Washington State/Seattle-King County HIV/AIDS Epidemiology Report

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HIV/AIDS Epidemiology publications are also on the internet at: www.metrokc.gov/health/apu/epi

Alternative formats provided upon request. To be included on the mailing list or to request address corrections, please call (206) 296-4645.

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Credits

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HIV/AIDS Reporting Requirements

Detailed requirements for reporting of communicable disease including HIV/AIDS are described in the Washington Administrative Code (WAC), section 246-101, online http://apps.leg.wa.gov/WAC/default.aspx?cite=246-101

Washington health care providers are required to report all HIV infections, regardless of the date of the patient's initial diagnosis, to the health department. Providers are also required to report new diagnoses of AIDS in a person previously diagnosed with HIV infection. Local health department officials forward case reports to the State Department of Health. Names are never sent to the federal government.

Laboratories are required to report evidence of HIV infection (i.e. positive western blot assays, p24 antigen detection, viral culture, and nucleic acid detection), all HIV viral load tests (detectable or not), and all CD4 counts in the setting of HIV infection. If the laboratory cannot distinguish tests, such as CD4 counts, done due to HIV versus other diseases (such as cancer), the CD4 counts should be reported and the health department will investigate. However, laboratory reporting does not relieve health care providers of their duty to report as most of the critical information necessary for surveillance and follow-up is not available to labs.

For further information about HIV/AIDS reporting requirements, please call your local health department or the Washington State Department of Health at 1 (888) 367 5555. In King County call (206) 296-4645.

Table 1: Surveillance of reported[1] HIV/AIDS cases, deaths, and people living with HIV/AIDS—reported as of 6/30/2007—King County, other Washington counties, all Washington State, and U.S.

		Adult/Adolescent		Pediatric[3]	
		HIV	AIDS[2]	HIV or AIDS	Total
King County	New cases reported in 1st half 2007	155	119	0	274
	Cases reported year-to-date	155	119	0	274
	Cumulative Cases	2,873	7,555	33	10,461
	Cumulative Deaths	119	4,145	9	4,273
	Persons Living (prevalent cases)	2,754	3,410	24	**6,188**
Other Counties	New cases reported in 1st half 2007	138	90	1	229
	Cases reported year-to-date	138	90	1	229
	Cumulative Cases	1,551	4,290	40	5,881
	Cumulative Deaths	86	2,197	12	2,295
	Persons Living (prevalent cases)	1,465	2,093	28	**3,586**
Washington State	New cases reported in 1st half 2007	293	209	1	503
	Cases reported year-to-date	293	209	1	503
	Cumulative Cases	4,424	11,845	73	16,342
	Cumulative Deaths	205	6,342	21	6,568
	Persons Living (prevalent cases)	4,219	5,503	52	**9,774**
United States[4]	Estimated Cases as of 12/31/2005				
	Cumulative Cases	244,868	979,287	14,171	1,238,326
	Cumulative Deaths	2,978	545,079	5,378	553,435
	Persons Living (prevalent cases)	241,890	434,208	8,793	684,891

1. An estimated 11,000 to 12,000 people live in Washington with HIV infection including AIDS. These include the 9,774 prevalent cases reported above. In King County, there are an estimated 7,200 to 7,800 people living with HIV infection including AIDS. These include the 6,188 prevalent cases reported above. The difference between the estimated cases and the reported prevalent cases include three groups:
   a. People diagnosed with AIDS but not yet reported (probably fewer than 5% of total AIDS reports).
   b. People diagnosed with HIV infection but not yet reported.
   c. People infected with HIV but not yet diagnosed or reported (perhaps 10-20% of total HIV estimate).
2. New AIDS counts include cases previously reported as HIV without AIDS.
3. Pediatric cases are under age 13 at the time of diagnosis with HIV or AIDS.
4. U.S. data for people with HIV infection not AIDS are based upon reports from states and areas with confidential, named-based HIV infection reporting. Washington is not included in those counts at this time.

Table 2: Cumulative HIV/AIDS case counts and deaths by resident county and AIDSNet region at diagnosis—reported as of 6/30/2007—Washington State

		Cumulative Cases	Deaths		Presumed Living			
			No.	(%)[1]	HIV	AIDS	Total	(Total %)[2]
	Adams	6	1	(17)	1	4	5	(0.1)
	Asotin	21	7	(33)	3	11	14	(0.1)
	Columbia	5	4	(80)	0	1	1	(0.0)
	Ferry	8	6	(75)	1	1	2	(0.0)
	Garfield	1	0	(0)	1	0	1	(0.0)
	Lincoln	4	2	(50)	0	2	2	(0.0)
	Okanogan	33	9	(27)	7	17	24	(0.2)
	Pend Orielle	9	5	(56)	0	4	4	(0.0)
	Spokane	666	292	(44)	150	224	374	(3.8)
	Stevens	26	12	(46)	7	7	14	(0.1)
	Walla Walla	60	29	(48)	6	25	31	(0.3)
	Whitman	16	4	(25)	1	11	12	(0.1)
Region 1	**Subtotal**	**855**	**371**	**(43)**	**177**	**307**	**484**	**(5.0)**
	Benton	118	39	(33)	31	48	79	(0.8)
	Chelan	61	24	(39)	17	20	37	(0.4)
	Douglas	5	2	(40)	2	1	3	(0.0)
	Franklin	69	18	(26)	18	33	51	(0.5)
	Grant	44	20	(45)	10	14	24	(0.2)
	Kittitas	25	10	(40)	5	10	15	(0.2)
	Klickitat	15	6	(40)	6	3	9	(0.1)
	Yakima	229	81	(35)	56	92	148	(1.5)
Region 2	**Subtotal**	**566**	**200**	**(35)**	**145**	**221**	**366**	**(3.7)**
	Island	74	34	(46)	14	26	40	(0.4)
	San Juan	25	11	(44)	6	8	14	(0.1)
	Skagit	89	38	(43)	21	30	51	(0.5)
	Snohomish	927	334	(36)	228	365	593	(6.1)
	Whatcom	215	85	(40)	54	76	130	(1.3)
Region 3	**Subtotal**	**1,330**	**502**	**(38)**	**323**	**505**	**828**	**(8.5)**
Region 4	**King**	**10,461**	**4,273**	**(41)**	**2,773**	**3,415**	**6,188**	**(63.3)**
	Kitsap	297	121	(41)	77	99	176	(1.8)
	Pierce	1,457	596	(41)	398	463	861	(8.8)
Region 5	**Subtotal**	**1,754**	**717**	**(41)**	**475**	**562**	**1,037**	**(10.6)**
	Clallam	77	34	(44)	19	24	43	(0.4)
	Clark	611	219	(36)	178	214	392	(4.0)
	Cowlitz	132	54	(41)	40	38	78	(0.8)
	Grays Harbor	80	33	(41)	16	31	47	(0.5)
	Jefferson	38	17	(45)	12	9	21	(0.2)
	Lewis	54	26	(48)	10	18	28	(0.3)
	Mason	100	24	(24)	19	57	76	(0.8)
	Pacific	30	12	(40)	11	7	18	(0.2)
	Skamania	7	5	(71)	0	2	2	(0.0)
	Thurston	244	81	(33)	59	104	163	(1.7)
	Wahkiakum	3	0	(0)	1	2	3	(0.0)
Region 6	**Subtotal**	**1,376**	**505**	**(37)**	**365**	**506**	**871**	**(8.9)**
Total		**16,342**	**6,568**	**(40)**	**4,258**	**5,516**	**9,774**	**(100.0)**

1. Percent of county cases who have died (row %).
2. Percent of total presumed living cases in Washington State (column %).

Table 3: Demographic characteristics of people presumed living with HIV/AIDS—reported as of 6/30/2007—King County, other Washington counties, all Washington State, and U.S.

