sexual dysfunction	33
Sexually Transmitted Infections (STIs)	34
Conditions Other than AIDS Opportunistic Illnesses	35
Psychiatric Disorders.....	36
Comparison between PHQ-8 Defined Depression from Interview and Depression Diagnosis:.....	37
Substance Use.....	38
Comparison between self-reported substance use from the MMP interview and medical record documentation of substance use during the surveillance period:	39
Psychiatric Disorders and Substance Use Overlap	41
Use of Services	42
Referrals for Services	43
Questions about MMP?	44
References	45
Appendix	46

What is the Medical Monitoring Project (MMP)?

The Medical Monitoring Project (MMP) is an ongoing population-based surveillance system to assess clinical outcomes and behaviors of HIV-infected persons receiving care in the U.S. MMP is designed to collect data on a representative sample of HIV-infected persons receiving care through the selection of an annual probability sample. The sampling design consists of three stages: selection of geographic primary sampling units (state/city level), selection of facilities providing HIV care (provider level), and selection of patients. The state/city level and provider level selection uses probability proportional to size sampling methods (based on HIV case reports for state/city level and estimated HIV caseload for provider level). Patients have an equal probability of being selected following selection of HIV providers.¹ Michigan is one of 17 states and 6 cities currently conducting MMP in collaboration with the Centers for Disease Control and Prevention (CDC).

The Medical Monitoring Project includes confidential interviews and medical record abstractions (MRA). Data from MMP can be used on a national and local level to describe the characteristics and trends of HIV-infected persons in care, identify utilization of services and unmet needs, and plan for improved prevention and care services. The data provided by MMP may be used by prevention planning groups, clinicians, Ryan White consortia, and policy leaders to help advocate for additional resources.

MMP presents a unique opportunity to contribute to knowledge about HIV care in the U.S. The true success of MMP depends upon the participation of HIV health care providers and HIV infected patients.

MMP in Michigan

In Michigan, the 2007-2009 annual cycles did not succeed in interviewing and abstracting the medical records of enough patients to meet the minimum participation criteria for calculating estimates that would be representative of the HIV infected patients in care in the state. However, this summary of medical record abstraction data provides a general overview of persons in HIV care in 2009 in Michigan. A comparison between the 2009 MMP sample (summarized in this document) with state surveillance data demonstrated that the sample was similar to the population living with HIV/AIDS in Michigan in 2009 (see page 8). During the 2010 cycle, Michigan completed enough medical record abstractions to meet the criteria needed to apply weights to the data for a representative sample. We expect the 2010 MMP data to be finalized for analysis in 2012.

MMP Medical Record Abstraction

The medical record abstraction component of MMP provides data on the medical care received by HIV-infected patients along with clinical and virologic status information. Therefore, information collected from the MMP MRA may differ from HIV-infected persons not in care. There are two time periods that pertain to the medical record data. The medical history period (MHP) is the time period beginning with the first medical care provided following HIV diagnosis up until the start of the surveillance period (SP). The surveillance period is the 12 month period prior to the date of the interview.

Medical chart information for MMP is collected in four different forms corresponding to the medical history period (MHF) or the surveillance period (SPVF, SPIF, and SPSF). Each form collects information directly from the medical chart.

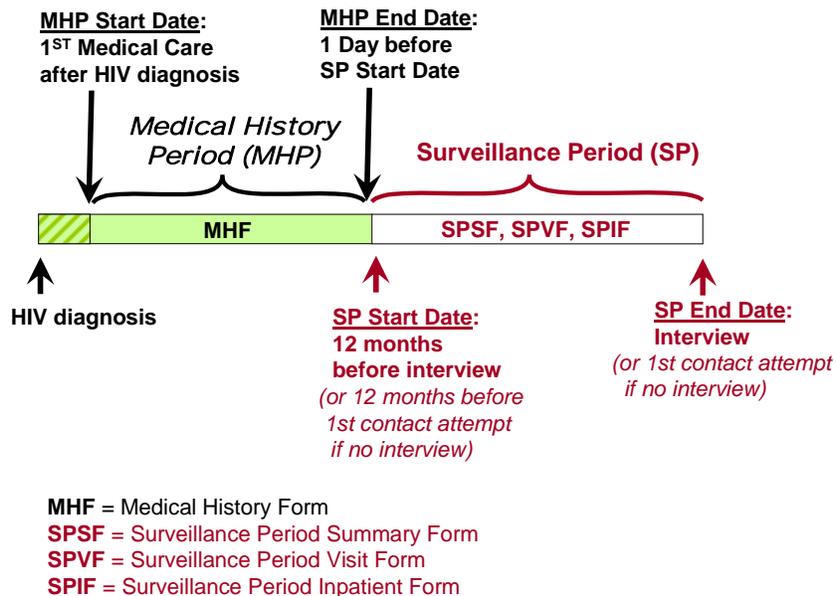
Medical History Form (MHF): abstracts medical care data from the medical history period; collects medical and demographic information

Surveillance Period Visit Form (SPVF): abstracts medical data from each outpatient visit made during the surveillance period

Surveillance Period Inpatient Form (SPIF): abstracts medical data from inpatient visits taking place during the surveillance period

Surveillance Period Summary Form (SPSF): collects information from the medical chart that occurred during the surveillance period that didn't need to be associated with a specific outpatient or inpatient visit (e.g., pregnancies, immunizations, medical referrals, medical coverage/insurance) (to clarify, the SPSF is NOT a summary of the SPVF and SPIF; it is other medical information abstracted directly from the medical chart)

The SPVF, SPIF, and SPSF only collect information from the medical chart that occurred during the 12 month surveillance period. For example, information on sexually-transmitted infections (STIs) was only abstracted using the SPVF and therefore we do not have information on STIs that were diagnosed prior to the surveillance period. Some data were collected during the medical history period and the surveillance period and therefore is summarized across both time periods (e.g., AIDS-defining opportunistic illnesses, ARV medicines, infectious disease screening, and immunizations).



Abstraction criteria: CDC issued abstraction manuals to guide abstractors through the abstraction process. Specific criteria were used in abstracting information from various laboratory tests, conditions, medications, etc. which only allowed certain data to be abstracted. For example, medical record conditions other than AIDS defining opportunistic illnesses that were described as “plausible,” “probable,” “potential,” etc., were not abstracted; instead documentation of a physician diagnosis was needed. Similarly, abstractors could not make assumptions about the existence of a condition based on information on laboratory test results or medication prescriptions alone; a physician diagnosis was required. Therefore, some of the prevalence estimates in this document may be under-estimates.

Michigan Participating Facilities: There are a total of 40 facilities that are sampled for every MMP cycle. In 2009, 21 (53%) of the facilities agreed to participate in MMP (provided patient lists to MMP staff). Of the remaining facilities, 13 (33%) refused to participate and 6 (15%) were ineligible facilities. Of those facilities that agreed to participate, 17 (43% of all facilities sampled) had patients that participated.

Breakdown of 2009 MI MMP Facilities		
Total facilities sampled	40	100%
Facilities that agreed to participate*	21	53%
<i>Facilities with participating patients</i>	17	81%
<i>Facilities without participating patients</i>	4	19%
Refused to participate	13	33%
Ineligible facilities	6	15%

**Facilities that participated in providing a list of patients; four facilities participated in MMP but had no patients who completed the interview*

Participating Patients and Datasets: A total of 165 patients completed the 2009 MMP interview (of these, there was one interview record that could not be analyzed because of technical difficulties). In 2009, only patients who completed the interview could have their medical records abstracted. Of the 165 patients interviewed, 156 patients had their medical records abstracted (excluding medical records that could not be abstracted from a facility because IRB approval was still pending at the end of the collection cycle). There were a few abstraction records that were lost during data transmission, leaving 149 patients with medical record abstraction data that could be analyzed.

Participating Patients for MI 2009 MMP Cycle		
Total patients sampled	400	100%
Patients that participated in the interview*	165*	41%
<i>Medical records abstracted</i>	156	95%
<i>Medical records available for analysis</i>	149	96%
Refused to participate in interview	101	25%
Ineligible	9	5%
Other**	125	31%

**Number of patients who completed the interview; 1 interview record had technical problems and could not be analyzed*

***The most common reasons these patients did not participate were no response to contact from MMP staff and not showing up at scheduled interview time*

A total of 149 MHF and SPSF were available for analysis during the 2009 cycle (one per participant). Additionally there were 1211 separate SPVF observations and 32 SPIF observations (most participants had multiple outpatient site visits while many had no inpatient visits during the surveillance period).

Interview-Medical Record Abstraction Comparisons: This summary document contains mostly data summarized from the medical record abstraction component of MMP. A separate analysis and summary was done for the 2009 MMP interviews (please visit the Michigan MMP website for data summaries from the interview component of MMP at http://www.michigan.gov/mdch/0,4612,7-132-2940_2955_2982_46000_46002-165550--,00.html). There were some sections in the interview and medical record abstraction that lent itself to a comparison and therefore there are a few interview-medical record abstraction comparisons in this summary (**sections are highlighted using red text**). Other sections of the interview could not be compared to the medical record abstraction because of differing

time periods or differences in the type of information collected (for example, self-reported highest viral load test result could not be compared to the medical record abstraction because the abstraction did not collect this information over the entire time period since first HIV care visit). There were a total of 148 matched interview-MRA data pairs (one interview record had technical problems and could not be analyzed).

Representativeness: The 2009 MMP MRA cycle did not abstract enough medical records to reach the criteria needed for the weighted estimates to be representative of the population of HIV infected patients in care in Michigan. Reasons for a small sample size included participation refusals from facilities and patients, ineligible facilities and patients, and other reasons such as no response from a facility. Additionally, medical records were only abstracted for those patients that were interviewed. The data presented are unweighted data and may not represent the HIV-infected population in care in the state of Michigan.

Comparison of Data to Guidelines/Recommendations: When applicable, evidence-based clinical care guidelines or recommendations for HIV-infected patients were included in various sections of this summary to provide a standard for comparison. For example, prophylaxis and antiretroviral (ARV) medicines have been shown to be most effective within certain levels of immune dysfunction, therefore guidelines for starting these regimens are included in the summary. Three main guideline resources were used (listed below). The guidelines used were the most up to date versions available in 2009 (the surveillance period year). Guidelines and recommendations are updated on a regular basis because new evidence is constantly emerging in the field.

Panel on Antiretroviral Guidelines for Adults and Adolescents. Guidelines for the use of antiretroviral agents in HIV-1-infected adults and adolescents. Department of Health and Human Services. November 3, 2008; 1-139. Available at <http://www.aidsinfo.nih.gov/ContentFiles/AdultandAdolescentGL.pdf>.

Centers for Disease Control and Prevention. Guidelines for the Treatment and Prevention of Opportunistic Infections in HIV-Infected Adults and Adolescents. *MMWR* 2009 58(No. RR-4).

Aberg JA, Kaplan JE, Libman H, Emmanuel P, Anderson JR, et al. (2009). Primary Care Guidelines for the Management of Persons Infected with Human Immunodeficiency Virus: 2009 Update by the HIV Medicine Association of the Infectious Diseases Society of America. *Clinical Infectious Diseases* 49:651-81.