	King County		Other Counties		Washington State		Estimated U.S. AIDS[1]	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Sex								
Male	5,589	(90)	2,884	(80)	8,473	(87)	336,363	(77)
Female	599	(10)	702	(20)	1,301	(13)	101,619	(23)
Age Group at HIV diagnosis								
Under 13	26	(0)	32	(1)	58	(1)	3,774	(1)
13-19	117	(2)	103	(3)	220	(2)	not available	
20-29	1,793	(29)	1,062	(30)	2,855	(29)	not available	
30-39	2,678	(43)	1,309	(37)	3,987	(41)	not available	
40-49	1,233	(20)	784	(22)	2,017	(21)	not available	
50-59	292	(5)	240	(7)	532	(5)	not available	
60 and over	49	(1)	56	(2)	105	(1)	not available	
Current Age as of 12/31/2006								
Under 13	11	(0)	8	(0)	19	(0)	1,412	(0)
13-19	12	(0)	23	(1)	35	(0)	3,146	(1)
20-29	343	(6)	255	(7)	598	(6)	20,276	(4)
30-39	1,456	(24)	845	(24)	2,301	(24)	97,990	(25)
40-49	2,640	(43)	1,416	(39)	4,056	(41)	187,591	(43)
50-59	1,360	(22)	770	(21)	2,130	(22)	97,846	(21)
60 and over	366	(6)	269	(8)	635	(6)	29,721	(6)
Race/Ethnicity[2]								
White	4,297	(69)	2,582	(72)	6,879	(70)	154,944	(35)
Black	1,000	(16)	428	(12)	1,428	(15)	193,408	(44)
Hispanic	571	(9)	372	(10)	943	(10)	81,138	(19)
Asian & Pacific Islander	170	(3)	95	(3)	265	(3)	4,479	(1)
Asian	*160*	*(3)*	*50*	*(1)*	*210*	*(2)*	*not available*	
Native Hawaiian & Other PI	*10*	*(0)*	*15*	*(0)*	*25*	*(0)*	*not available*	
Native American or Alaskan Native	86	(1)	82	(2)	168	(2)	1,640	(0)
Multiple Race	46	(1)	6	(0)	52	(1)	N/A	
Unknown Race	18	(0)	21	(1)	39	(0)	2,373	(1)
HIV Exposure Category								
Male-male sex	4,297	(69)	1,754	(49)	6,051	(62)	198,837	(45)
Injection drug use (IDU)	360	(6)	493	(14)	853	(9)	98,750	(23)
IDU & male-male sex	535	(9)	299	(8)	834	(9)	26,903	(6)
Heterosexual contact	454	(7)	564	(16)	1,018	(10)	102,797	(23)
Blood product exposure	36	(1)	41	(1)	77	(1)	not available	
Perinatal exposure	19	(0)	27	(1)	46	(0)	3,742	(1)
Undetermined/other[3]	487	(8)	408	(11)	895	(9)	6,953	(2)
Total	**6,188**	**(100)**	**3,586**	**(100)**	**9,774**	**(100)**	**437,982**	**(100)**

1. U.S. AIDS data were reported as of 12/31/2005; detailed summaries of 246,909 living HIV cases reported from states and areas with confidential name-based HIV infection reporting were not readily available. CDC age at diagnosis data could not be readily recalculated to match Washington categories. Hemophilia and blood product numbers are included in the 'Undetermined / other' category.
2. All race categories are mutually exclusive and are non-Hispanic. A few Asian & Pacific Islander cases cannot be readily assigned into either Asian, or Native Hawaiian & Other Pacific Islander and are included only in the total.
3. Includes cases with incomplete information, and sexual exposures where the heterosexual partner is not known to be HIV+, IDU, or a bisexual male. One case was probably infected via occupational exposure.

Table 4: People presumed living with HIV/AIDS by gender, race or ethnicity, and HIV exposure category—reported as of 6/30/2007—King County

	White[1]		Black[1]		Hispanic		Asian & PI[1,2]		Native Am/AN[1,3]		Total[4]	
HIV Exposure Category	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Male												
Male-male sex	3,369	(78)	358	(36)	385	(67)	115	(68)	31	(36)	4,297	(69)
Injection drug use (IDU)	118	(3)	73	(7)	29	(5)	5	(3)	8	(9)	235	(4)
IDU & male-male sex	427	(10)	41	(4)	39	(7)	5	(3)	13	(15)	535	(9)
Heterosexual contact	47	(1)	102	(10)	21	(4)	5	(3)	2	(2)	178	(3)
Blood product exposure	16	(0)	3	(0)	2	(0)	1	(1)	0	(0)	22	(0)
Perinatal exposure	1	(0)	4	(0)	0	(0)	1	(1)	0	(0)	6	(0)
Undetermined/other	96	(2)	140	(14)	51	(9)	19	(11)	4	(5)	316	(5)
Male Subtotal	**4,074**	**(95)**	**721**	**(72)**	**527**	**(92)**	**151**	**(89)**	**58**	**(67)**	**5,589**	**(90)**
Female												
Injection drug use	62	(1)	40	(4)	4	(1)	1	(1)	17	(20)	125	(2)
Heterosexual contact	116	(3)	118	(12)	23	(4)	8	(5)	7	(8)	276	(4)
Blood product exposure	4	(0)	8	(1)	2	(0)	0	(0)	0	(0)	14	(0)
Perinatal exposure	3	(0)	7	(1)	2	(0)	1	(1)	0	(0)	13	(0)
Undetermined/other	38	(1)	106	(11)	13	(2)	9	(5)	4	(5)	171	(3)
Female Subtotal	**223**	**(5)**	**279**	**(28)**	**44**	**(8)**	**19**	**(11)**	**28**	**(33)**	**599**	**(10)**
Total	**4,297**	**(69)**	**1,000**	**(16)**	**571**	**(9)**	**170**	**(3)**	**86**	**(1)**	**6,188**	**(100)**

Table 5: People presumed living with HIV/AIDS by gender, race or ethnicity, and HIV exposure category—reported as of 6/30/2007—Washington State

	White[1]		Black[1]		Hispanic		Asian & PI[1,2]		Native Am/AN[1,3]		Total[4]	
HIV Exposure Category	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Male												
Male-male sex	4,773	(69)	484	(34)	530	(56)	154	(58)	55	(33)	6,051	(62)
Injection drug use (IDU)	361	(5)	114	(8)	62	(7)	8	(3)	16	(10)	564	(6)
IDU & male-male sex	671	(10)	62	(4)	59	(6)	7	(3)	22	(13)	834	(9)
Heterosexual contact	127	(2)	149	(10)	54	(6)	14	(5)	8	(5)	354	(4)
Blood product exposure	42	(1)	3	(0)	7	(1)	1	(0)	0	(0)	53	(1)
Perinatal exposure	7	(0)	9	(1)	2	(0)	2	(1)	1	(1)	21	(0)
Undetermined/other	273	(4)	180	(13)	101	(11)	28	(11)	5	(3)	596	(6)
Male Subtotal	**6,254**	**(91)**	**1,001**	**(70)**	**815**	**(86)**	**214**	**(81)**	**107**	**(64)**	**8,473**	**(87)**
Female												
Injection drug use (IDU)	172	(3)	69	(5)	12	(1)	4	(2)	30	(18)	289	(3)
Heterosexual contact	329	(5)	197	(14)	83	(9)	27	(10)	23	(14)	664	(7)
Blood product exposure	7	(0)	11	(1)	3	(0)	3	(1)	0	(0)	24	(0)
Perinatal exposure	9	(0)	10	(1)	4	(0)	2	(1)	0	(0)	25	(0)
Undetermined/other	108	(2)	140	(10)	26	(3)	15	(6)	8	(5)	299	(3)
Female Subtotal	**625**	**(9)**	**427**	**(30)**	**128**	**(14)**	**51**	**(19)**	**61**	**(36)**	**1,301**	**(13)**
Total	**6,879**	**(70)**	**1,428**	**(15)**	**943**	**(10)**	**265**	**(3)**	**168**	**(2)**	**9,774**	**(100)**

1. And not Hispanic. All race and ethnicity categories are mutually exclusive.
2. Due to small cell sizes, data have been combined for Asians, Native Hawaiians, and other Pacific Islanders.
3. Native American or Alaskan Native
4. Totals include 43 King County and 47 Washington State people classified in multiple race, and 26 King County and 47 Washington State people with missing race.

Table 6: People presumed living with HIV/AIDS by gender and age at HIV diagnosis—reported as of 6/30/2007—King County and Washington State

Age at HIV Diagnosis	King County				Washington State			
	Male		Female		Male		Female	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Under 13 years	11	(0)	15	(3)	28	(0)	30	(2)
13-19 years	83	(1)	34	(6)	147	(2)	73	(6)
20-29 years	1,586	(28)	207	(35)	2,412	(28)	443	(34)
30-39 years	2,474	(44)	204	(34)	3,566	(42)	421	(32)
40-49 years	1,146	(21)	87	(15)	1,787	(21)	230	(18)
50-59 years	245	(4)	47	(8)	442	(5)	90	(7)
60 years and over	44	(1)	5	(1)	91	(1)	14	(1)
Total	**5,589**	**(100)**	**599**	**(100)**	**8,473**	**(100)**	**1,301**	**(100)**

Table 7: People presumed living with HIV/AIDS by gender, race or ethnicity, and place of birth[1]—reported as of 6/30/2007—King County and Washington State

Race / Ethnicity	King County				Washington State			
	U.S.-born		Foreign-born		U.S.-born		Foreign-born	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
White, non-Hispanic	4,011	(98)	96	(2)	6,443	(98)	139	(2)
Black, non-Hispanic	643	(66)	324	(34)	981	(71)	402	(29)
Male Black, non-Hispanic	*516*		*178*		*756*		*209*	
Female Black, non-Hispanic	*127*		*146*		*225*		*193*	
Hispanic	219	(42)	300	(58)	342	(40)	506	(60)
Asian & PI, non-Hispanic	51	(32)	107	(68)	85	(35)	159	(65)
Native American, non-Hispanic	78	(94)	5	(6)	159	(96)	6	(4)
Multiple or unknown race, non-Hispanic	49	(88)	7	(13)	66	(86)	11	(14)
TOTAL	**5,051**	**(86)**	**839**	**(14)**	**8,076**	**(87)**	**1,223**	**(21)**

1. Table 7 does not include 298 King County and 475 Washington cases missing place of birth information.

Figure 1: Number of new HIV/AIDS diagnoses, deaths, and people living with HIV/AIDS at end of three year intervals—reported as of 6/30/2007—King County