Note: Percentages in tables and graphs in this document may not add up to 100% due to rounding error

Comparison between MMP participants, MMP sample, and persons living with HIV/AIDS in Michigan during the 2009 cycle (data from eHARS)

	Reported PLWHA in Michigan in 2009 (n=17199)*	2009 MMP selected sample (N=396)**	Participants in 2009 with analyzable MRA data (n=149)
Diagnosis status			
HIV, not-AIDS	7646 (44%)	156 (39%)	56 (38%)
AIDS	9553 (56%)	240 (61%)	93 (62%)
Sex at birth			
Male	13440 (78%)	307 (78%)	110 (74%)
Female	3757 (22%)	89 (22%)	39 (26%)
Race/Ethnicity			
Black, non-Hispanic	9626 (56%)	243 (61%)	95 (64%)
White, non-Hispanic	6385 (37%)	138 (35%)	49 (33%)
Hispanic	804 (5%)	8 (2%)	2 (1%)
Multiracial	213 (1%)	4 (1%)	2 (1%)
Other	143 (<1%)	2 (<1%)	1 (<1%)
Missing/Unknown	28 (<1%)	1 (<1%)	0
Risk			
MSM	8464 (49%)	207 (52%)	76 (51%)
IDU	1922 (11%)	38 (10%)	15 (10%)
MSM/IDU	850 (5%)	19 (5%)	9 (6%)
Blood recipient	113 (<1%)	3 (<1%)	1 (<1%)
HRH	2084 (12%)	52 (13%)	24 (16%)
Hetero-Fem PH	825 (5%)	23 (6%)	10 (7%)
Unk: Male PH	1451 (8%)	29 (7%)	9 (6%)
Unk: Other	1299 (8%)	25 (6%)	5 (3%)
Exposure			
MSM-only	5478 (32%)	127 (32%)	48 (32%)
MSM + Sex w/Fem	2403 (14%)	56 (14%)	19 (13%)
MSM & HRH	579 (3%)	24 (6%)	9 (6%)
MSM & IDU	619 (4%)	11 (3%)	5 (3%)
MSM & IDU & HRH	231 (1%)	8 (2%)	4 (3%)
HRH-only	2084 (12%)	52 (13%)	24 (16%)
Hetero-Fem PH	825 (5%)	23 (6%)	10 (7%)
IDU & HRH	881 (5%)	22 (6%)	9 (6%)
IDU-only	1029 (6%)	16 (4%)	6 (4%)
Blood recipient	113 (<1%)	3 (<1%)	1 (<1%)
Unk: Male PH	1450 (8%)	29 (7%)	9 (6%)
Unk: Other	1298 (8%)	25 (6%)	5 (3%)
Years since first HIV diagnosis†			
0-5 years	5377 (31%)	120 (30%)	39 (26%)
6-10 years	3959 (23%)	107 (27%)	31 (21%)
11-15 years	4185 (24%)	88 (22%)	38 (26%)
16-20 years	2818 (16%)	65 (16%)	35 (23%)
21+ years	860 (5%)	16 (4%)	6 (4%)

*Defined as all reported persons living with HIV/AIDS in Michigan, alive at the end of 2009; includes cases diagnosed outside of Michigan

**400 patients were selected from patient lists from sampled providers, 1 is missing because the patient was HIV-negative (not eligible) and 3 others were missing likely because they were accidentally included in the patient list for a HIV care facility

†Defined as the number of years between the date of HIV disease diagnosis and July 1, 2009

For every MMP cycle, 400 patients are randomly selected from HIV patient lists from the selected HIV care providers. A small percent of patients selected may not be eligible because of errors in the generation of patient lists, for example, some patients may be HIV-negative. The table above compares select variables from eHARS (Enhanced HIV/AIDS Reporting System) for the patients who had their medical records abstracted (n=149, the sample of patients summarized in this document), for the HIV infected patients selected from patient lists from HIV care facilities who were HIV positive (n=396), and for reported people living with HIV/AIDS in 2009 in Michigan.

In comparison to the surveillance data, the MMP sample of patients with medical records abstracted had a slightly greater proportion of patients with an AIDS diagnosis (0.62 versus 0.56; difference not significant). The MMP sample of patients with MRA also has a slightly greater proportion of females compared to the proportion of PLWHA who were females in 2009 in Michigan (0.26 versus 0.22; difference not significant). Overall, the sample of MMP patients with medical records abstracted had a similar composition with respect to demographics and risk and exposure categories to the population of PLWHA in Michigan in 2009.

Patient Demographic Information*

Note: The following patient demographic information tables were summarized from medical records (not self-reported).

Race/Ethnicity			
	Male (n=106)	Female (n=40)	Total (n=146)
White, non-Hispanic	38 (36%)	10 (25%)	48 (33%)
Black, non-Hispanic	60 (57%)	27 (68%)	87 (60%)
Hispanic	2 (2%)	1 (3%)	3 (2%)
Multiracial	2 (2%)	0	2 (1%)
Race not documented	4 (4%)	2 (5%)	6 (4%)

Age on the Last Day of the Surveillance Period			
	Male (n=106)	Female (n=40)	Total (n=146)
18-24	3 (3%)	1 (3%)	4 (3%)
25-34	6 (6%)	3 (8%)	9 (6%)
35-44	28 (26%)	13 (33%)	41 (28%)
45-54	53 (50%)	15 (38%)	68 (47%)
55+	16 (15%)	8 (20%)	24 (16%)

*1 participant was documented as transgender and 2 participants did not have documentation on sex or gender and so were not included in patient demographic information due to small numbers

- Country of birth was documented for 61 of the 149 patients with medical records abstracted (41%)
 - The majority of patients were born in the United States (n=55, 90%)
 - The remaining 6 patients had countries of birth outside of the United States; 5 of these patients were born in Africa (83%)

Comparison between self-reported race/ethnicity from the MMP interview and race/ethnicity from the medical record:

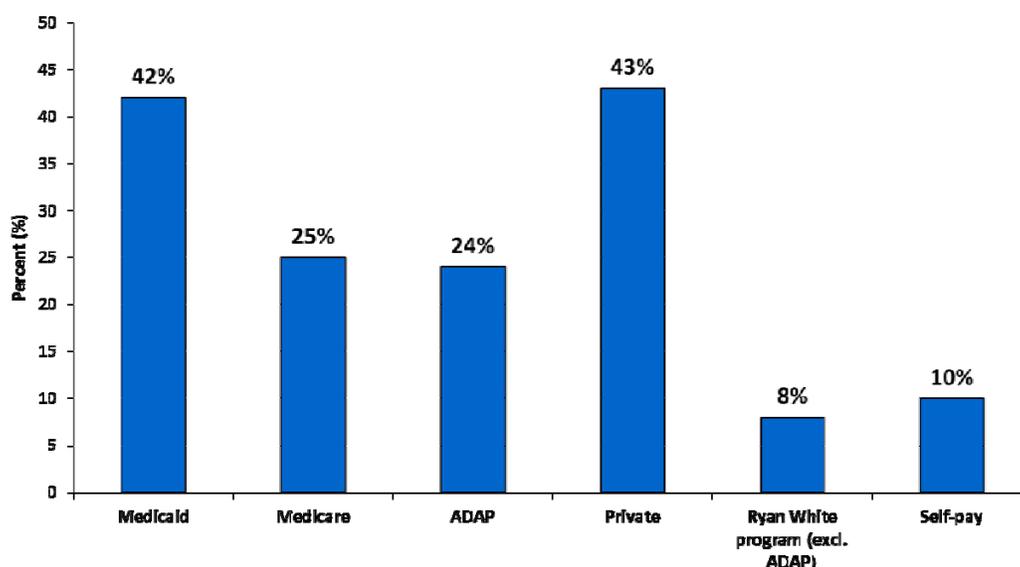
- There were 139 patients that both self-reported a race/ethnicity in the MMP interview and had a race/ethnicity documented in the medical record (two patients refused to report their race/ethnicity in the interview and another six were missing race/ethnicity in the medical record)
 - 32% (n=45) White/White
 - 63% (n=87) Black/Black
 - 1% (n=2) Hispanic/Hispanic
 - 4% (n=6) had mismatched race/ethnicity (interview/medical record)
 - Black/Multiracial: 2
 - Hispanic/Black: 1
 - Asian/White: 1
 - Multiracial/Black: 1
 - Multiracial/White: 1

Sources of Medical Coverage/Insurance

See Appendix for health coverage table

- Documentation of any type of coverage for medical care or other services was collected during the 12 month surveillance period
- 31 patients of the 149 patients with medical records abstracted (21%) had no documentation of medical coverage or had only documentation of self-pay; 79% of patients (n=118) had documentation of at least one type of medical coverage

Documentation of Medical Coverage During the Surveillance Period, NOT mutually exclusive (n=118)



Among patients with documentation of at least one type of medical coverage during the surveillance period (n=118):

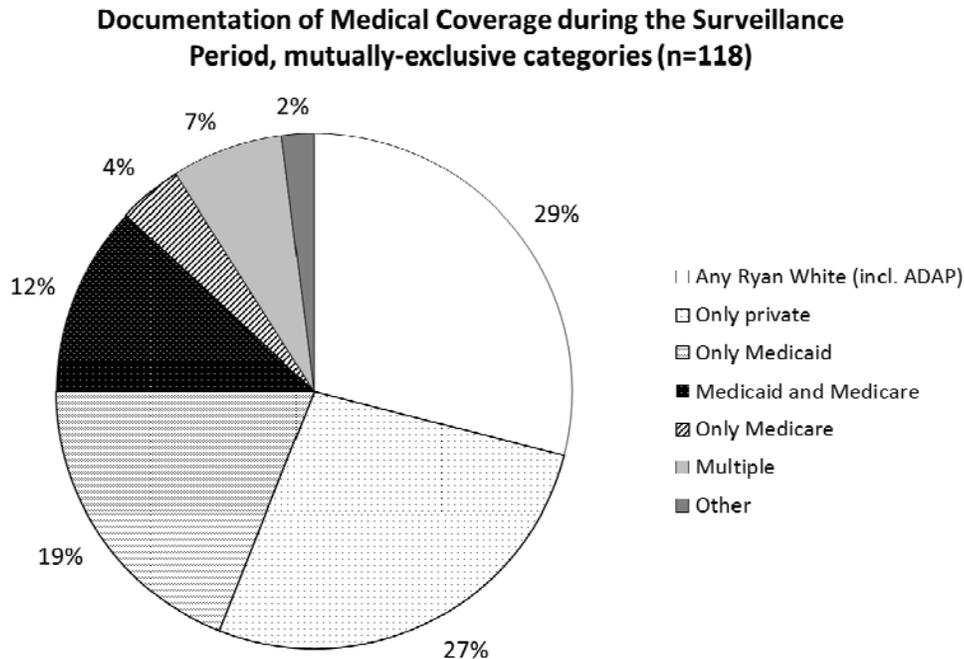
- 24% (n=28) had documentation of coverage by the AIDS Drug Assistance Program (ADAP)*
 - Six patients (21%) had ONLY documentation of ADAP
- 10% (n=12) had at least one type of medical coverage but had documentation of using self-pay for at least one inpatient or outpatient visit
- 16% (n=19) had documentation of **Medicaid and Medicare** (with or without other types of coverage documented, including private)
- 10 patients (8%) had documentation of **Ryan White program (excluding ADAP)**
 - Eight patients (7%) had ONLY documentation of **Ryan White program (excluding ADAP)**; the remaining two patients had documentation of Ryan White and one or more other types of coverage
- One patient (<1%) had documentation of a **clinical trial/clinical study** as a type of coverage for medical care

**In Michigan, ADAP (MIDAP) helps cover HIV-specific and related medicines, vaccines, and dental care for those who qualify for the program; because it only covers these items, ADAP is usually not considered a source of insurance*

Mutually-exclusive categories for medical coverage/insurance

For a more comprehensive summary of medical coverage, mutually-exclusive health coverage categories were created. For the graph below, patients are only represented once. Patients were placed in a category starting from the top of the list below and moving to the bottom. If the patient met the category criteria, the patient could not be placed in another down the list.

- Any Ryan White, *including* ADAP: patients were classified in this category if they had any documentation of payment through the Ryan White program (even if they also had other types of health coverage, they were only included in this category)
- Only private insurance
- Only Medicaid
- Medicaid and Medicare (no private)
- Only Medicare
- Multiple: documentation of governmental funding source and private (for example, private and Medicare), no Ryan White program coverage documented
- Other: patients that did not fall into one of the above categories; includes a patient who only had documentation of prison/jail



Retention in Care

- Over the 12 month surveillance period, the median number of outpatient visits was seven (range: 1-42 visits)
- Three patients (2%) had documentation of only one outpatient visit during the surveillance period

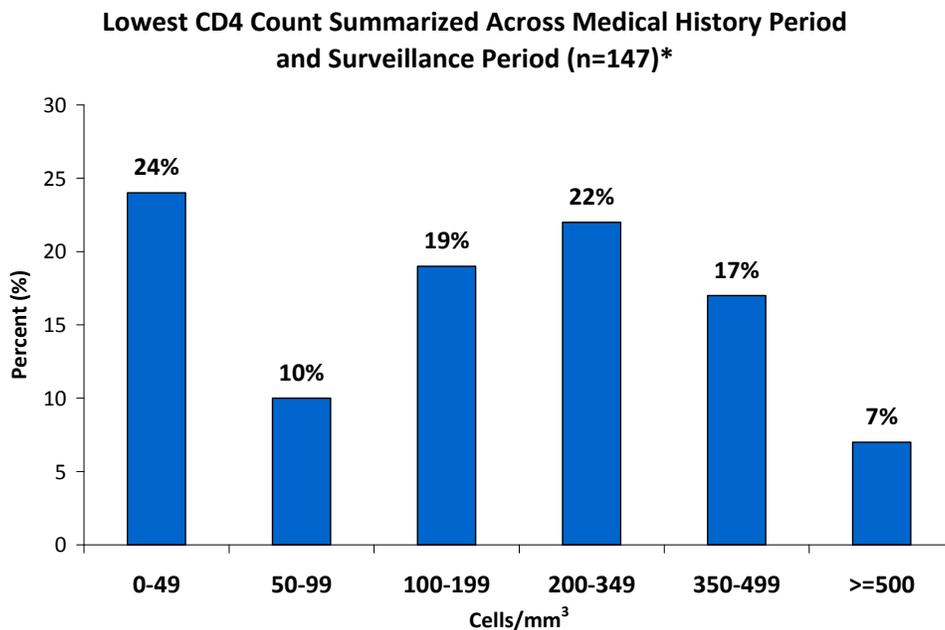
Laboratory Test Results

The median age at first HIV positive test result for the 2009 MMP sample is 35 (range: 19-58; calculated using eHARS data for age at HIV diagnosis for MMP patients, n=149).