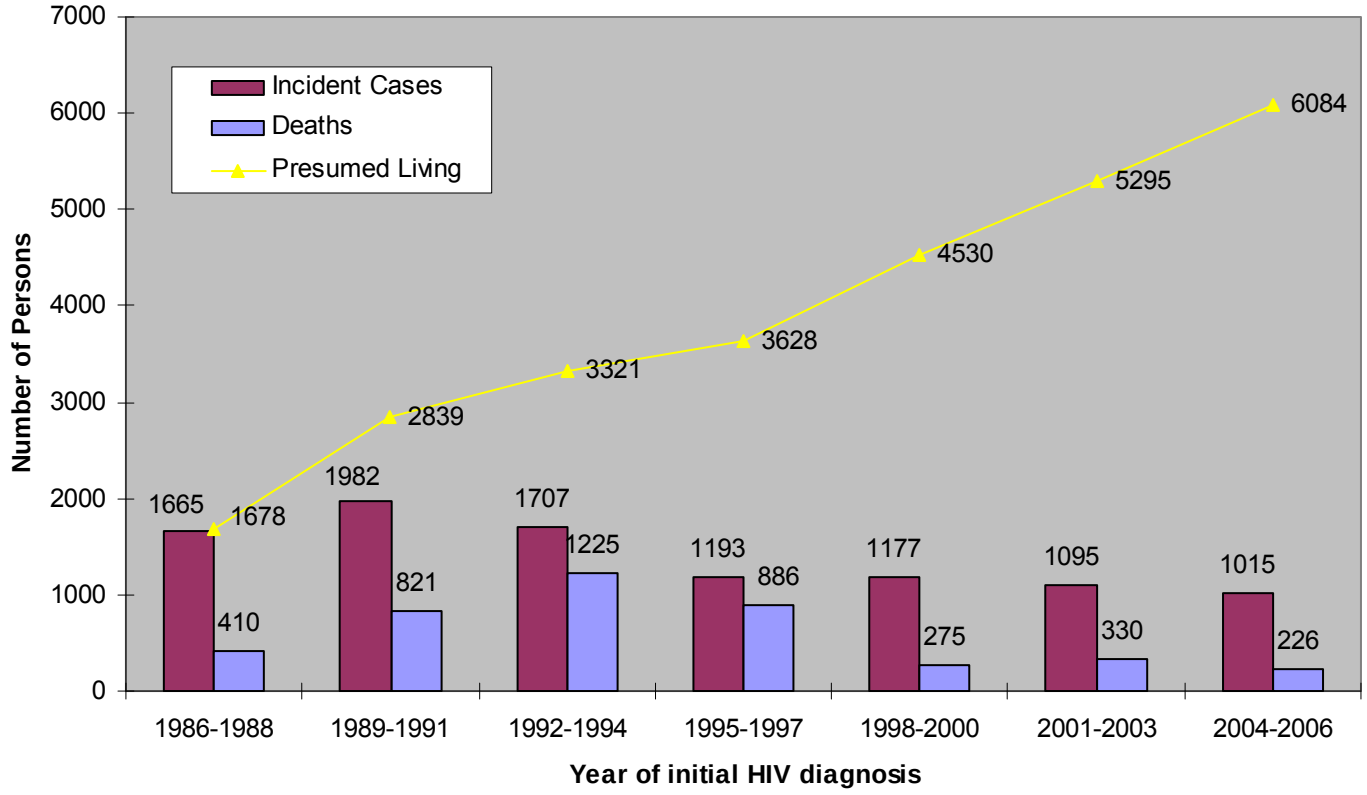


Figure 2: Number of new HIV/AIDS diagnoses, deaths, and people living with HIV/AIDS at end of three year intervals—reported as of 6/30/2007—Washington State

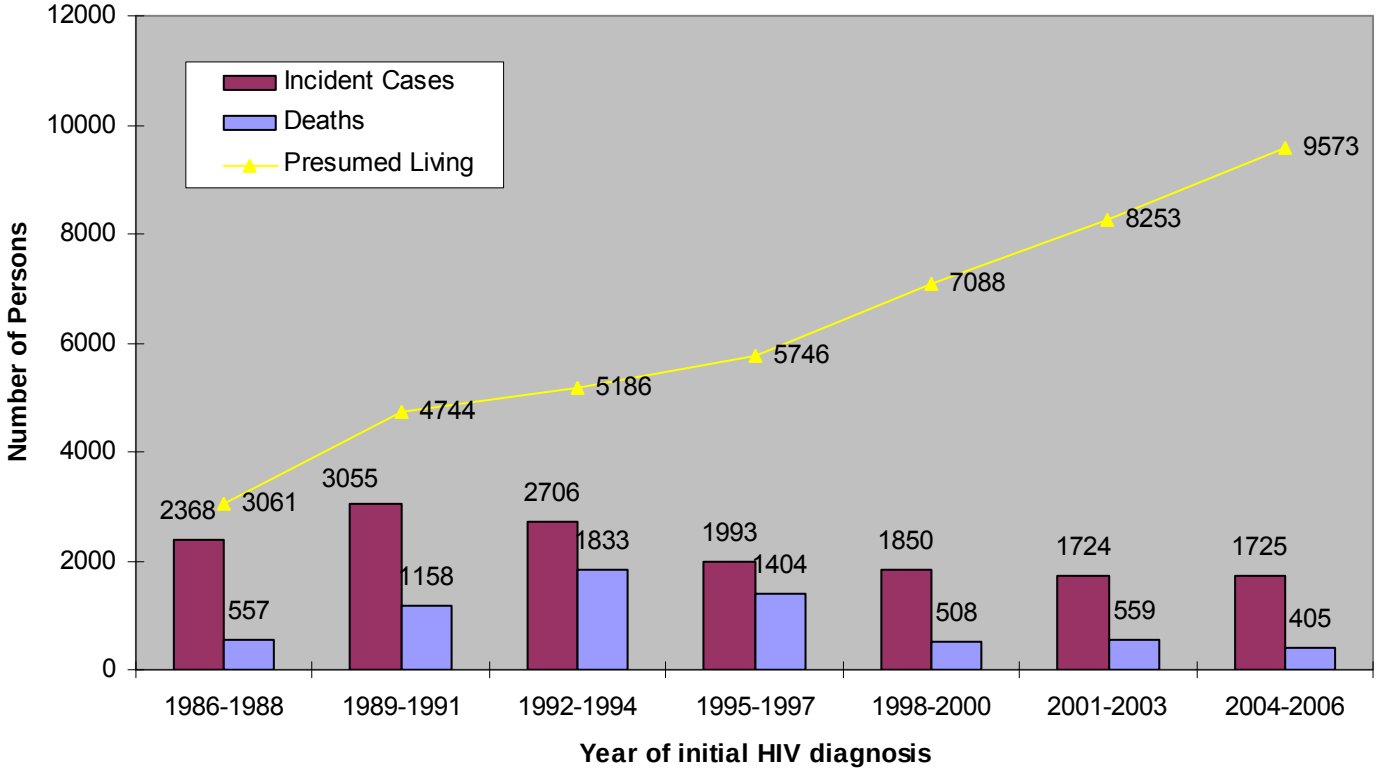


Table 8: Demographic characteristics of King County residents diagnosed 1981-2006 and reported through 6/30/2007, by date of HIV diagnosis

	1981-1997		1998-2000		2001-2003		2004-2006[1]		Trend[2]
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	1998-2006
TOTAL	**7,051**	**(100)**	**1,177**	**(100)**	**1,095**	**(100)**	**1,015**	**(100)**	
HIV Exposure Category									
Men who have sex with men (MSM)	5,330	(76)	788	(67)	710	(65)	630	(62)	
Injection drug user (IDU)	389	(6)	80	(7)	71	(6)	60	(6)	
MSM-IDU	745	(11)	91	(8)	86	(8)	83	(8)	
Heterosexual contact	257	(4)	105	(9)	123	(11)	73	(7)	
Blood product exposure	91	(1)	6	(1)	6	(1)	4	(0)	
Perinatal exposure	22	(0)	5	(0)	0	(0)	0	(0)	
SUBTOTAL- known risk	*6,834*		*1,075*		*996*		*850*		
Undetermined/other[3]	217	(3)	102	(9)	99	(9)	165	(16)	
Sex & Race/Ethnicity									
Male	*6,657*	*(94)*	*1,038*	*(88)*	*971*	*(89)*	*904*	*(89)*	
White Male[4]	5,471	(78)	710	(60)	650	(59)	558	(55)	down
Black Male[4]	605	(9)	166	(14)	148	(14)	155	(15)	
Hispanic Male	373	(5)	106	(9)	113	(10)	114	(11)	
Other Male[4]	208	(3)	56	(5)	60	(5)	77	(8)	up
Female	*394*	*(6)*	*139*	*(12)*	*124*	*(11)*	*111*	*(11)*	
White Female[4]	210	(3)	56	(5)	31	(3)	33	(3)	
Black Female[4]	126	(2)	64	(5)	70	(6)	60	(6)	
Hispanic Female	24	(0)	12	(1)	10	(1)	7	(1)	
Other Female[4]	34	(0)	7	(1)	13	(1)	11	(1)	
Race/Ethnicity									
White[4]	5,681	(81)	766	(65)	681	(62)	591	(58)	down
Black[4]	731	(10)	230	(20)	218	(20)	215	(21)	
Hispanic	397	(6)	118	(10)	123	(11)	121	(12)	
Asian & Pacific Islander[4]	113	(2)	35	(3)	34	(3)	52	(5)	up
Native American or Alaskan Native[4]	98	(1)	18	(2)	21	(2)	9	(1)	
Multiple Race[4]	27	(0)	7	(1)	16	(1)	19	(2)	up
Unknown Race[4]	4	(0)	3	(0)	2	(0)	8	(1)	
Place of Birth									
Born in U.S. or Territories	6,466	(92)	925	(79)	853	(78)	742	(73)	down
Born outside U.S.	430	(6)	179	(15)	222	(20)	210	(21)	up
Birthplace unknown	155	(2)	73	(6)	20	(2)	63	(6)	
Age at diagnosis of HIV									
0-12 years	26	(0)	6	(1)	0	(0)	3	(0)	
13-19 years	104	(1)	18	(2)	14	(1)	4	(0)	down
20-29 years	1,969	(30)	262	(22)	234	(21)	238	(23)	
30-39 years	3,128	(44)	525	(45)	518	(47)	393	(39)	down
40-49 years	1,369	(19)	282	(24)	244	(22)	282	(28)	up
50-59 years	367	(5)	71	(6)	70	(6)	76	(7)	
60 + years	88	(1)	13	(1)	15	(1)	19	(2)	
Residence									
Seattle residence	6,111	(87)	986	(84)	861	(79)	760	(75)	down
King County outside Seattle	940	(13)	191	(16)	234	(21)	255	(25)	up