The median number of CD4 counts, CD4 cell percentages, and viral load tests done during the 12 month surveillance period was 3 for patients that had at least one test type documented (range 1-7; includes laboratory tests done during inpatient and outpatient visits). Laboratory testing guidelines in place in 2009 for HIV infected patients recommended CD4 counts and viral load tests be done every 3-6 months (2-4 times a year).²

Five percent of patients (n=8) had no documentation of any CD4 counts during the surveillance period, 14% of patients (n=21) had no documentation of any CD4 percentages during the surveillance period, and 9% of patients (n=13) had no documentation of any viral load tests during the surveillance period.

Note: CD4 counts were abstracted during both the medical history period and surveillance periods. CD4 % tests and viral load test results were only abstracted during the 12 month surveillance period.



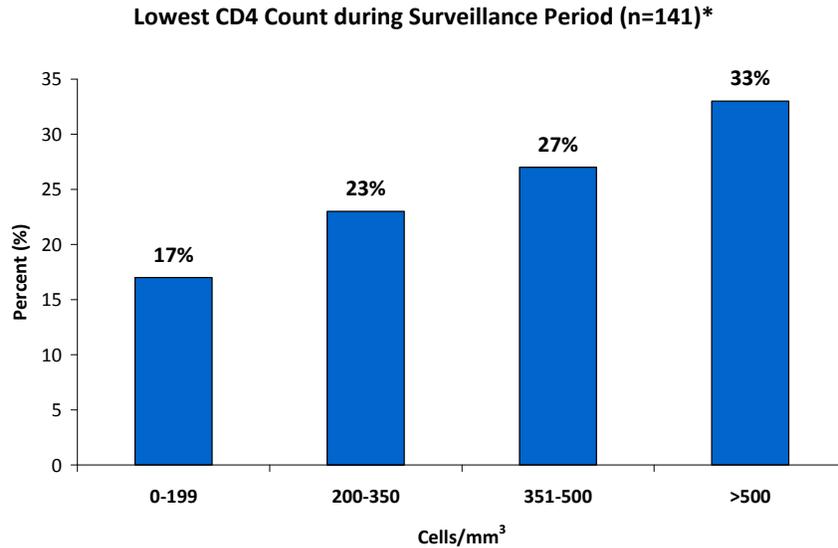
**Two patients had no documentation of any CD4 count values; below 200 cells/mm³ is a criterion for an AIDS diagnosis³*

Comparison between self-reported lowest CD4 count from the MMP interview and MRA data (n=147):

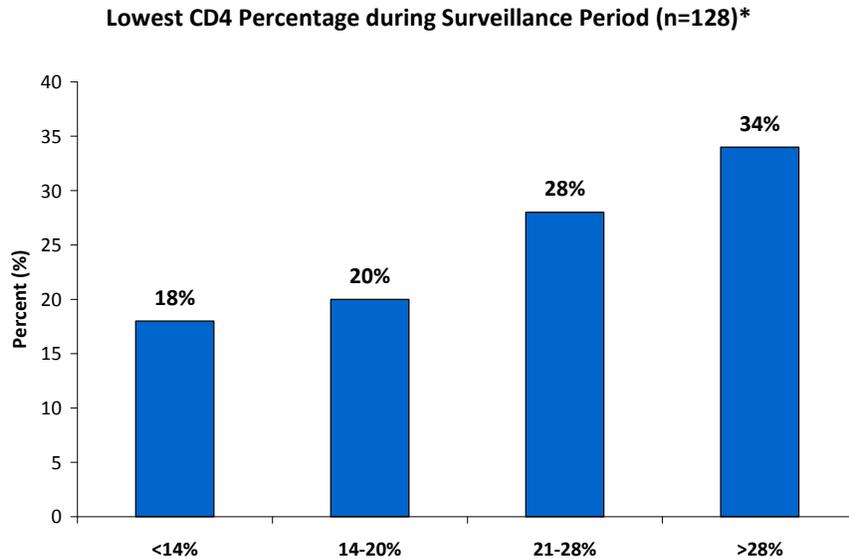
- 60 participants (41%) self-reported their lowest CD4 count result in the correct range
- 22 participants (15%) reported their lowest CD4 count as lower than the MRA data
- 30 participants (20%) reported their lowest CD4 count as higher than the MRA data
- 35 participants (24%) responded “don’t know” or did not know if they have ever had a CD4 count

Laboratory Tests Summarized for the Surveillance Period

Note: Not all patients who had a CD4 cell count value documented during the surveillance period had a CD4 percentage; therefore the graphs below represent different numbers of patients. All patients with a CD4 percent reported also had a CD4 count, but not all patients with a CD4 count had a CD4 percent. This is most likely because of differences between laboratories performing the CD4 testing.⁶



*Excludes patients with no documentation of a CD4 count value during the surveillance period (n=8); below 200 cells/mm³ is a criterion for an AIDS diagnosis³



*Excludes patients with no documentation of a CD4 % test during the surveillance period (n=21); below 14% is a surveillance criterion for an AIDS diagnosis³

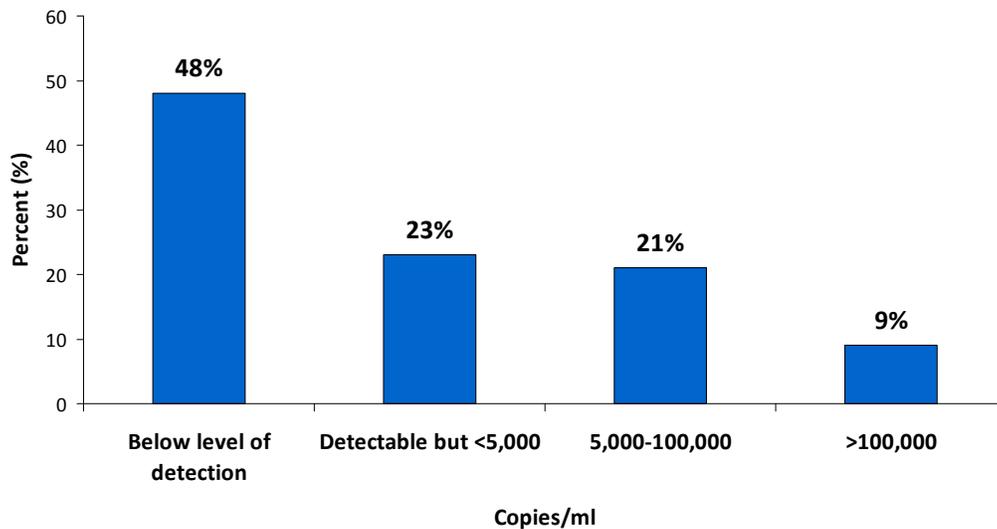
CD4 counts and CD4 percentages provide similar information to HIV care providers about the status of a patient's immune functioning and HIV disease progression and are correlated but discordances between these measures do occur. The graphs above show common break points for CD4 counts and CD4 percentages and patients are only represented once.

To demonstrate the occurrence of discordant CD4 counts and CD4 percents, the table below displays the distribution of all of the CD4 counts and CD4 percentage results that were abstracted during the surveillance period for outpatient visits. The table includes all combinations of CD4 counts and percentages when they occurred during the same outpatient visit and many patients are represented multiple times.

Distribution of CD4 laboratory tests performed during the surveillance period, outpatient visits (total=349 CD4 laboratory test combinations for 128 patients)*					
CD4 lymphocyte percentage					
Absolute CD4 count/mm ³	<14%	14%-20%	21%-28%	>28%	Total
<200	35 (80%)	9 (20%)	0	0	44
200-350	14 (23%)	19 (31%)	25 (40%)	4 (6%)	62
351-500	2 (2%)	33 (37%)	31 (34%)	24 (27%)	90
>500	1 (<1%)	13 (8%)	36 (24%)	103 (67%)	153
Total	52 (15%)	74 (21%)	92 (26%)	131 (38%)	349

*Excludes 1 laboratory test for a patient with a CD4 count >500 that didn't have a CD4% value

Highest Viral Load Test Result Documented During the Surveillance Period (n=136)*



*Excludes patients that had no documentation of a viral load test during the surveillance period (n=13). Viral load values were not collected during the medical history period. Summarizes the highest viral load result for outpatient and inpatient visits during the SP.

Almost half of the patients who had documentation of at least one viral load test during the surveillance period had an undetectable viral load result as their highest value (see graph above). The medical history form (MHF) only abstracts whether the patient had an undetectable viral load test result documented at any time during the medical history period. Summarizing over the medical history period and surveillance period, 83% of patients (n=123) had documentation of at least one undetectable viral load test (conversely, 17% (n=26) had no documentation of an undetectable viral load).

Of the 136 patients with a viral load test result value during the surveillance period, 40 patients (29%) had one or more viral load test values of ≥ 5000 copies/ml. Seventy-five percent of those patients (n=30) had documentation of ARV medicine prescription(s) prior to the viral load test value of $\geq 5,000$. Of the 10 remaining patients, 9 had no documentation of ARV medicines at any time (during the medical history period or the surveillance period) and one patient had documentation of receiving an ARV prescription during the visit with the viral load value of $\geq 5,000$.

Antiretroviral Therapy (ART)

- 92% of patients (n=137) had documentation of ARV prescription during the medical history period and/or surveillance period; conversely, 9% of patients (n=12) had no documentation of any ARV prescriptions

Ever prescribed ARV medicines by lowest CD4 count:

- The 2009 standard of care for ART initiation was for CD4 counts <350 cells/mm³

Any Documentation of ARV Prescription by Lowest CD4 Count			
Lowest CD4 Count	Yes	No	Total
0-49	36 (100%)	0	36 (24%)
50-99	14 (100%)	0	14 (10%)
100-199	28 (100%)	0	28 (19%)
200-349	32 (97%)	1 (3%)	33 (22%)
350-499	18 (72%)	7 (28%)	25 (17%)
>=500	8 (73%)	3 (27%)	11 (7%)
Total	136 (93%)	11 (7%)	147*

*Two patients had no documentation of any CD4 count values; one of these patients also had no documentation of any ARV prescriptions

- Proportionally more blacks than whites had no documentation of ARV medicines (11% or n=10 of blacks compared to 4% or n=2 of whites)

Viral suppression (n=121)*:

- 65% of patients (n=79) prescribed ARV during the medical history period achieved consistent viral suppression during or before the surveillance period (had all viral load test results <=200 copies/ml for viral load tests documented during the surveillance period)
- Conversely, 35% of patients (n=42) with a previous ARV prescription had one or more viral load test results during the surveillance period of >200 copies/ml

*Excludes patients with no ARV prescriptions documented during the medical history period (n=16) and excludes patients with no viral load test done during the surveillance period (n=12)

Interview self-report: Doctor advised to delay treatment (n=7):

- The medical record abstraction data verified that patients who self-reported they had NEVER taken ARV medicines because their doctor advised to delay treatment did in fact have no ARV prescriptions written
- Lowest CD4 count:
 - 350-499: 4 (57%)
 - >=500: 3 (43%)
- Lowest CD4 percentage (%):
 - 14-20%: 1 (14%)
 - 21-30%: 5 (71%)
 - 31-40%: 1 (14%)
- Highest viral load test results:
 - 49-4,999 copies/mL: 2 (29%)
 - 5,000-100,000 copies/mL: 5 (71%)

The table below summarizes ARV classes and specific medicines ever documented over the MHP and SP:

Antiretroviral Medicines Ever Prescribed (n=137)*	
Combination Nucleoside/Nucleotide Analogue Reverse Transcriptase Inhibitors (CNRTI)	123 (90%)
Combivir (AZT/3TC)	69 (50%)
Epzicom (ABC/3TC)	18 (13%)
Trizivir (ABC/3TC/AZT)	21 (15%)
Truvada (FTC/TDF)	62 (45%)
Protease Inhibitors (PI)	86 (63%)
Amprenavir (APV, Agenerase)	6 (4%)
Atazanavir (ATV, Reyataz)	46 (34%)
Darunavir (DRV, TMC 114, Prezista)	13 (9%)
Fosamprenavir (FPV, Lexiva)	9 (7%)
Indinavir (IDV, Crixivan)	23 (17%)
Lopinavir/Ritonavir (LPV/RTV, Kaletra, Meltrex)	39 (28%)
Nelfinavir (NFV, Viracept)	34 (25%)
Ritonavir (RTV, Norvir)	68 (50%)
Saquinavir (SQV-HGC, Invirase, Fortovase)	20 (15%)
Tipranavir (TPV, Aptivus)	5 (4%)
Non-Nucleoside Reverse Transcriptase Inhibitors (NNRTI)	79 (58%)
Delavirdine (DLV, Rescriptor)	4 (3%)
Efavirenz (EFV, Sustiva)	51 (37%)
Etravirine (Intelence, ETR, TMC125)	3 (2%)
Nevirapine (NVP, Viramune)	45 (33%)
Nucleoside/Nucleotide Analogue Reverse Transcriptase Inhibitors (NRTI)	77 (56%)
Abacavir (ABC, Ziagen)	34 (25%)
Didanosine (ddl, Videx)	34 (25%)
Emtricitabine (FTC, Emtriva)	8 (6%)
Lamivudine (3TC, Epivir)	54 (39%)
Stavudine (d4T, Zerit)	40 (29%)
Tenofovir (TDF, Viread)	35 (26%)
Zalcitabine (ddC, Hivid)	6 (4%)
Zidovudine (AZT, Retrovir)	42 (31%)
Multi-class (Atripla)	52 (38%)
Integrase Inhibitor (Raltegravir)	14 (10%)
Entry Inhibitor (Maraviroc)	5 (4%)
Fusion Inhibitor (Enfuvirtide)	4 (3%)