1. Data from recent years are incomplete.
2. The chi-square test for trend identifies statistical changes ($p < .05$) over the periods 1998-2000, 2001-03, and 2004-06.
3. Undetermined mode of exposure includes cases with incomplete information, and sexual exposures where the heterosexual partner is not known to be HIV+, IDU, or a bisexual male. One case was probably infected through occupational exposure.
4. And not Hispanic. The groups Asian and Native Hawaiian & Pacific Islanders are grouped because of small cell sizes.

Table 9: Demographic characteristics of Washington State residents diagnosed 1981-2006 and reported through 6/30/2007, by date of HIV diagnosis

	1981-1997		1998-2000		2001-2003		2004-2006[1]	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
TOTAL	**10,817**	**(100)**	**1,850**	**(100)**	**1,724**	**(100)**	**1,725**	**(100)**
HIV Exposure Category								
Men who have sex with men (MSM)	7,390	(68)	1,111	(60)	1,003	(58)	953	(55)
Injection drug user (IDU)	947	(9)	200	(11)	154	(9)	143	(8)
MSM-IDU	1,136	(11)	135	(7)	129	(7)	127	(7)
Heterosexual contact	628	(6)	207	(11)	244	(14)	197	(11)
Blood product exposure	217	(2)	10	(1)	8	(0)	10	(1)
Perinatal exposure	53	(0)	7	(0)	1	(0)	2	(0)
SUBTOTAL - known risk	*10,371*		*1,670*		*1,539*		*1,432*	
Undetermined/other[3]	446	(4)	180	(10)	185	(11)	293	(17)
Sex & Race/Ethnicity								
Male	*9,892*	*(91)*	*1,585*	*(86)*	*1,469*	*(85)*	*1,467*	*(85)*
White Male[4]	8,157	(75)	1,108	(60)	993	(58)	974	(56)
Black Male[4]	835	(8)	224	(12)	213	(12)	216	(13)
Hispanic Male	585	(5)	168	(9)	171	(10)	171	(10)
Other Male[4]	315	(3)	85	(5)	92	(5)	106	(6)
Female	*925*	*(9)*	*265*	*(14)*	*255*	*(15)*	*258*	*(15)*
White Female[4]	558	(5)	128	(7)	99	(6)	104	(6)
Black Female[4]	218	(2)	89	(5)	106	(6)	92	(5)
Hispanic Female	74	(1)	27	(1)	23	(1)	33	(2)
Other Female[4]	75	(1)	21	(1)	27	(2)	29	(2)
Race/Ethnicity								
White[4]	8,715	(81)	1,236	(67)	1,092	(63)	1,078	(62)
Black[4]	1,053	(10)	313	(17)	319	(19)	308	(18)
Hispanic	659	(6)	195	(11)	194	(11)	204	(12)
Asian & Pacific Islander[4]	167	(2)	58	(3)	60	(3)	73	(4)
Native American or Alaskan Native[4]	178	(2)	31	(2)	37	(2)	31	(2)
Multiple Race[4]	31	(0)	8	(0)	16	(1)	22	(1)
Unknown Race[4]	14	(0)	9	(0)	6	(0)	9	(1)
Place of Birth								
Born in U.S. or Territories	9,936	(92)	1,474	(80)	1,371	(80)	1,322	(77)
Born outside U.S.	656	(6)	257	(14)	304	(18)	302	(18)
Birthplace unknown	225	(2)	119	(6)	49	(3)	101	(6)
Age at diagnosis of HIV								
0-12 years	65	(1)	8	(0)	1	(0)	6	(0)
13-19 years	196	(2)	31	(2)	26	(2)	15	(1)
20-29 years	3,117	(29)	412	(22)	364	(21)	409	(24)
30-39 years	4,623	(43)	784	(42)	751	(44)	585	(34)
40-49 years	2,065	(19)	448	(24)	418	(24)	498	(29)
50-59 years	573	(5)	139	(8)	121	(7)	173	(10)
60 + years	178	(2)	28	(2)	44	(3)	40	(2)
Residence[5]								
Region 1- Spokane area	544	(5)	110	(6)	87	(5)	100	(6)
Region 2- Yakima area	328	(3)	77	(4)	70	(4)	76	(4)
Region 3- Everett area	871	(8)	137	(7)	130	(8)	173	(10)
Region 4- Seattle area	7,051	(65)	1,177	(64)	1,095	(64)	1,015	(59)
Region 5- Tacoma area	1,145	(11)	211	(11)	177	(10)	198	(11)
Region 6- Olympia area	878	(8)	138	(7)	165	(10)	163	(9)

1. Data from recent years are incomplete.
2. The chi-square test for trend identifies statistical changes ($p < .05$) over the periods 1998-2000, 2001-03, and 2004-06.
3. Undetermined mode of exposure includes cases with incomplete information, and sexual exposures where the heterosexual partner is not known to be HIV+, IDU, or a bisexual male. One case was probably infected through occupational exposure.
4. And not Hispanic. The groups Asian and Native Hawaiian & Pacific Islanders are grouped because of small cell sizes.
5. The counties and regions are: Region 1—Adams, Asotin, Columbia, Ferry, Garfield, Lincoln, Okanogan, Pend Oreille, Spokane, Stevens, Walla Walla, and Whitman; Region 2- Benton, Chelan, Douglas, Franklin, Grant, Kittitas, Klickitat, and Yakima; Region 3- Island, San Juan, Skagit, Snohomish, and Whatcom; Region 4- King; Region 5- Kitsap and Pierce; Region 6- Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Lewis, Mason, Pacific, Skamania, Thurston, and Wahkiakum.

Frequently asked questions about estimates of people living with HIV/AIDS in Washington State

How many people are estimated to be living in Washington State with HIV/AIDS?
The Washington State Department of Health estimates that the number of people living with HIV/AIDS in Washington State is between 11,000 and 12,000 cases. As of June 2007, there were 9,774 people reported to be living with HIV/AIDS in the state. This number does not reflect those who received anonymous tests for HIV and have not entered care because they are unlikely to be reported to public health; it also does not represent those who are HIV-infected but have never been tested. Anonymous testers who do not enter care are thought to make up a very small proportion of individuals and in Washington State, the proportion of individuals who are HIV-positive who do not know their status is estimated to be 10%-20%. These estimates are based on information about the size and characteristics of at-risk populations and from seroprevalence studies, analyses of HIV testing patterns, evaluations of surveillance system performance, and trend analyses of recent HIV and AIDS incidence.

The Centers for Disease Control and Prevention (CDC) has reported that 25% of people who are HIV-infected do not know their status. Where does this number come from, and why is the percent for Washington State different?
In 2005, CDC estimated that there were 1,039,000 to 1,185,000 people living with HIV/AIDS in the United States as of the end of 2003, and that 24-27% of these people were not aware of their HIV infection. This estimate was based on a study by Glynn and Rhodes and presented at the National HIV Prevention Conference in July 2005[1]. Although presented as a range, many have simplified the results of the study to say that nationally, approximately 25% of HIV-positive persons do not know that they have HIV.

When considering national estimates, it is important to remember that the size and characteristics of the epidemic are different in different areas of the country. The sizes of the different at-risk populations differ across the country, as do the availability of prevention services, including HIV testing, and care services. Washington State's unique characteristics have been taken into account when analyzing local data and estimating the proportion of people who are HIV-infected and do not know their status.

Why do you present a range (11,000 to 12,000) instead of a single number to represent the number of people living with HIV/AIDS in Washington State?
When calculating the number of people living with HIV/AIDS in the state, we start with the best data that we have, which are cases reported to the surveillance system. We know that these cases do not represent all individuals living with HIV/AIDS in the state, so we use study data to develop estimates of the size of at-risk populations and HIV testing patterns. Estimates include some amount of uncertainty and it is important to reflect this uncertainty when presenting them. We recommend that if a single number is presented, it is the midpoint of the range, accompanied by information about the range. For instance, using the range above, one might say that an estimated 11,500 individuals (11,000 to 12,000) are living with HIV/AIDS in Washington State.