**Only includes patients who had documentation of any ARV medicines; categories and sub-categories are not mutually exclusive*

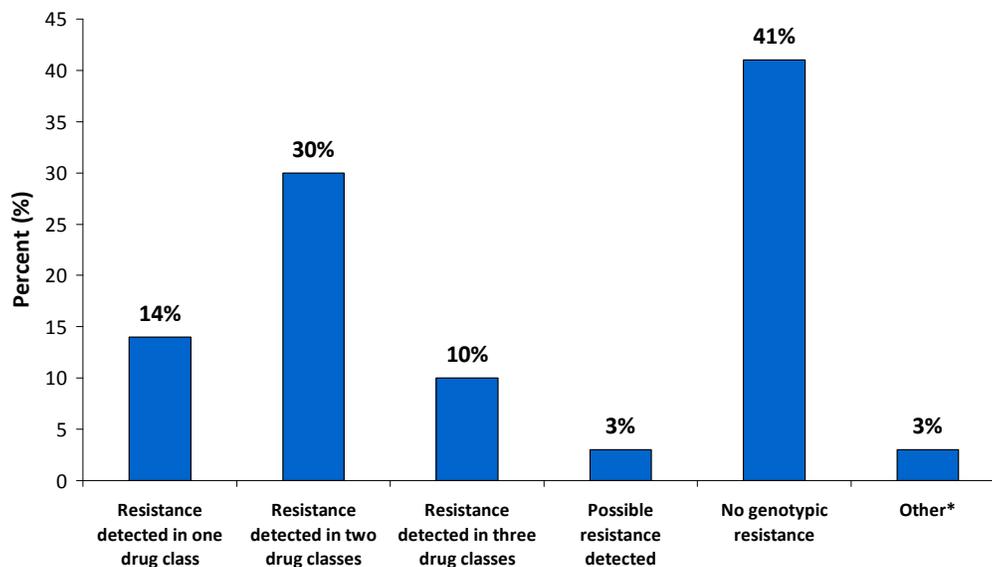
HIV ART Resistance Testing

Recommendation: All HIV-infected patients should have genotypic ART resistance testing performed, regardless of initiation of ART⁵

Genotypic ART Resistance Testing

- 49% (n=73) of patients had documentation of genotypic ART resistance testing during the medical history period
 - 55% (n=40) of those tested had genotypic ART resistance reported
 - 14% (n=10) of those tested had **resistance detected for one drug class**
 - Non-Nucleoside Reverse Transcriptase Inhibitors (NNRTI): 5
 - Nucleoside/Nucleotide Analogue Reverse Transcriptase Inhibitors (NRTI): 4
 - Protease Inhibitor (PI): 1
 - 30% (n=22) of those tested had **resistance detected for two drug classes**
 - NRTI and PI: 15
 - NRTI and NNRTI: 6
 - NNRTI and PI: 1
 - 10% (n=7) of those tested had **resistance detected for three drug classes** (NRTI, NNRTI, and PI)
 - 3% (n=2) of those tested had possible resistance reported (1 patient had possible genotypic resistance to PI and NRTI classes and another patient had possible genotypic resistance to PI, NRTI, and NNRTI classes)
 - 41% (n=30) of those tested had no genotypic resistance reported
 - 1% (n=1) had no test result documented and 1% (n=1) had incomplete genotypic resistance information

Genotypic ART Resistance Testing Documented during the Medical History Period (n=73)



*No test result documented (n=1) or incomplete genotypic resistance information (n=1)

Phenotypic ART Resistance Testing

- 3% (n=5) of patients had documentation of phenotypic ART resistance testing during the medical history period
 - 40% (n=2) of those tested had phenotypic ART resistance reported
 - NNRTI phenotypic resistance: 1
 - NRTI and PI phenotypic resistance: 1
 - One patient had no phenotypic resistance reported
 - One patient had an indeterminate result (possible phenotypic resistance)
 - One patient had no test result documented

Virtual Phenotypic ART Resistance Testing

- 4% (n=6) of patients had documentation of virtual phenotypic ART resistance testing during the medical history period
 - 100% (n=6) had virtual phenotypic ART resistance reported
 - Two patients had virtual phenotypic ART resistance detected for three drug classes (PI, NNRTI, and NRTI)
 - Three patients had virtual phenotypic ART resistance detected for two drug classes (NRTI and PI)
 - One patient had virtual phenotypic ART resistance detected for NRTI class only

Prophylaxis

PCP prophylaxis by lowest CD4 count

- PCP prophylaxis is recommended when the patient's CD4 count falls below 200 cells/uL.⁴

Ever Receive Prophylaxis for PCP by Lowest Ever Documented CD4 Count*			
Lowest CD4 Count	Yes	No	Total
0-49	36 (100%)	0	36 (24%)
50-99	12 (86%)	2 (14%)	14 (10%)
100-199	19 (68%)	9 (32%)	28 (19%)
200-349	4 (12%)	29 (88%)	33 (22%)
350-499	2 (8%)	23 (92%)	25 (17%)
>=500	1 (9%)	10 (91%)	11 (7%)
Total	74 (50%)	73 (50%)	147

**Two patients had no documentation of any CD4 count values and were excluded from table*

- 86% (67/78) of patients who met the clinical recommendation for receiving prophylaxis for *Pneumocystis jiroveci* pneumonia (PCP) had medical record documentation of receiving prophylaxis during the medical history period (MHP) and/or the surveillance period (SP)

MAC prophylaxis by lowest CD4 count

- MAC prophylaxis is recommended when the patient's CD4 count falls below 50 cells/uL.⁴

Ever Receive Prophylaxis for MAC by Lowest Ever Documented CD4 Count*			
Lowest CD4 Count	Yes	No	Total
0-49	28 (78%)	8 (22%)	36 (24%)
50-99	4 (29%)	10 (71%)	14 (10%)
100-199	2 (7%)	26 (93%)	28 (19%)
200-349	2 (6%)	31 (94%)	33 (22%)
350-499	1 (4%)	24 (96%)	25 (17%)
>=500	0	11 (100%)	11 (7%)
Total	37 (25%)	110 (75%)	147

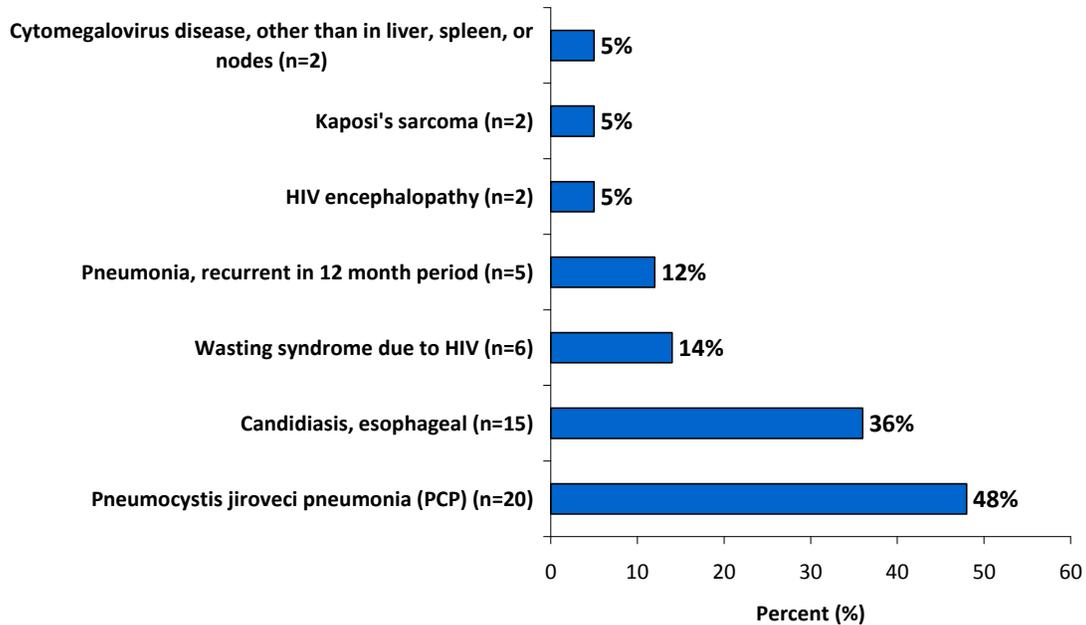
**Two patients had no documentation of any CD4 count values and were excluded from table*

- 78% (28/36) of patients who met the clinical recommendation for receiving prophylaxis for *Mycobacterium avium* complex (MAC) had medical record documentation of receiving MAC prophylaxis during the MHP and/or the SP

AIDS Defining Opportunistic Illnesses (AIDS OI)

- 28% of patients (n=42) had documentation of one or more AIDS OI diagnoses over the medical history period (MHP) and/or surveillance period (SP)
 - 31% (n=13) were diagnosed with two or more AIDS OI

AIDS Opportunistic Illnesses (AIDS OI) Diagnosed during the Medical History Period and/or Surveillance Period (n=42)*



*Includes all AIDS OI documented in two or more patients

- Other AIDS OI diagnosed in only one patient during the MHP and/or SP (categories are not mutually exclusive):
 - Cytomegalovirus retinitis (with loss of vision)
 - Cryptosporidiosis, chronic intestinal
 - Herpes simplex (chronic ulcer or bronchitis, pneumonitis, or esophagitis)
 - *Mycobacterium avium* complex or *M. kansasii*, disseminated or extrapulmonary
 - *Mycobacterium tuberculosis*, pulmonary

Inpatient Visits during Surveillance Period

- 14% of patients (n=21) had at least 1 inpatient visit during the surveillance period
- 4% of patients (n=6) had more than 1 inpatient stay
- The median length of stay was 3 days (range from <1 day to 10 days)

Infectious Disease Testing and Results

Note: There were two main sections in the abstraction forms that recorded infectious hepatitis information from patient's medical records. One section abstracted documentation of a physician diagnosis of hepatitis (indicating a current infection, available only in the surveillance period forms) and the other section abstracted hepatitis laboratory test results (available for the MHP and SP). Often, only laboratory test results were documented.

The abstraction form used the terms screening and testing for hepatitis interchangeably, limiting comparisons between recommendations and the data. The abstraction form documented whether there was screening, and then allowed the specification of the type of laboratory test performed (which included screening/antibody tests, antigen tests, and viral detection tests). Additionally there was the option of selecting "test type not documented." Therefore screening for hepatitis in this section was broadly defined as having at least one laboratory test done.

Antibody tests are screening tests and a positive antibody test requires a confirmatory test, such as a viral detection test. Antibody tests by themselves may indicate current infection, past infection (if test for hepatitis B or C), immunization (if test for hepatitis A or B), or may be a false-positive result. A positive viral detection test (qualitative or quantitative/PCR) confirms a positive antibody test and indicates a current infection with the virus.

Physician Diagnosis: Hepatitis, infectious, not drug-induced

- 5% of patients (n=7) had documentation of a **physician diagnosis of infectious hepatitis** (current infection) during the **surveillance period**
 - Two of these patients had specific written documentation of current *chronic* hepatitis C
 - One patient had a positive screening test for hepatitis C during the MHP but the type of test was not documented
 - One patient was infected with hepatitis B (positive for HBV RNA qualitative)
 - One patient was infected with hepatitis B and possibly hepatitis A (positive for anti-HAV total and positive HepB PCR)
 - Two patients may have been infected with hepatitis A and/or possibly hepatitis B during the MHP (positive anti-HBc total and positive anti-HAV total)
- One patient had specific written documentation of cirrhosis from hepatitis C (but was not checked off as having a physician diagnosis of infectious hepatitis in the abstraction form)
- Another 4% of patients (n=6) had documentation of hepatitis, NOS (not otherwise specified)

Hepatitis A Testing

Recommendation: Screen for hepatitis A at baseline using total antibody to hepatitis A virus⁵

- 83% of patients (n=123) had documentation of being screened/tested for hepatitis A at least once during the MHP and/or the SP
 - **2% of patients tested (n=2) were infected with hepatitis A (positive anti-HAV IgM AND positive anti-HAV total)**
 - Another 27% of patients screened (n=33) may have been infected with hepatitis A (positive anti-HAV IgM **OR** positive anti-HAV total)
 - Other interpretations include a past hepatitis A immunization or a false positive test result

Hepatitis B Testing

Recommendation: All HIV-infected patients should be screened for HBV infection (by detection of hepatitis B surface antigen, HBsAg, antibody to HBsAg, and antibody to hepatitis B total core antigen) upon initiation of care⁵

Hepatitis B serology quick reference

Antibody tests: anti-HBc IgG, anti-HBc total, anti-HBs, anti-HBc IgM

- Anti-HBc IgG, anti-HBc total, and anti-HBs may indicate past infection and immunity, immunity from vaccination, or ongoing infection with hepatitis B virus
- Anti-HBc IgM indicates acute (current) infection with hepatitis B virus

Antigen tests: HBeAg and HBsAg

- Indicates current infection with hepatitis B virus

Viral detection test (nucleic acid test): HBV DNA

- HBV DNA indicates current infection with the hepatitis B virus

For more information, please visit <http://www.cdc.gov/hepatitis/ChooseB.htm>

- 89% of patients (n=132) had documentation of receiving at least one laboratory test for hepatitis B during the MHP and/or the SP
 - 54% of patients tested (n=71) had at least one positive hepatitis B laboratory test result (anti-HBc IgG, anti-HBc IgM, anti-HBc total, anti-HBs, HBeAg, HBsAg, or HBV DNA)
 - Possible interpretations include that the patient was immune due to previous infection or immunization, the patient was acute or chronically infected, the patient had a resolved infection, or the patient may have had a false-positive result
 - **14% of patients screened (n=18) were infected at some point with hepatitis B during the medical history period and/or the surveillance period (positive for hepatitis B surface antigen, HBsAg and/or positive for anti-HBc IgM, and/or a positive DNA result)**

Hepatitis C Testing

Recommendation: All HIV-infected patients should be screened for HCV infection upon initiation of care by a test for HCV antibody⁵

Note: In the abstraction form, the HCV antibody tests EIA and RIBA were grouped together. The EIA is the typical antibody screening test while an RIBA is sometimes used as a supplemental test and confirms a positive EIA antibody test (usually the confirmatory test is a viral detection test).

Hepatitis C serology quick reference

Antibody tests: EIA and RIBA

- EIA indicates past or present infection or a false-positive result
- RIBA is a supplemental antibody test that confirms an EIA and indicates current or past infection

Viral detection tests (nucleic acid test): HCV RNA qualitative and HCV RNA quantitative (HCV)

- Indicates current infection with hepatitis C virus

- 86% of patients (n=128) had documentation of being screened for hepatitis C at least once during the MHP and/or the SP (defined as patients with documentation of at least one type of hepatitis C laboratory test)
 - 15% of patients screened (n=19) had a positive hepatitis C laboratory test result (anti-HCV /EIA/RIBA, HCV RNA qualitative, HCV RNA quantitative (PCR), or test type not documented)
 - Possible interpretations include that the patient had an acute or chronic infection, the patient had a resolved infection, or that the patient had a false-positive screening result
 - **6% of patients screened (n=8) were infected with hepatitis C based on laboratory test results (positive HCV RNA quantitative and/or positive HCV RNA qualitative) and an additional 2% (n=2) had specific physician documentation of current hepatitis C infection**
 - The remaining 9 patients with at least one positive hepatitis C laboratory test had unknown hepatitis C status because of limitations in the data, i.e. for some patients the test type was not documented and there was no physician documentation of a diagnosis

Note: No patients met the laboratory criteria for both hepatitis B and hepatitis C

Toxoplasma Testing

Recommendation: All HIV-infected patients should be screened for exposure to *Toxoplasma gondii* upon initiation of care⁵

- 67% of patients (n=100) were screened for *Toxoplasma* during the MHP and/or the SP
- 33% of patients (n=49) had no documentation of *Toxoplasma* screening or had documentation that *Toxoplasma* screening was not done

Results (only most recent test result abstracted, n=100):

- A total of 7% (n=7) of those screened for *Toxoplasma* had a positive *Toxoplasma* antibody titer

Tuberculosis (TB) Testing

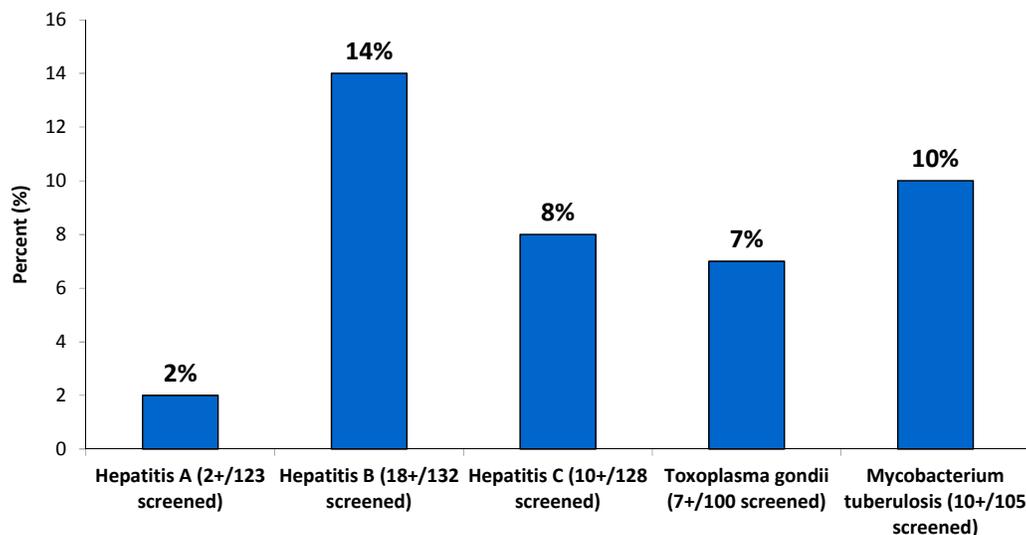
Recommendation: All HIV-infected patients should be tested for *M. tuberculosis* by either a TST/PPD/Mantoux or an interferon- γ release assay. The QuantiFERON test aids in detecting latent *M. tuberculosis* infection.⁵

- 70% of patients (n=105) were screened for *M. tuberculosis* during the MHP and/or the SP
- 30% of patients (n=44) had no documentation of screening for *M. tuberculosis* or had documentation of not being screened for both the MHP and the SP

Results (only most recent TST/PPD/Mantoux or QuantiFERON test (QFT) results abstracted from MHF and SPSF):

- A total of 10% (n=10) of those screened for tuberculosis had a positive tuberculin skin test or QFT during the MHP or SP
 - 9 patients had a positive tuberculin skin test
 - Two of these patients had physician documentation of tuberculosis (one patient had documentation of latent TB and one had documentation of pulmonary tuberculosis)
 - 1 patient had a positive QFT
- 17% of patients (n=18) had at least one tuberculin skin test that was not read (patient did not come back to have test read)

Percent of Patients Infected with Specified Infectious Diseases Among Patients with Documentation of Screening*



*Screening was defined as having documentation of at least one type of laboratory test for the specified infection. Hepatitis A infection was defined as a positive anti-HAV IgM and a positive anti-HAV total (n=2); hepatitis B infection was defined as positive for HBsAg and/or positive for anti-HBc IgM, and/or a positive HBV DNA result (n=18); hepatitis C infection was defined as having a positive HCV RNA quantitative (PCR) and/or a positive HCV RNA qualitative (n=8), or if the patient had specific documentation of hepatitis C infection from physician notes (n=2)

+ = positive

Immunizations

Hepatitis A Immunization

Recommendation: Hepatitis A vaccine is recommended for all susceptible men who have sex with men (MSM), injection drug users, persons with chronic liver disease, and patients infected with hepatitis B and/or C⁵

- 77% of patients (n=115) were **presumed** susceptible to hepatitis A virus based on no laboratory result documentation of previous infection or immunization (excludes patients that had documentation of a positive anti-HAV IgM and/or a positive anti-HAV total laboratory test during the MHP or the SP, n=34)
 - **60% of presumed hepatitis A virus susceptible patients (n=69) had documentation in their medical record of receiving a hepatitis A immunization (Havrix, Vaqta) and/or a combination hepatitis A/B (Twinrix) immunization during the MHP and/or the SP**
 - Among patients that received a hepatitis A vaccine (n=62), 5% (n=3) had documentation of receiving three vaccine doses; another 45% (n=28) had documentation of receiving two vaccine doses, 24% (n=15) had documentation of receiving one dose, and 26% (n=16) had documentation of receiving a hepatitis A vaccine but the number of doses was not documented (two doses of hepatitis A vaccine is recommended for full protection)
 - Among patients that received a combination hepatitis A/B vaccine (n=12), 33% (n=4) received three vaccine doses (3-4 doses are recommended for full protection), 17% (n=2) received two doses, 17% (n=2) received one dose, and 33% (n=4) had documentation of receiving the vaccine but the number of doses was not recorded in the medical record
 - Five patients (7%) had documentation of BOTH the hepatitis A and the combination hepatitis A/B vaccine
 - Among the patients *without* documentation of a hepatitis A immunization and who were presumed susceptible based on no positive laboratory test results, 5 patients had additional written documentation of a reason for not receiving the immunization:
 - Prior vaccination: 3 (these patients had no evidence of prior vaccination, only written notation of a prior vaccination)
 - Other (immune): 1 (no evidence of immunity, just a written notation)
 - Patient declined: 1

Hepatitis B Immunization

Recommendation: Hepatitis B vaccine should be administered to all those who are susceptible to HBV⁵

- 36% of patients (n=54) had documentation of receiving a hepatitis B immunization (Energix B, Recombivax) during the MHP or the SP
- Among the patients *without* documentation of a hepatitis B immunization (n=95), 18 had additional written documentation of a reason for not receiving the immunization:
 - Prior vaccination: 4
 - Previously infected: 12
 - Other (immune): 1

- Patient declined: 1
- Restricting the analysis to only patients **presumed** to be susceptible to hepatitis B infection based on no documentation of immunity (n=78; excludes patients that had documentation of one or more positive hepatitis B laboratory tests and therefore excludes patients that may be protected because of previous infection or immunization)
 - **54% of presumed hepatitis B susceptible patients (n=42) had medical record documentation of receiving a hepatitis B immunization (Energix B, Recombivax) and/or a combination hepatitis A/B (Twinrix) immunization**
 - Among the patients that received a hepatitis B immunization (n=37), 3% (n=1) had documentation of receiving four vaccine doses, 49% (n=18) had documentation of receiving three doses, 14% (n=5) had documentation of receiving two doses, 8% (n=3) had documentation of receiving one dose, and 27% (n=10) had documentation of receiving a hepatitis B immunization but had no documentation on the number of doses received
 - Three doses of hepatitis B vaccine is recommended for full life-long protection (one dose of the vaccine produces adequate antibody levels to protect against infection in 50% of vaccinated people and two doses produces adequate antibody levels in 80% of vaccinated people and protection is transitory)
 - Among the patients that received a combination hepatitis A/B (Twinrix) vaccine (n=10), 30% (n=3) had documentation of receiving three vaccine doses, 20% (n=2) had documentation of receiving two vaccine doses, 20% (n=2) had documentation of receiving one vaccine dose, and the remaining 30% (n=3) had documentation of receiving a combination hepatitis A/B vaccine but had no documentation on the number of doses received (3 doses of the combination hepatitis A/B vaccine is recommended for full protection)
 - Five patients (12%) had documentation of receiving BOTH a hepatitis B and a combination hepatitis A/B immunization
 - The remaining 46% of patients (n=36) were presumed susceptible to hepatitis B infection (based on lack of documentation of hepatitis B positive laboratory test(s)) and did not have medical record documentation of receiving a hepatitis B immunization
 - Among these 36 patients, 7 patients (19%) had specific documentation that a hepatitis B immunization (Energix B, Recombivax) was NOT given. Most had a specific reason written in the medical record:
 - Prior vaccination: 2 (no evidence for a prior vaccination, only written notation of a prior vaccination)
 - Previously infected: 3 (no evidence of a previous infection from laboratory tests, only written notation)
 - Patient declined: 1
 - Not documented: 1

Combination Hepatitis A/B Immunization (N=149)

- 8% of patients (n=12) had documentation of receiving a hepatitis A and B vaccine (Twinrix) during the MHP or the SP
- Among the patients *without* documentation of a hepatitis A and B vaccine, one patient had documentation of a reason for not receiving the immunization: Other (immune)

Pneumococcal immunization

- 75% of patients (n=112) had documentation of a pneumococcal immunization during the MHP or the SP
- Among the patients *without* documentation of receiving a pneumococcal immunization (n=37), 4 patients had documentation of a reason for not receiving the immunization:
 - Prior vaccination: 1
 - Patient declined: 3

Influenza immunization (information collected during the 12 month surveillance period only) (n=149)

- Only 43% of patients (n=64) had documentation of receiving an influenza immunization
- 5% of patients (n=7) had documentation of not receiving an influenza immunization
 - 4 patients declined vaccination
 - 1 patient had documentation of the influenza vaccine being unavailable
 - 1 patient had documentation of not receiving the influenza vaccine because it was not flu season
 - 1 patient had no documentation of the reason for not receiving an influenza immunization
- The remaining 52% of patients (n=78) had no documentation of whether or not an influenza immunization was given