This range seems lower than ranges presented in the past. Since people continue to be diagnosed with HIV and, as a result of improved treatment, fewer people die, how is it possible that the numbers are going down?
In 1993 and 1996, the Washington State Department of Health and Public Health - Seattle & King County published reports of estimates of people living with HIV/AIDS[2,3]. In 1993, it was estimated that 10,000 to 20,000 people were living with HIV/AIDS in Washington State, and in 1996 (before highly active anti-retroviral treatment [HAART] was widely used), the estimated range was reduced to 9,000 to 14,000 individuals, because better data became available. With estimates, it is generally the case that the better your data become on which you are basing the estimate, the more accurate the estimate becomes and the narrower the range of uncertainty becomes. Previous estimates of HIV infection were based primarily on AIDS case data, which less completely reflected the extent of the epidemic. Since the time of the last estimates report, Washington State adopted HIV infection reporting and, as of 2006, comprehensive laboratory reporting, both of which have contributed to surveillance data that are more complete than they have been in the past. More accurate surveillance data lead to more accurate estimates and lower levels of uncertainty, as can be seen with the current narrower estimated range of 11,000 to 12,000 individuals living with HIV.

As more people become infected with HIV every year, and the number of HIV-related deaths stays low, can we expect the estimates to go up?
At this time, it is difficult to know how many people are getting newly infected with HIV every year; the surveillance system collects information on when people are first diagnosed with HIV, which may not reflect when they become infected. The number of new HIV diagnoses has been relatively stable for the past five years. Washington State is participating in HIV Incidence Surveillance, a project which will produce, as more data are collected, better information about the annual number of new infections. Nevertheless, as long as the number of new infections is larger than the number of deaths, we can expect that the number of people living with HIV infection will increase over time.

Why is it important to continue to work on improving the accuracy of estimates of the number of people living with HIV/AIDS in our state?
Health department staff will continue to look closely at surveillance system data and other study data to monitor the accuracy of estimates of people living with HIV/AIDS in our state. We will also collaborate with experts in statistics and mathematical modeling to see what we can learn from them. Receipt and allocation of resources to provide prevention and care services for infected individuals rely on the most accurate numbers possible. Estimates that under-represent the epidemic can potentially lead to receipt of inadequate resources, while estimates that over-represent the epidemic can potentially misdirect surveillance, prevention and care resources to find and plan services for a much larger population than exists.

- *Contributed by Maria Courogen and Jason Carr*

1. Glynn M, Rhodes P. Estimated HIV prevalence in the United States at the end of 2003 [abstract]. National HIV Prevention Conference, Atlanta GA, June 12 – 15, 2005.
2. Washington State and Seattle-King County HIV/AIDS Quarterly Epidemiology Report. Jointly published by Washington State Office of HIV/AIDS Epidemiology, Washington State Department of Health, and Public Health—Seattle & King County HIV/AIDS Epidemiology Unit, 1st quarter 1993; Vol 28.
3. Washington State and Seattle-King County HIV/AIDS Quarterly Epidemiology Report. Jointly published by Washington State Infectious Disease and Reproductive Health Assessment Unit of Washington State Department of Health, and Public Health—Seattle & King County HIV/AIDS Epidemiology Unit, 3rd quarter 1996; Vol 42.

Annual review of the epidemiology of HIV and AIDS in Seattle and King County

This article summarizes the status of the HIV and AIDS epidemics in King County (KC), Washington through June 30, 2007, based upon reports to Public Health of people with AIDS or HIV infection.

Global and National Perspective

According to the Joint United Nations Programme on HIV/AIDS[1], 39.5 million people worldwide were living with HIV or AIDS at the end of 2006, including 2.3 million children under 15 years of age. On average, 1.0% of adults worldwide age 15-49 are infected with HIV. An estimated 4.3 million persons acquired HIV infection, and 2.9 million deaths occurred in 2006. Twenty-eight million people have died from AIDS since 1981.

There are 1,039,000 to 1,185,000 HIV infected people in the United States, including an estimated one-quarter who remain undiagnosed and unaware of their status[2]. About 40,000 new infections occur in the U.S. each year (less than 1% of the world total), with over 17,000 deaths in 2005[3].

In 2005, the Seattle Metropolitan Statistical Area (MSA) including King, Snohomish and Island counties, ranked 44th nationally with an annual AIDS rate of 12.9 reported cases per 100,000 population. In comparison, the Tacoma MSA had a rate of 4.9 and the Portland, Oregon MSA rate was 8.2 per 100,000. The highest metropolitan rates (per 100,000 population) in the country were in Miami FL (52.8), Fort Lauderdale FL (45.8), New York City (45.4), Baltimore MD (40.4), San Francisco CA (33.4), Memphis TN (33.3), and Atlanta GA (32.3). [3]

The Seattle MSA cases make up a decreasing proportion of total U.S. cases over time. The Seattle MSA accounted for 1.01% of the cumulative U.S. total at the end of 1992, 0.95% at the end of 1996, and 0.83% at the end of 2005.[3]

Number of HIV-infected People Living in King County

The Washington State Department of Health estimates that 11,000 to 12,000 state residents, including 7,200 to 7,800 residents of King County are living with HIV or AIDS[4] [note this range is lower than previously published because we now believe only 10-20% of people infected with HIV in King County have not been diagnosed in contrast to CDC's 25% estimate for the country]. The number of new, reported, HIV diagnoses in King County has been level with 350-400 new diagnoses each year since 1998. Because there are about 100 HIV-related deaths annually, the reported number of King County residents living with HIV/AIDS is increasing (Figures 1 & 2).

As of June 30, 2007, HIV-infected King County residents include 3,415 reported living with AIDS, 2,773 reported living with HIV but not AIDS, an estimated 300-500 people diagnosed but not yet reported, and an estimated 500-1,300 people who are unaware of their infection status.

Figure 1: People reported living with HIV infection or AIDS
King County, 1986-2006, data reported through June 30, 2007

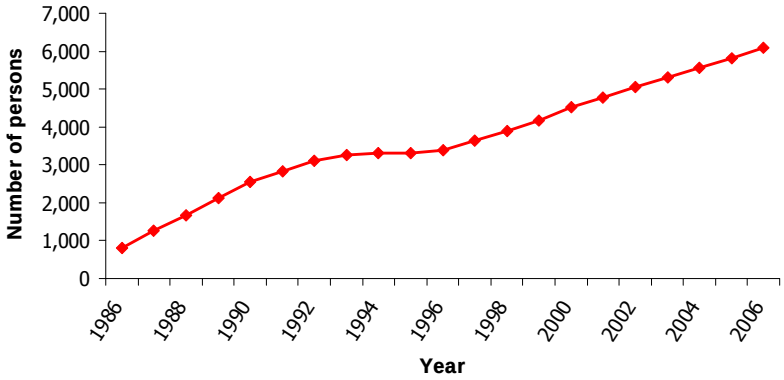


Table 1: Characteristics of King County residents with HIV or AIDS as of 6/30/2007

Characteristics of King Co. residents with HIV or AIDS 6/30/2007	Actual Reports		Estimated HIV Prevalence		
	Number Reported	Percent	Estimated Infected*	2006** Population	Estimated Rate Per 100***
Total	6,188	100%	7,500	1,826,732	0.4%
Race/Ethnicity					
White, not Hispanic	4,297	69%	5,260	1,303,959	0.4%
Black, not Hispanic	1,000	16%	1,220	112,218	1.1%
Foreign-born Blacks	*324*	*5%*	*410*	*23,776*	*1.7%*
Native-born Blacks	*643*	*10%*	*810*	*88,442*	*0.9%*
Hispanic	571	9%	700	131,277	0.5%
Asian & Pacific Islander	170	3%	210	262,022	0.1%
Native American or Alaskan Native	86	1%	110	17,257	0.6%
Multiple Race	46	<1%	Not applicable	Not applicable	Not applicable
Unknown	18	<1%	Not applicable	Not applicable	Not applicable
Sex & Race/Ethnicity					
Male	5,589	90%	6,770	914,083	0.7%
White Male	4,074	66%	4,990	650,379	0.8%
Black Male	721	12%	880	56,326	1.6%
Hispanic Male	527	9%	650	71,569	0.9%
Asian or Pacific Islander Male	151	2%	180	127,378	0.1%
Native American or Alaskan Native Male	58	1%	70	8,431	0.8%
Multiple or Unknown Race	58	1%	Not applicable	Not applicable	Not applicable
Female	599	10%	730	912,649	<0.1%
White Female	223	4%	270	653,580	0.04%
Black Female	279	5%	340	55,897	0.6%
Hispanic Female	44	1%	50	59,708	0.1%
Asian or Pacific Islander Female	19	<1%	30	134,638	<0.1%
Native American or Alaskan Native Female	28	<1%	40	8,826	0.5%
Multiple or Unknown Race	6	<1%	Not applicable	Not applicable	Not applicable
HIV Exposure Category					
Men who have sex w/men (MSM)	4,297	74%	5,530	40,000	13.8%
Injection drug user (IDU)	360	6%	460	15,000	3.1%
MSM-IDU	535	9%	690	3,150	21.9%
Blood product exposure	36	1%	50	Unknown	Unknown
Heterosexual contact****	574	10%	740	1,250,000	0.06%
Perinatal exposure	19	<1%	30	Unknown	Unknown
Subtotal- known exposure	5,821	100%	7,500	1,826,732	0.4%
Undetermined/ other	*367*	*6%*	*Not applicable*	*Not applicable*	*Not applicable*
Current Age as of 6/30/2007					
0-19 years	25	<1%	30	442,237	0.1%
20-24 years	78	1%	90	110,529	0.1%
25-34 years	804	13%	980	259,797	0.4%
35-44 years	2,419	39%	2,930	310,889	0.9%
45-44 years	2,044	33%	2,480	297,662	0.8%
55-64 years	692	11%	840	211,765	0.4%
65 years and over	126	2%	150	193,853	0.1%
Place of Birth					
Native-born	5,051	82%	6,430	1,468,749	0.4%
Foreign-born	839	14%	1,070	268,285	0.4%
Unknown birthplace	298	5%	Not applicable	Not applicable	Not applicable

* Between 7,200 and 7,800 King Co. residents may be infected with HIV. Each estimate is the percentage of cases excluding unknown categories, times the midpoint 7,500, rounded to the nearest 10.