Influenza immunization comparison between interview and medical records (n=148):

- 84% of patients (n=125) self-reported having an influenza vaccine during the 12 months prior to interview (the surveillance period); it appears that the medical record data alone may underestimate how many patients received an influenza vaccine, possibly because they received it elsewhere (clinics, drug stores, etc.)
 - Of these, 50% (n=62) had medical record documentation of receiving an influenza vaccine
 - Another 47% (n=59) had no documentation in the medical records of whether or not an influenza immunization was given
 - 2% (n=2) had documentation that an influenza vaccine was declined by the patient; another 2% (n=2) had documentation that an influenza vaccine was not given
- One patient self-reported that they didn't receive an influenza vaccine and another self-reported "don't know" and had medical record documentation of receiving an influenza vaccine

Pregnancy

- No females in the sample had documentation of pregnancy during the surveillance period (information on pregnancy was not abstracted during the medical history period)

Cervical and Anal Cancer Screening

- 12 patients (8%) were screened for cervical or anal cancer during the surveillance period
- Three patients (8% of all females) had abnormal results from cervical cancer screening (30% of those screened)

Frequently Repeated Tests for Routine Health Care Maintenance

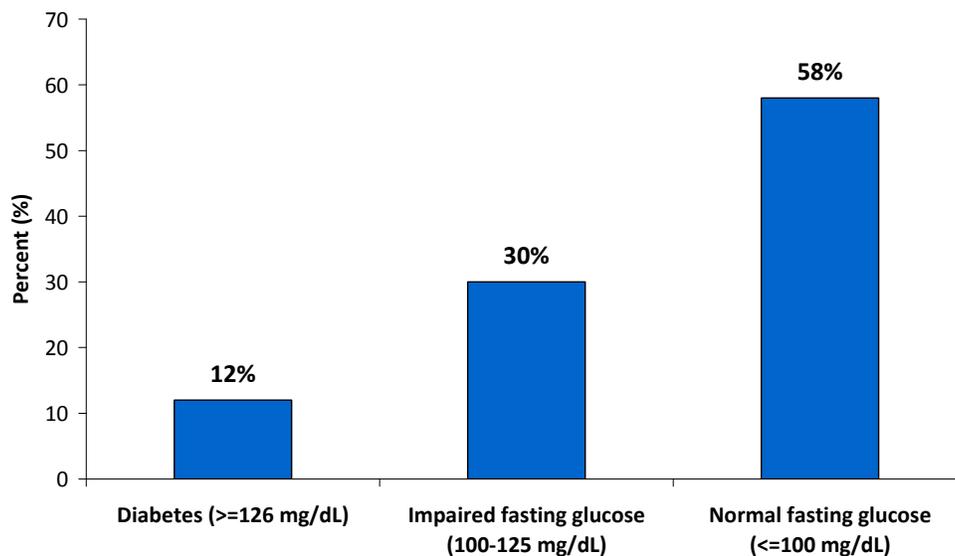
- Laboratory test results for frequently repeated tests (glucose regulatory tests, hematology tests, lipid levels, liver function tests, renal function tests, and chemistry tests) were only abstracted during the surveillance period (in the SPVF)

Fasting blood glucose (FBG)

Recommendation: A fasting blood glucose test is recommended every 6-12 months for all HIV-infected patients^{4,5}

- 22% of patients (n=33) had documentation of a FBG test during the SP
 - 12% (n=4) had a FBG test value ≥ 126 mg/dL; indicates diabetes
 - 30% (n=10) had a FBG test value between 100 and 125 mg/dL; indicates impaired fasting glucose
 - 58% (n=19) had a FBG ≤ 100 mg/dL; normal fasting glucose

Fasting Blood Glucose (FBG) Test Results (n=33)



Lipid profile

Recommendation: A fasting lipid profile is recommended to be performed at least annually for all HIV-infected patients⁴

- A lipid profile is composed of cholesterol HDL, cholesterol LDL, total cholesterol, and triglycerides

HDL cholesterol

- 54% of patients (n=80) had documentation of one or more HDL cholesterol tests
- Below is a summary of the lowest HDL cholesterol value documented during the SP (n=80)
 - 48% (n=38) had low HDL levels (<40 mg/dL for males and <50 mg/dL for females); a risk factor for cardiovascular disease
 - 31% (n=25) had normal HDL levels (40-59 mg/dL for males and 50-59 mg/dL for females)
 - 21% (n=17) had high HDL levels (\geq 60 mg/dL for males and females); optimal, a protective factor against cardiovascular disease

LDL cholesterol

- 54% of patients (n=81) had documentation of one or more LDL cholesterol tests
- Below is a summary of the highest LDL cholesterol value documented during the SP (n=81)
 - 72% (n=58) had optimal or near optimal LDL level (<130 mg/dL)
 - 17% (n=14) had borderline high LDL level (130-159 mg/dL)
 - 11% (n=9) had high LDL level (\geq 160 mg/dL)

Total cholesterol

- 59% of patients (n=88) had documentation of one or more total cholesterol tests
- Below is a summary of the highest total cholesterol value documented during the SP (n=88)
 - 59% (n=52) had a total cholesterol value < 200 mg/dL (desirable)
 - 26% (n=23) had a total cholesterol value between 200 and 239 mg/dL (borderline high)
 - 15% (n=13) had a total cholesterol value \geq 240 mg/dL (high)

Triglycerides

- 56% of patients (n=84) had documentation of one or more triglyceride tests
- Below is a summary of the highest triglyceride test value documented during the SP (n=84)
 - 58% (n=49) had a normal triglyceride level (less than 150 mg/dL)
 - 12% (n=10) had a borderline high triglyceride level (150-199 mg/dL)
 - 16% (n=24) had a high triglyceride level (200-499 mg/dL)
 - 1% (n=1) had a very high triglyceride level (\geq 500 mg/dL)

Liver Function Tests

Bilirubin, total

- 74% of patients (n=111) had at least one bilirubin (total) test result documented during the surveillance period (during one or more outpatient visits, not collected for inpatient visits)
 - Summarizing the **highest** bilirubin total values during the surveillance period (many patients had more than one bilirubin total test result) (n=110):
 - Range: 0.03-4.0 mg/dL, (normal range is 0.1-1 mg/dL)
 - Median: 0.6 mg/dL
 - The majority of patient's highest bilirubin values were ≤ 1.0 mg/dL (n=81, 74%)
 - 26% of patients (n=29) had at least one bilirubin total test value that was over the normal range (>1 mg/dL)
 - Among the patients with at least one bilirubin test result above normal, 60% (n=18) had documentation of at least one prescription of atazanavir during the surveillance period (bilirubin levels are normally asymptotically raised in patients taking atazanavir) and 47% (n=14) had documentation of prescriptions for atazanavir and ritonavir

Alanine Transaminase, ALT (SGPT)

- 81% of patients (n=120) had at least one ALT (SGPT) test result documented during the surveillance period (from an outpatient and/or inpatient visit)
 - Summarizing the **highest** ALT (SGPT) values during the surveillance period (many patients had more than one ALT (SGPT) test result):
 - Normal levels of ALT: ≤ 47 U/L for males 21 and older and ≤ 30 U/L for females 21 and older (all patients in the 2009 cycle were 21 or older during the SP)
 - Males (n=84): median value was 35 U/L (range: 7-182 units/L); the majority were < 47 U/L (n=63, 75%)
 - Females (n=33): median value was 27 U/L (range: 8-70 units/L); the majority were ≤ 30 U/L (n=22, 67%)
 - Summarizing ALT (SGPT) values by sex (n=117)* resulted in 21% of patients (n=24) having ALT levels above normal but less than twice the normal level and 7% of patients (n=8) having ALT levels greater than twice the normal level
 - Among patients with ALT levels above normal but $< 2x$ the normal level (n=24), 33% (n=8) had positive hepatitis B or hepatitis C laboratory tests (4 patients met the laboratory criteria for hepatitis B and 4 patients had at least one positive hepatitis C lab test result); additionally two of these patients had documentation of alcoholism during the SP (one patient had documentation of hepatitis C and alcoholism)
 - Among patients with ALT levels above twice the normal level (n=8), 25% had positive laboratory tests for hepatitis B or hepatitis C (one patient with hepatitis B and one patient with hepatitis C)

**1 participant was documented as transgender and 2 participants did not have documentation on sex or gender and so were not included*

Aspartate Transaminase, AST (SGOT)

- 81% of patients (n=121) had at least one AST (SGOT) test result documented during the surveillance period (from an outpatient and/or inpatient visit)

- Summarizing the **highest** AST (SGOT) values during the surveillance period (many patients had more than one AST (SGOT) test result):
 - Range 5-192 units/L
 - Median: 32 units/L

Other Medications

Note: medications other than ARV medicines were abstracted during the 12-month surveillance period only (during outpatient and inpatient visits). Only select medications were abstracted. For information on antiretroviral medicines, see page 17 of this document.

Lipid-lowering medications

- The following lipid-lowering drugs were abstracted from medical charts: atorvastatin (Lipitor), fluvastatin (Lescol), gemfibrozil (Lopid, Gen-Fibro), niacin, pravastatin (Pravachol), and rosuvastatin
- **18% of patients** (n=27) were prescribed one or more **lipid-lowering drugs** (see above list) during the surveillance period
- 11% of patients (n=16) were prescribed atorvastatin (Lipitor)
- 4% of patients (n=6) were prescribed pravastatin (Pravachol)

Antidepressants

- The following antidepressant medications were abstracted from medical charts: amitriptyline (Elavil, Endep), amitriptyline/chlordiazepoxide, bupropion (Wellbutrin), citalopram (Celexa), escitalopram (Lexapro), fluoxetine (Prozac), mirtazapine (Remeron), paroxetine (Paxil), sertraline (Zoloft), trazadone (Desyrel), and venlafaxine (Effexor)
- **18% of patients** (n=27) were prescribed one or more **antidepressants** (see above list) during the surveillance period

Gastrointestinal medications

- The following gastrointestinal medications were abstracted from medical charts: cimetidine, esomeprazole, famotidine, lansoprazole, lansoprazole/amoxicillin/clarithromycin, nizatidine, omeprazole, pantoprazole, and ranitidine
- **16% of patients** (n=24) were prescribed one or more **gastrointestinal medications** (see above list) during the surveillance period

Hypoglycemic agents (diabetes medications)

- The following hypoglycemic agents were abstracted from medical charts: acarbose, chlorpropamide, insulin, metformin, pioglitazone, rosiglitazone, and rosiglitazone/glemepiride
- **8% of patients** (n=12) were prescribed one or more **hypoglycemic agents** (see above list) during the surveillance period

Drugs for sexual dysfunction

- The following drugs were abstracted: sildenafil (Viagra), tadalafil (Cialis), and vardenafil (Levitra)
- **11% of males** (n=12 out of 106 males) were prescribed either **Viagra, Cialis, or Levitra** during the surveillance period (8 were prescribed Viagra, 3 were prescribed Cialis, and 1 was prescribed Levitra)

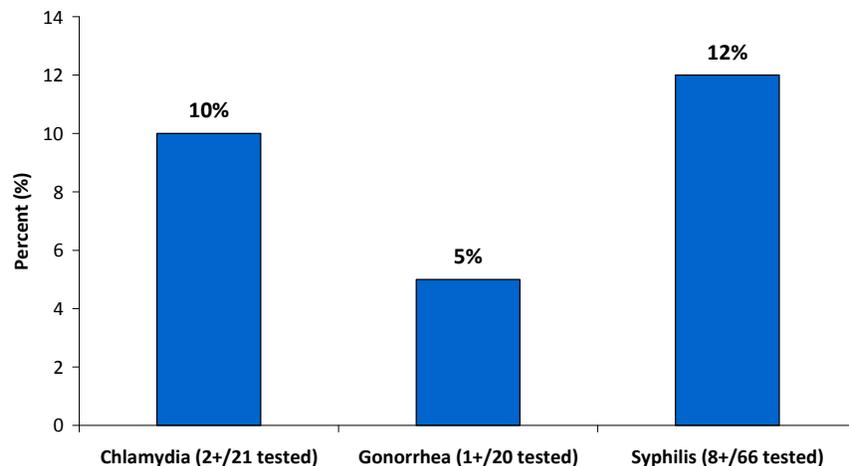
Sexually Transmitted Infections (STIs)

Note: Documentation of STI testing and diagnosis was only abstracted during the surveillance period. Data on STIs were abstracted in two different ways, 1) specific documentation of a physician diagnosis, and 2) laboratory tests for STIs.

Recommendation: STI screening tests should be repeated periodically depending on the patient's symptoms, behavioral risk, and possible exposures.⁵

- All **physician diagnoses** of a new or existing STI abstracted during the surveillance period (with or without supporting laboratory results):
 - Chlamydia: 1
 - Genital herpes: 3
 - Syphilis, NOS: 1
 - STI diagnosed but type not specified: 3
- **Laboratory tests for STIs** abstracted (with or without physician diagnosis):
 - Chlamydia
 - Out of the 149 charts abstracted, 21 patients were tested for Chlamydia and two were positive (one also had a physician diagnosis)
 - The most common specimen site type was urine (16/21 specimens collected)
 - Gonorrhea
 - Out of the 149 charts abstracted, 20 patients were tested for gonorrhea and one was positive
 - The most common specimen site type was urine (16/20 specimens collected)
 - Syphilis
 - Out of the 149 charts abstracted, 66 patients were tested for syphilis infection and eight patients had one or more positive test results (one patient also had a physician diagnosis)
 - A positive laboratory test result for syphilis is indicative of a past or present infection (due to limitations in the data, different stages of syphilis could not be differentiated)
- One patient had documentation of positive laboratory tests for gonorrhea and syphilis

**Percent of Patients with Positive STI Laboratory Test Results
Among Patients with Documentation of being Tested**



Conditions Other than AIDS Opportunistic Illnesses

Note: Documentation of conditions other than AIDS OI was only abstracted during the surveillance period (in the SPVF and SPIF); they were not collected during the medical history period (MHP). Also only certain medical conditions were abstracted.

Cardiovascular conditions (during the surveillance period) (n=149):

- One patient was had a diagnosis of cardiomyopathy (<1%)
- Two patients had a diagnosis of ischemic heart disease (1%); one of these patients had documentation of a myocardial infarction (MI) during from an inpatient visit
- One patient had a diagnosis of a stroke (<1%)
- 32 patients had documentation of hypertension (21%)

Hepatitis (during the surveillance period) (n=149):

- 10% of patients (n=15) had documentation of a hepatitis diagnosis during an outpatient or inpatient visit
 - One patient had a diagnosis of alcohol-induced hepatitis (7%)
 - One patient had a diagnosis of drug-induced hepatitis (7%)
 - Seven patients had a diagnosis of infectious hepatitis (47%)
 - Six patients had a diagnosis of hepatitis, NOS (not otherwise specified) (40%)

Neuropathy (during the surveillance period) (n=149):

- 8% of patients (n=12) had documentation of neuropathy during an outpatient or inpatient visit
 - Two patients had a diagnosis of cranial neuropathy (17%)
 - One patient had a diagnosis of peripheral neuropathy (8%)
 - One patient had a diagnosis of neuropathy, NOS and peripheral neuropathy (8%)
 - Eight patients had a diagnosis of neuropathy, NOS (67%)

Kidney Diseases (during the surveillance period) (n=149):

- 5% of patients (n=8) had documentation of a kidney condition during an outpatient or inpatient visit
 - All eight patients had documentation of nephropathy (kidney damage)
 - Three patients had documentation of CKD (chronic kidney disease)
 - One patient had documentation of nephrolithiasis (kidney stone) and CRI (chronic renal insufficiency)
 - One patient had documentation of RTA (renal tubular acidosis) and renal failure (inpatient visit)

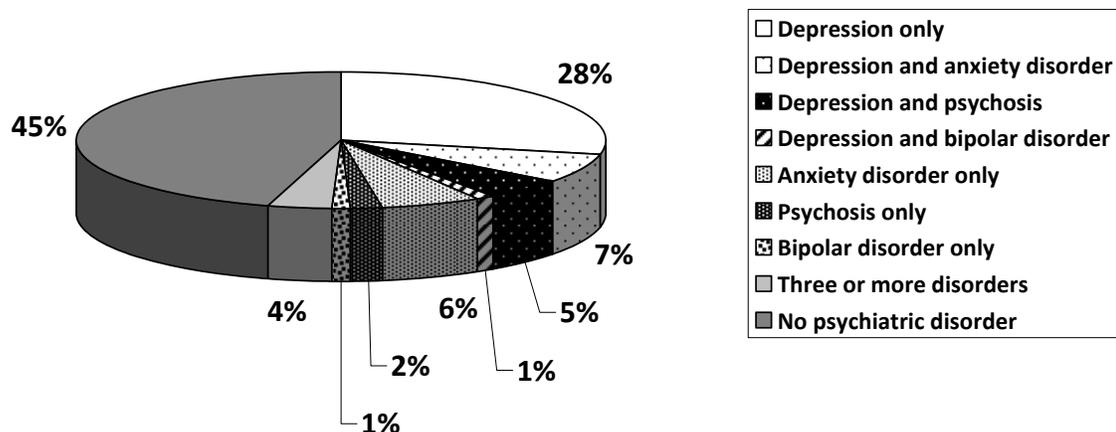
Diabetes (during the surveillance period) (n=149):

- 9% of patients (n=13) had documentation of diabetes during an outpatient or inpatient visit
 - Three patients had documentation of type I diabetes
 - Eight patients had documentation of type II diabetes
 - Two patients had documentation of diabetes, NOS

Psychiatric Disorders

- 55% of patients (n=82) had documentation of a diagnosis of one or more of the four psychiatric disorders abstracted (anxiety disorder, bipolar disorder, depression, psychosis) during the medical history period (MHP) and/or the surveillance period (SP) (bipolar disorder was only abstracted during the MHP) (condition abstracted if documentation of a physician diagnosis and a need for treatment)
- 46% of patients (n=68) had documentation of a diagnosis of depression (major depression, depressive disorder) during the MHP and/or the SP (lifetime prevalence of major depression in the U.S. adult general population is 16.5%)⁷
 - Depression symptoms have been found in many studies to be significantly associated with nonadherence to HIV treatment⁸
- 12% of patients (n=18) had documentation of a diagnosis of psychosis during the MHP and/or the SP
 - Three patients (17%) had a cause of psychosis documented
 - Two of these three patients had documentation of schizophrenia (one of these patients also had documentation of bipolar disorder)
 - One patient had documentation of schizoaffective disorder
 - The remaining patients (n=15, 83%) did not have a specific cause of the psychosis documented
 - Two of these 15 patients (13%) had documentation of bipolar disorder (psychosis may have been a symptom of bipolar disorder for these patients)

Documentation of Psychiatric Disorders (N=149)*



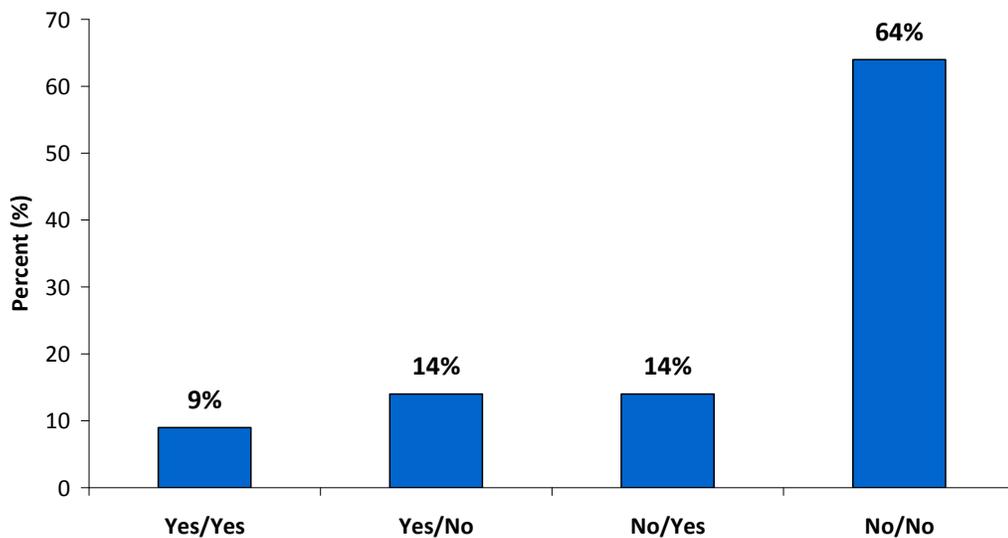
*Any documentation of physician diagnosed anxiety disorder, depression, bipolar disorder, or psychosis (including schizophrenia) during the medical history period and/or the surveillance period that required treatment (e.g. counseling, medications, hospitalization)

Comparison between PHQ-8 Defined Depression from Interview and Depression Diagnosis:

Note: The following analysis is strictly a comparison and should be interpreted with caution. The PHQ-8 is a screening tool for depression and is not a substitute for a physician diagnosis. The PHQ-8 has questions that correspond to symptoms experienced by patients during the previous 2-weeks while the physician diagnosis of depression was abstracted from medical records at any time during a 12-month period.

- 14% (n=20) met the PHQ-8 criteria for current depression during the interview and had no documentation of physician-diagnosed depression during the surveillance period (may be indicative of recent onset of depression or depression symptoms missed by health care providers)
- Additionally, 14% (n=21) of patients did not meet the PHQ-8 criteria for current depression during the interview but had documentation of physician diagnosed depression during the surveillance period (may be indicative of successful depression treatment)
- Interestingly, using the PHQ-8 score corresponding to a two-week period of symptom recall or medical record documentation of depression diagnoses made over a 12-month period both give a prevalence of depression of 23% in this HIV-infected population (the 12-month prevalence of major depression in the general U.S. adult population is 6.7%)⁹
 - Medical record documentation of ANY depression diagnosis since first entering HIV care is higher- 46%

Comparison Between PHQ-8 Defined Depression from Interview and Diagnosis of Depression During SP
(PHQ-8 Depression from interview / Depression Diagnosis from MRA) (n=148)*



* The PHQ-8 module consists of 8 of the 9 diagnostic criteria from the Diagnostic and Statistical Manual of Mental Disorders, version IV (DSM-IV). The item assessing suicidal and self-injurious ideation was omitted from the PHQ-8. Current depression was defined using the PHQ-8 algorithm criteria for major depression (requires the first or second item (anhedonia or depressed mood) to be present at least "more than half the days" and 5 of the 8 symptoms to be present "more than half the days") and for other depression (2 to 4 symptoms, including the first or second item, to be present at least "more than half the days"); questions from the PHQ-8 referred to the past two weeks and were asked during the interview while a depression diagnosis may have been documented at any time during the surveillance period (the 12 months prior to interview)¹⁰

Substance Use

- 39% (n=58) had documentation of using one or more specific non-prescribed substances during the medical history period (MHP) and/or the surveillance period (SP)
 - 41% (n=24) had documentation of one type of drug
 - 26% (n=15) had documentation of two drug types
 - 33% (n=19) had documentation of three or more different drugs
- 23% (n=35) had documentation of alcohol abuse during the MHP and/or the SP
- 10% (n=15) had documentation of evidence of injection substance use during the MHP and/or the SP

Documentation of Non-prescribed Substance Use (n=149)				
		Type of Use*		
Drug**	Number (%)	Injection	Non-injection	Not documented
Amphetamines	5 (3%)	0	2 (40%)	3 (60%)
Cocaine	29 (19%)	1 (3%)	17 (59%)	12 (41%)
Crack cocaine	19 (13%)	3 (16%)	9 (47%)	7 (37%)
Ecstasy	1 (<1%)			
Hallucinogens	1 (<1%)			
Heroin	12 (8%)	5 (42%)	3 (25%)	4 (33%)
Marijuana	39 (26%)			
Methadone	6 (4%)	0	1 (17%)	5 (83%)
Methamphetamines	4 (3%)			
Painkillers	4 (3%)	1 (25%)	0	3 (75%)
Steroids/hormones	3 (2%)			
Other†	8 (5%)	0	5 (63%)	3 (38%)
Substance not specified	1 (<1%)	1 (100%)		

* Injection and non-injection are not mutually exclusive categories

**Not mutually exclusive categories

†Other included opiates, mescaline, diet pills, depressants, speed, morphine, and Demerol

Comparison between self-reported substance use from the MMP interview and medical record documentation of substance use during the surveillance period:

Marijuana

- Ten participants had documentation of marijuana use during the SP
- Additionally, 43 participants (29%) self-reported marijuana use during the SP and had no documentation of marijuana use in medical records during the SP

Comparison between self-reported marijuana use and MRA documentation			
	MRA documentation during SP		
Self-report frequency of use	Yes	No	Total
Daily	3 (30%)	14 (10%)	17 (11%)
Weekly	2 (20%)	7 (5%)	9 (6%)
Monthly	1 (10%)	6 (4%)	7 (5%)
Less than monthly	1 (10%)	16 (12%)	17 (11%)
Never	3 (30%)	95 (69%)	98 (66%)
Total	10	138	148

Crack cocaine

Comparison between self-reported crack use and MRA documentation			
	MRA documentation during SP		
Self-report frequency of use	Yes	No	Total
Daily	1 (13%)	0	1
Weekly	1 (13%)	0	1
Monthly	1 (13%)	2 (1%)	3
Less than monthly	2 (25%)	1 (<1%)	3
Never	3 (38%)	137 (98%)	140
Total	8	140	148

Cocaine

Comparison between self-reported cocaine use and MRA documentation			
	MRA documentation during SP		
Self-report frequency of use	Yes	No	Total
Monthly	0	3 (2%)	3 (2%)
Less than monthly	1 (20%)	5 (3%)	6 (4%)
Never	4 (80%)	135 (94%)	139 (94%)
Total	5	143	148