** 2006 population estimates are from the American Community Survey of the U.S. Census Bureau.

*** The estimated rate is the estimated number infected divided by the population.

**** Includes 120 presumed heterosexual cases among women (see reference 5 at end of article).

Characteristics of People Living with HIV or AIDS

Table 1 presents the number of reported cases, the estimated number of total infections, and estimated 2006 infection rate. The estimated rates of HIV infection vary widely between population groups. The highest rates are among men who have sex with men (MSM), injection drug users (IDU), MSM/IDU, and foreign-born Blacks, with over 1% of these populations infected. These four groups account for 90% of all infections in King County.

Ninety percent of people living with HIV or AIDS in King County are male. Most, 69%, are White, 16% are Black, 9% Hispanic, 3% Asian/Pacific Islander (API), and 1% Native American/Alaska Native (NA/AN). Eighty-two percent were born in the U.S. or territories, 14% were foreign-born, and the birthplace was unknown for 4%. Compared with non-Hispanic Whites, the rates are four times higher among foreign-born Blacks, twice as high among U.S.-born Blacks and 1.5 times higher among Native American & Alaskan Natives (NA/AN).

Six percent of cases have no identified behavioral exposure to HIV. Among cases with known exposure, 74% are men who have sex with men (MSM), 9% are MSM who also inject drugs (MSM-IDU), 6% are injection drug users (IDU), 10% are heterosexual (men or women whose heterosexual partner has HIV or is an MSM or IDU) or presumed heterosexual[5]transmission (women who have sex with men and deny IDU), and fewer than 1% each were born to HIV-infected mothers or received blood products (mostly prior to 1985 in the US).

While the distribution of exposure categories differs by race, gender, and birth country, MSM, IDU, and foreign-born Blacks account for 95-98% of all male cases for each race. Among White, Hispanic, and Asian/Pacific Islander (API) men, MSM exposure accounts for 81-87% of known exposures, and for 57% among NA/AN men and 53% among Black men. MSM-IDU is the second most common exposure among White men (11%), Hispanic men (8%), and NA/AN men (24%). Foreign-born Blacks make up 26% of cases among Black men and are presumed to be mostly due to heterosexual transmission.

The vast majority of HIV-infected women are either IDU (23%) of cases) or have a heterosexual risk (66% of cases). Heterosexual cases are those with partners known to be HIV-infected (31%), partners who are IDU (9%), partners who are bisexual men (5%), or partners with hemophilia (1%). Another 20% of female cases are presumed heterosexual[5] transmission, which includes documented sex with men and denial of IDU. HIV heterosexual exposures account for 67% of cases among White, 75% among Black, 81% among Hispanic, and 88% among API women. However, among NA/AN women with HIV, IDU is the most common risk behavior (63%), and only 37% were heterosexual or presumed heterosexual transmission.

King County residents with HIV include people born worldwide. Among people diagnosed with HIV in 2003 or 2004, (selected as two recent years with mostly complete information) the place of birth was as follows:

- 78% United States
- 9% Africa
- 7% Mexico, Latin America and Caribbean
- 2% Asia and Eastern Europe
- 1% Western Europe or Canada
- 2% unknown birthplace

Infection rates are much higher among foreign-born Blacks (1.7%) than among native-born Blacks (0.9%). Foreign-born Blacks are a significant population for special prevention interventions because the risk profiles, language, cultural, and educational needs vary greatly from those among their U.S-born counterparts. The majority of reported cases among foreign-born Blacks are due to heterosexual transmission (44%), presumed heterosexual transmission (15%), or have no reported risk (32%), while 57% of native-born Blacks are MSM or MSM-IDU, and 15% are IDU.

Seventy-two percent of King County residents living with HIV are currently age 35- 54 years, and 13% are at least age 50 years of age. At the time of diagnosis, 77% of HIV-infected individuals resided in Seattle, 8% on the Eastside or north of Seattle and Lake Washington, and 15% in South King County.

Immunologic and Virologic Status

The Washington Administrative Code now requires that laboratories report all CD4 results and all HIV viral load results, regardless of level, to Public Health. While these data are still incomplete for the past year, they allow us to evaluate the immunologic status of all people living with HIV infection. As of October 1, 2007 we have received CD4 or viral load laboratory data on 3,340 of the 5,744 King County residents diagnosed with HIV or AIDS prior to July 1, 2006. Based on the most recent reported result, the status among 2,802 people with a CD4 after July 2006 included 16% with severe immune deficiency (CD4 count under 200 cells or under 14% of total lymphocytes), 44% with moderate immune deficiency (200-500 cells per microliter or 14-28% of total lymphocytes), and 37% with negligible or no immune deficiency (CD4 over 500 and over 28% of total lym-

phocytes). Based on the most recent reported result, the status among 3,161 people with any viral load test after July 2006 included 54% with no detectable viral load, 25% with a low viral burden (under 10,000 copies per microliter), 10% with a moderate viral burden (10-50,000 copies), and 11% with a high viral burden (over 50,000 copies).

Trends in Diagnosis of HIV Infection

Based upon data reported through June 2007, we compared the characteristics of persons diagnosed with HIV infection during 1998-2000, 2001-2003, and 2004-2006 (Table 2). A chi-square test for trend was used to determine if there was a statistically significant change in proportion of cases for each group over those three periods.

There have been only moderate shifts in the proportion of persons newly diagnosed with HIV infection among different groups over the past nine years. Between the three-year periods 1998-2000 through 2004-06, the proportion of cases increased for foreign-born Blacks (from 6% to 9%), and API (from 3% to 5%). The proportion of total cases decreased for White males (from 60% to 55%) and all Whites (from 65% to 58%)..

There was a slight increase in the proportion of King County residents age 40-49 at diagnosis (from 24% to 28%), and a decrease in people age 30-39 at the time of diagnosis (from 45% to 39%). At the same time the population of people living with HIV has aged consistently over the past decade as HIV has become a chronic infection. In 1998, half of individuals living with HIV were under age 39 and half were over age 39. In 2006, this median age was 44.

The residence of King County residents diagnosed with HIV is shifting away from Seattle. The proportion of cases among City residents has dropped from 84% to 75% of newly diagnosed cases, while South King County residents make up 16% rather than 10% of new cases, and East/ North King County residents make up 9% rather than 6% of new cases (comparisons for 1998-2000 through 2004-06).

The overall perinatal transmission rate in King County and in Washington is essentially zero because of effective anti-retroviral prophylaxis during pregnancy and after birth. Approximately 15-30 HIV+ women give birth each year in Washington but there have not been any perinatal infections transmitted to infants born in King County since 1997. All recent local diagnoses of perinatal infection have been made among

Table 2: Trends in HIV diagnosis among King County residents, 1998-2006

Characteristics	1998-2006	
	Trend	%
HIV Exposure Category		
Men who have sex with men (MSM)	No change	73%
Injection drug user (IDU)	No change	7%
MSM-IDU	No change	9%
Heterosexual contact	No change	10%
Sex & Race/Ethnicity		
Male	No change	89%
White Male	Decreasing	60% to 55%
Black Male	No change	14%
Hispanic Male	No change	10%
Female	No change	11%
White Female	No change	4%
Black Female	No change	6%
Hispanic Female	No change	1%
Race/Ethnicity		
White, non Hispanic	Decreasing	65% to 58%
Black, non Hispanic	No change	20%
Hispanic	No change	11%
Asian or Pacific Islander	Increasing	3% to 5%
American Indian/ Alaska Native	No change	1.5%
Age at diagnosis of HIV		
0-19 years	Decreasing	2% to 1%
20-29 years	No change	22%
30-39 years	Decreasing	45% to 39%
40-49 years	Increasing	24% to 28%
50-59 years	No change	7%
60 + years	No change	1%
Residence		
Seattle	Decreasing	84% to 75%
North and East King County	Increasing	6% to 9%
South King County	Increasing	10% to 16%
Place of birth, race, and exposure		
Born outside the U.S.	Increasing	15% to 21%
Foreign-born Blacks	*Increasing*	*6% to 9%*
Foreign-born who are not Black	*No change*	*11%*
Born in the U.S.	Decreasing	79% to 73%
Native-born Blacks	*No change*	*11%*
Native-born who are not Black	*No change*	*65%*

* Includes 120 presumed heterosexual women (see reference 5).

children born elsewhere who moved to King County or Washington.

Incidence and Resistance Testing

In two CDC-funded projects, Public Health tests small amounts of leftover sera from HIV-diagnostic specimens to help characterize the virus in persons newly diagnosed with HIV. We are currently testing about three-quarters of all specimens for King County residents; we expect the remaining quarter will be included in the next 12 months. These tests reveal several characteristics of the HIV virus circulating within the local population.

► 29% of new HIV diagnoses are among persons recently infected. Probability calculations suggest these people were likely infected within the past 12 months.

► 12% of treatment-naïve people have high-level resistance to one or more anti-retroviral drugs; 3% are resistant to antiretrovirals in two or more classes of drugs. These proportions have not changed since preliminary resistance testing data first became available in 1998.

► 9% of specimens are non-B subtypes of HIV-1. Most of these were among persons born in other countries.

Declining transmission rates

While the number of people living with HIV has been increasing about 5% annually since effective treatments became available, the number who are diagnosed each year has been relatively stable. Therefore, the *transmission rate* (new diagnoses divided by total infected population) is declining slightly. This may mean that the few infected persons who transmit the virus to uninfected persons represent a smaller proportion of the entire infected population each year. This may be partly due to more HIV-infected people knowing their status and reducing risk to their partners.

Diagnoses of AIDS and Deaths

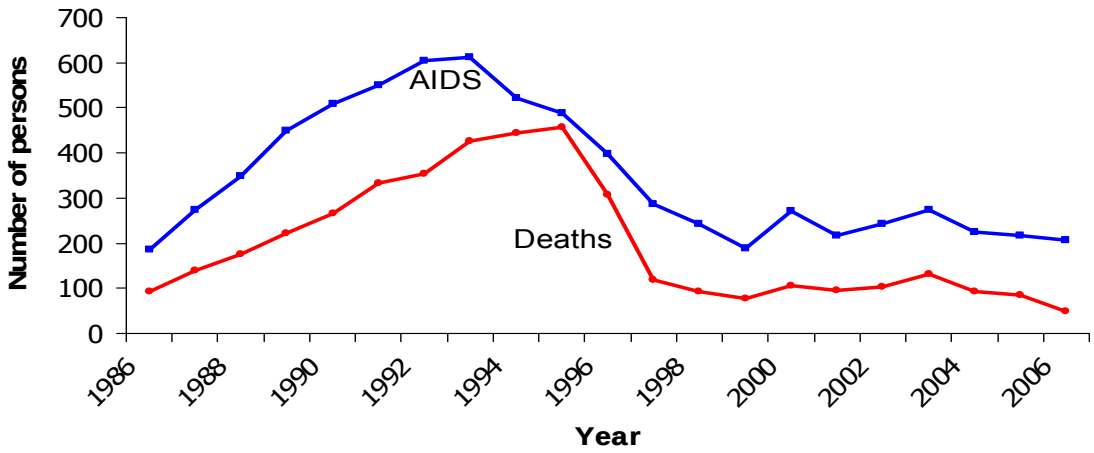
The diagnosis of AIDS is an important marker of HIV disease progression. Between 1981 and June 30, 2007 a total of 7,569 King Co. residents have been diagnosed with AIDS and 4,154 (55%) of them have died. There were about 250 new AIDS diagnoses annually between 1998 and 2006 (Figure 2). The number of AIDS deaths fluctuated between 70 and 120 annually from 1998 through 2006.

HIV/AIDS was the leading cause of death among 25-44 year old males in King County during the years 1989 to 1996,[5] but dropped to the 5th leading cause of death by 2004.

The decline in deaths is due to implementing effective antiretroviral treatments, effective prophylaxis to prevent opportunistic infections, monitoring of HIV progression (for example by assays of CD4 counts and HIV viral load), and prevention efforts to reduce HIV transmission rates.

Given the availability and increasing use of highly active antiretroviral therapy (or HAART) since 1995-6, ongoing progression to AIDS and deaths are worrisome. Several factors contribute to disease progression and death. Some people learn their HIV status too late in the course of their HIV disease to prevent AIDS or death, some have problems accessing treatment, and some

Figure 2: New AIDS cases and deaths
King County, 1986-2006, data reported through June 30, 2007



refuse treatment. Other people may experience treatment failures due to problems with taking medications, adverse side effects of HAART, and / or development of HIV strains resistant to antiretroviral drugs. Strategies to counter these factors include increased HIV testing to promote earlier diagnosis, and simplifying HAART regimens to improve adherence.

Conclusions

King County has an estimated 7,200 - 7,800 HIV-infected residents, including approximately 3,500 people with AIDS, 3,000 diagnosed with HIV, and 700-1300 who have yet to learn they carry HIV. Over 4,200 HIV-infected persons have died since 1982. About 350-400 new HIV infections have been diagnosed each year since 1998, of which about one-quarter were not diagnosed with HIV until they had already developed AIDS. The numbers of deaths, new HIV and new AIDS diagnoses were roughly level from 1998 to 2006.

The total number of people living with AIDS or with HIV infection in King County is increasing because each year there are more new diagnoses than deaths. Ninety percent of all infections are among MSM, IDU, or foreign-born Blacks. Most HIV-infected King County residents are White men who have sex with men, are 30-45 years of age at the time of diagnosis, and reside in Seattle. However, an increasing proportion of cases are among foreign-born Blacks, and residents outside Seattle.

- *Contributed by Amy Bauer and Jim Kent*

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Results from the National HIV/AIDS Behavioral Survey of injection drug users in the Seattle area, 2005

Injection drug use is a prime risk factor for HIV infection. In 2005, among adults newly diagnosed with HIV infection or AIDS in the 38 states or other areas with confidential name-based reporting, 13% reported injection drug use, 3% reported both injection drug use and male-to-male sex and 2% reported heterosexual contact with an injection drug user (IDU).[1] In King County, 6% of persons diagnosed with HIV in 2004-2006 reported injection drug use; a further 8% reported both injection drug use and male-to-male sex and a handful reported heterosexual sex with an IDU.[2] These proportions have been essentially stable in King County since 1981.
Several studies have monitored HIV infection and risk behaviors for HIV transmission among King County IDU. From 1988 through 1999 Public Health conducted unlinked HIV seroprevalence surveys of IDU entering drug treatment as part of the CDC National HIV Serosurveillance System.[3,4] From 1994 through 1997 the RAVEN study recruited 2,967 IDU from four drug treatment centers, a drug detoxification center, two social service agencies and from persons entering the King County correctional facility in Seattle on drug-related charges.[5] RAVEN participants represent approximately 19% of the approximately 16,000 IDU estimated to reside in the Seattle area.[6] The Kiwi study recruited 1,765 IDU among persons incarcerated in the two main King County Jails, in Seattle and Kent, from 1998 through 2002, either by screening all persons booked into jail during random selected time intervals or from inmates visiting the jail health clinics seeking HIV counseling and testing.[7] Finally, the Third Collaborative Injection Drug Users Study/Drug Users Intervention Trial (CIDUS III/DUIT, or DUIT), a multicenter behavioral intervention trial for young IDU, recruited 581 persons aged 15-30 years by community outreach and by peer recruitment from 2002 through 2004.[8]
In 2005, King County was one of 23 sites nationwide that participated in CDC's on-going National HIV Behavioral Surveillance (NHBS) survey, characterizing the IDU population and monitoring behaviors of relevance for HIV transmission and prevention.[9] We report here a summary of the salient results of this survey for Seattle area IDU and make comparison with previous findings from the RAVEN and Kiwi studies.

Methods

The NHBS survey recruited participants by means of a systematic form of peer recruitment known as respondent driven sampling (RDS).[10,11] Nineteen IDU, the seeds, were initially recruited so as to represent the geographic, racial, gender and primary injection drug distribution of Seattle area IDU and on the basis of their

Table 1: Sociodemographic characteristics of Seattle area IDU enrolled in the 2005 NHBS survey

	No. (Total=371)	RDS Adjusted Estimate	95% Confidence Interval
Age			
18 – 30	49	12%	(6% - 21%)
31 – 40	77	23%	(14% - 32%)
41 – 50	154	41%	(32% - 52%)
> 50	91	24%	(15% - 33%)
Race			
White*	207	53%	(42% - 64%)
Black*	66	20%	(10% - 30%)
Hispanic	30	12%	(4% - 22%)
Native American*	7	2%	(0.2% - 6%)
Other*	3	0.5%	(0.2% - 1%)
Multiple races*	58	12%	(7% - 19%)
Sex			
Male	282	77%	(66 % - 84%)
Female	89	23%	(16% - 33%)
Education			
< High school grad.	102	23%	(16% - 33%)
High school grad.	147	40%	(31% - 50%)
> High school grad.	122	37%	(26% - 47%)
Area of Residence			
Downtown	182	52%	(42% - 65%)
North Seattle	25	6%	(3% - 11%)
South Seattle	86	25%	(15% - 36%)
South King County	58	11%	(3% - 21%)
Other area in MSA	7	6%	(0.4% - 12%)
Yearly Income			
$0 -$4,999	142	43%	(34% - 55%)
$5,000 - $9,999	78	22%	(15% - 30%)
$10,000 - $19,999	63	16%	(10% - 23%)
$20,000 +	86	19%	(9% - 27%)
Currently Homeless			
Yes	230	54%	(35% - 57%)
Incarcerated last 12 months			
Yes	185	50%	(40% - 60%)

IDU=Injection drug user, NHBS=National HIV Behavioral Surveillance
* and non-Hispanic

presumed recruitment efficiency. After completing an interview, seeds were given three coupons to pass on to their injecting peers, who were in turn invited to complete an interview and distribute coupons to a new wave of participants. IDU who completed a questionnaire were paid $25. Persons who had been issued coupons were given a payment of $10 for each eligible person they referred to NHBS. Participants were required to be at least 18 years old, reside in King, Snohomish or Island Counties, have injected in the previous 12 months and able to complete a survey in English. In all, 371 valid interviews were included for this analysis, derived from ten productive seeds and 28 waves of recruitment.