Amphetamines

Comparison between self-reported amphetamine use and MRA documentation			
	MRA documentation during SP		
Self-report frequency of use	Yes	No	Total
Weekly	0	1 (<1%)	1 (<1%)
Less than monthly	0	1 (<1%)	1 (<1%)
Never	2 (100%)	144 (99%)	146 (99%)
Total	2	146	148

Heroin

Comparison between self-reported heroin use and MRA documentation			
Self-report frequency of use	MRA documentation during SP		Total
	Yes	No	
Daily (injection)	1 (33%)	0	1 (<1%)
Less than monthly (non-injection)	0	1 (<1%)	1 (<1%)
Never	2 (67%)	144 (99%)	2 (1%)
Total	3	145	148

Methamphetamines

Comparison between self-reported methamphetamine use and MRA documentation			
Self-report frequency of use	MRA documentation during SP		Total
	Yes	No	
Monthly	0	1 (<1%)	1 (<1%)
Less than monthly	1 (33%)	0	1 (<1%)
Never	2 (67%)	144 (99%)	146 (99%)
Total	3	145	148

Painkillers (such as Oxycontin, Vicodin or Percocet)

- Two participants had documentation of painkiller substance use during the SP and both reported 'never' using painkillers
- Additionally, two participants self-reported non-prescription painkiller use (monthly and less than monthly) and had no medical record documentation during the SP

Steroids/Hormones

- Two participants had documentation of steroid/hormone substance use during the SP and both self-reported 'never' using steroids/hormones
- Additionally, one participant self-reported weekly steroid/hormone non-injection use and had no medical record documentation during the SP

Ecstasy (MDMA, X)

- There were no participants with medical record documentation of ecstasy use during the SP
- Four participants self-reported using ecstasy during the SP ('less than monthly')

Hallucinogens

- There were no participants with medical record documentation of hallucinogen use during the SP and no self-report of hallucinogen use

Psychiatric Disorders and Substance Use Overlap

- 39% of patients (n=58) had documentation of any non-prescription substance use and 55% of patients (n=82) had documentation of a diagnosis of one or more psychiatric disorders (anxiety disorder, bipolar disorder, depression, and/or psychosis)
- Among the patients with documentation of a psychiatric disorder diagnosis, 52% (43/82) also had documentation of substance use
- Among the patients with documentation of substance use, 74% (43/58) also had documentation of one or more psychiatric disorders

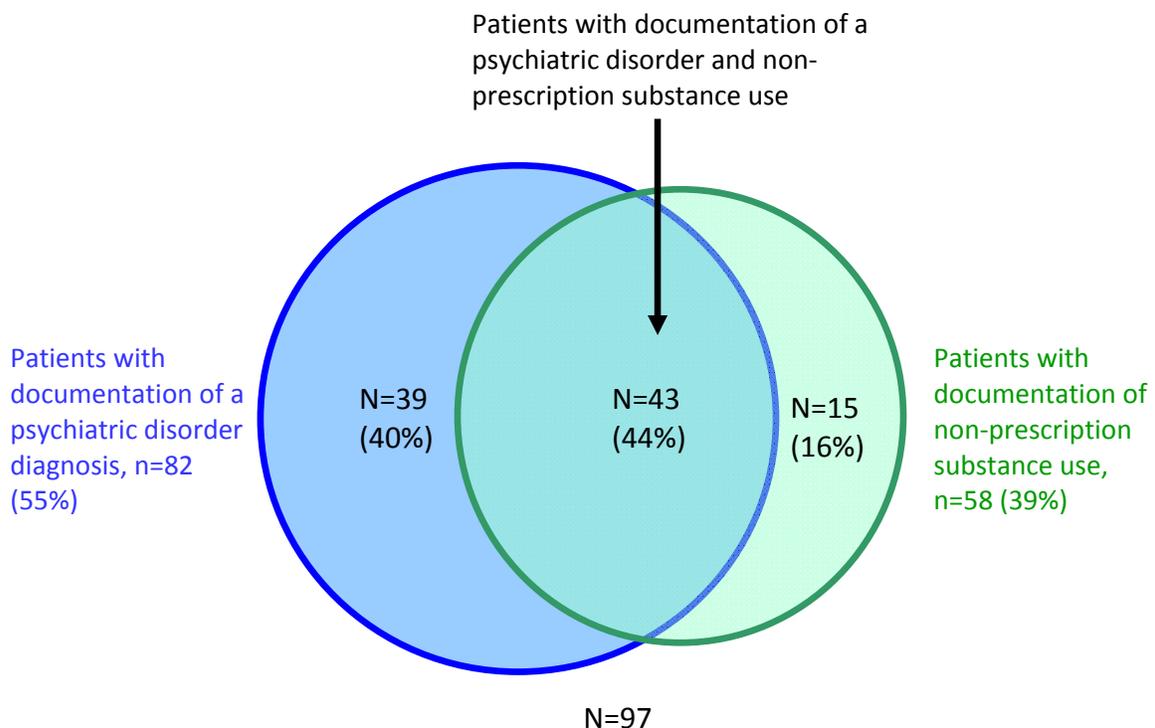
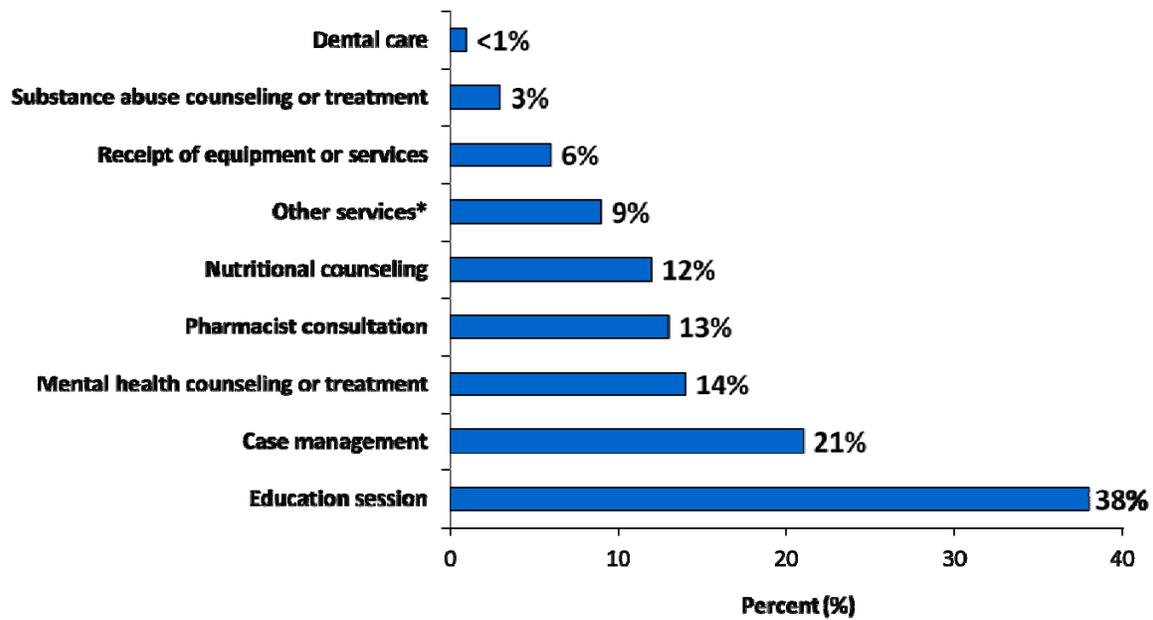


Diagram 1. Venn diagram of the number of patients with a psychiatric disorder diagnosis and the number of patients with documentation of substance use at any time in the medical history period and/or surveillance period (percents out of 97; the number of patients with a psychiatric disorder and/or documentation of substance use)

Use of Services

- 49% of patients (n=73) had documentation of auxiliary services provided during visits to HIV care providers during the surveillance period
 - The most commonly documented service was an education session (77% of patients with documentation of an auxiliary service, n=56) (referred to any individual or group session specifically designed to educate the patient about a particular behavior and/or health issue; did not have to be HIV-related)

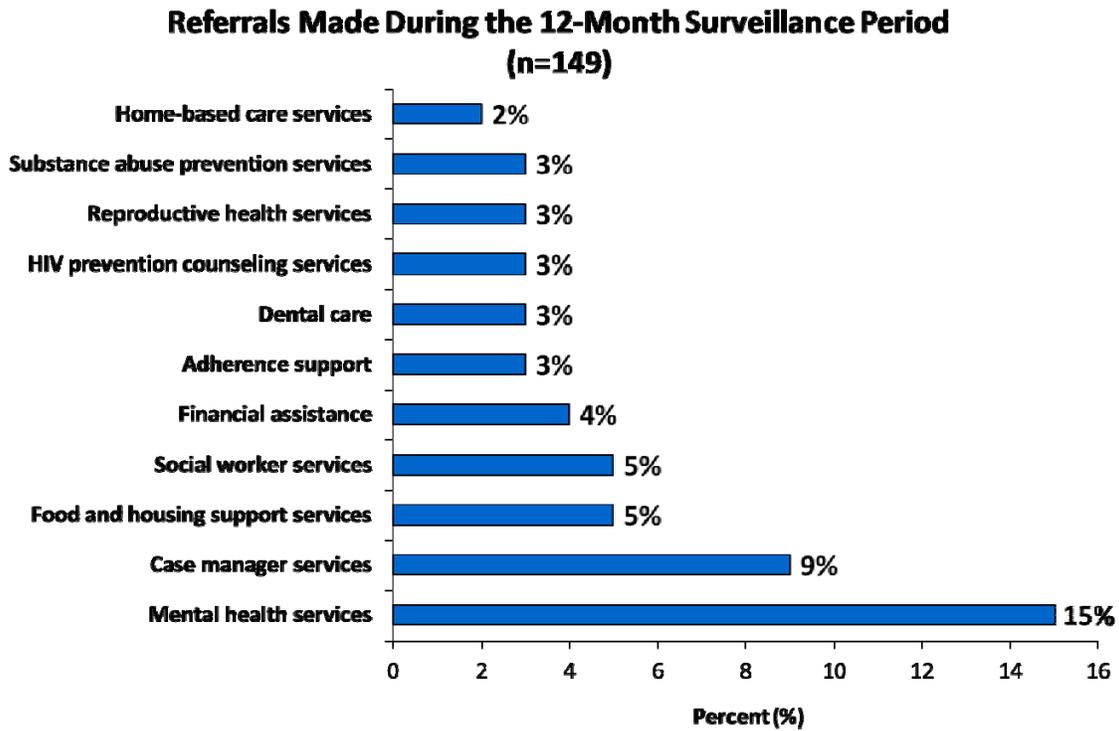
Other Services Provided During the 12-Month Surveillance Period at HIV Care Facilities (n=149)



*Other services included medication adherence counseling, hepatitis C treatment follow-up, and smoking cessation counseling

Referrals for Services

- 29% of patients (n=43) had documentation of at least one referral during the surveillance period
 - The most common referral was for mental health services (51% of patients with documentation of a referral, n=22)



Questions about MMP?

- If you are interested in learning more about MMP or have any questions, please contact
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Michigan Department of Community Health (MDCH) MMP Website

www.michigan.gov/hiv-std

Click "HIV/AIDS"

Click "Surveillance: Case Reporting and Projects"

CDC MMP Website

<http://www.cdc.gov/hiv/topics/treatment/mmp/index.htm>

MDCH HIV Statistics Online

www.michigan.gov/hiv-std

Click "HIV/AIDS"

Click "Statistics and Reports"



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Appendix

Table 1: Summary of documentation of coverage for medical care or other services during the SP (n=121)*

ADAP	Medicaid	Medicare	Private	Ryan White	None /self-pay	Clinical study /trial	Prison /Jail	Other, public insurance	Other, public insurance	Other	Number	Percent
X											6	5%
X	X										2	2%
X	X		X								1	<1%
X	X				X						1	<1%
X	X				X			X	X**		1	<1%
X	X	X		X	X						1	<1%
X	X	X				X					1	<1%
X		X									1	<1%
X		X	X								1	<1%
X		X	X					X**			1	<1%
X				X							3	2%
X			X								8	7%
X			X		X						1	<1%
	X										17	14%
	X	X									14	12%
	X	X								X (AAA)	1	<1%
	X	X	X								2	2%
	X							X†			1	<1%
	X			X							1	<1%
	X				X						5	4%
	X		X		X						1	<1%
		X									5	4%
		X	X								3	2%
			X								31	26%
			X					X‡			1	<1%
			X		X						1	<1%
				X							4	3%
				X	X						1	<1%
								X#			1	2%
					X						3	2%
							X				1	<1%

*Only includes patients with documentation of a coverage for medical care or other services during the SP; there was no documentation of CHAMPUS/Tricare or Veterans Administration coverage

**RxAmerica (only covers prescriptions)

†Kalamazoo County Health Plan

‡Children's Special Health Services

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