Based largely on theoretical calculations and mathematical modeling, it has been claimed that unbiased estimates of the proportions of characteristics in an underlying population can be derived from an RDS recruited population by adjusting study population figures based on data on injectors' network sizes and knowledge of the relative probabilities of recruitment across different groups of participants, which can be derived from coupon recruitment data. Because RDS adjustment breaks down when only small numbers of participants are available for ascertaining cross group recruitment probabilities, we do not present results broken down by gender (or other characteristics of interest), though we note where substantial differences between males and females in unadjusted sample proportions were observed. Questions generally referred to behaviors within the 12 months prior to interview. Serologic data were not obtained.

Table 2: Drug-related characteristics of Seattle area IDU enrolled in the 2005 NHBS survey

	N (N_{tot}=371)	RDS Adjusted Estimate	95% Confidence Intervals
Drug most frequently injected			
Heroin	235	66%	(50% - 77%)
Speedballs	31	7%	(4% - 12%)
Cocaine	25	8%	(3% - 13%)
Amphetamines	37	18%	(7% – 35%)
Other drug	3	1.2%	(0.1% - 3%)
Age first injected			
< = 15	77	23%	(14% - 35%)
16 – 20	142	33%	(24% - 42%)
21 - 25	65	19%	(12% - 30%)
26 +	125	26%	(16% - 32%)
Years injecting			
0 – 5	39	12%	(7% -17%)
6 – 15	82	17%	(10% - 23%)
16- 25	97	33%	(24% - 45%)
> 25	153	38%	(28% - 48%)
Time since last injection			
Last 30 days	329	76%	(63% - 87%)
2 – 6 months	40	23%	(13% - 36%)
7 – 12 months	2	0.4%	(0.1% - 1%)
Shared syringe, 12 months			
Yes	163	34%	(25% - 42%)
Shared cooker, 12 months			
Yes	249	62%	(52% - 72%)
Shared cottons, 12 months			
Yes	191	45%	(36% - 55%)
Shared Water, 12 months			
Yes	219	53%	(43% - 63%)
Backloaded, 12 months			
Yes	266	63%	(52% - 72%)

IDU=Injection drug user, NHBS=National HIV Behavioral Surveillance

Results

Sociodemographics

Seattle area NHBS participants tended to be substantially older than had been observed in the RAVEN or Kiwi studies (Table 1). The median age in NHBS was 44 compared to 37 in RAVEN and 36 in Kiwi. The gender ratio in NHBS, 77% male, corresponded to that in Kiwi (also 77%) but had a higher representation of males than RAVEN (63%). A higher proportion of NHBS participants reported multiple races (12%) than had been seen in either RAVEN (3%) or Kiwi (5%). Among NHBS participants reporting multiple races, 78% listed Native American as one of the races.

NHBS participants were much more likely to report a zip code of residence in downtown Seattle (52%) than either RAVEN (22%) or Kiwi (23%) participants. While education levels were reasonably high among NHBS participants (37% had education beyond high school), markers of current social status indicated high levels of social marginalization: 43% had a yearly income of less than $5,000, over half were currently homeless and half had been incarcerated in the previous 12 months.

Drug-Related Behaviors

In the NHBS data, heroin was by far the drug most frequently injected as had been the case in both RAVEN and Kiwi (Table 2). A substantial proportion (18%) reporting amphetamines as their primary injection drug,

Table 3: Sexual behavior characteristics of Seattle area IDU enrolled in the 2005 NHBS survey

	No.	No. in group	RDS Adjusted Estimate	95% Conf. Interval
Number Sexual Partners				
0	66	371	17%	(12% - 24%)
1	118		37%	(28% - 48%)
2 – 3	92		24%	(17% - 33%)
>= 4	95		21%	(13% - 29%)
Any exchange sex, 12 months	**70**	**371**	**19%**	**(11% - 27%)**
Yes				
Sexual partnerships				
No vaginal, anal or oral sex	66	371	17%	(11% - 23%)
Oral sex only	7		2%	(0.4% - 4%)
Exclusively heterosexual vaginal or anal sex	251		71%	(63% - 79%)
Exclusively homosexual anal sex	6		1%	(0.1% - 2%)
Both heterosexual and homosexual vaginal and/or anal sex	41		10%	(4% - 16%)
Male-to-Male oral or anal sex (among males), 12 months				
No	249	282	91%	(88% - 96%)
Yes, oral sex only	14		4%	(1% - 7%)
Yes, any anal sex	19		5%	(2% - 7%)
Used condom in all anal or vaginal sex, 12 months				
Yes	44	298	22%	(10% - 31%)
Sexual behavior with last partner, by partner characteristics				
Any condom use with last partner				
Heterosexual main partner	42	224	17%	(5% - 18%)
Heterosexual casual partner	71	147	52%	(37% - 79%)
Male-to-male main partner	4	6	(67%)[3]	(21% – 100%)
Male-to-male casual partner	7	12	(58%)[3]	(26% - 90%)
Knowledge of last sex partner's HIV status				
Heterosexual main partner	190	224	88%	(80% - 94%)
Heterosexual casual partner	78	147	47%	(25% - 70%)
Male-to-male main partner	5	7	(71%)[3]	(30% - 100%)
Male-to-male casual partner	13	30	(43%)[3]	(24% - 62%)
Discussed both partners' HIV status before first sex				
Heterosexual main partner	131	219	63%	(50% - 79%)
Heterosexual casual partner	66	98	64%	(20% - 88%)
Male-to-male main partner	4	7	(57%)[3]	(13% - 100%)
Male-to-male casual partner	14	21	(67%)[3]	(45% - 89%)
Used condom at last encounter when:				
Partner's HIV Status Unknown				
Heterosexual main partner	9	34	(27%)[3]	(11% - 43%)
Heterosexual casual partner	30	69	37%	(5% - 88%)
Male-to-male main partner	3	6	(50%)[3]	(2% - 98%)
Male-to-male casual partner	3	5	(60%)[3]	(7% -100%)
Both partners reported HIV negative				
Heterosexual main partner	32	187	14%	(3% - 17%)
Heterosexual casual partner	41	78	62%	(16% - 92%)
Male-to-male main partner	1	2	(50%)[3]	(0% - 100%)
Male-to-male casual partner	3	6	(50%)[3]	(2% - 98%)

[1]Exchange sex is used to describe sex for "money, drugs, shelter, transportation or other things".

[2]Among persons reporting anal or vaginal sex.

[3]Numbers of participants with informative coupon transactions were too small to calculate RDS estimates, so unadjusted sample population figures are presented.
IDU=Injection drug user, NHBS=National Behavioral Surveillance

higher than had been seen in RAVEN (6%) but less than in Kiwi (26%). Median age at first injection was 19 years old, the same as in both RAVEN and Kiwi. Over three quarters had injected in the past 30 days.

The proportion of NHBS participants reporting having injected with a needle previously used by someone else in the past 12 months (34%) was markedly lower than had been observed in RAVEN (53% in 6 months) or Kiwi (65% in 6 months). Sharing of other injection equipment was quite common among NHBS participants. There is no evidence of a time trend towards lower levels of syringe sharing among Seattle area IDU in the RAVEN and Kiwi data. Rather, a modest overall increase in syringe sharing was found in logistic regression models testing for a time trend in the 1994-2002 period, after control for age, race, gender and drug most frequently injected ($p_{(trend)} < .001$).

Table 4: Health related characteristics and behaviors of Seattle area IDU enrolled in the 2005 NHBS survey

	N (N_{tot}=371)	RDS Adjusted Estimate	95 % Confidence Interval
Ever tested for HIV	360	98%	(96% - 99%)
# Times tested for HIV, 2 years			
0	73	21%	(14% - 29%)
1	109	25%	(18% - 34%)
2	78	23%	(14% - 33%)
3 - 4	80	25%	(17% - 37%)
5 +	29	4%	(2% - 7%)
Self reported HIV positive	4	0.3%	(0% - 1%)
Ever tested for hepatitis C	334	90%	(84% - 95%)
Self-reported hepatitis C positive	228	60%	(50% - 71%)
Any sexually transmitted disease, 12 months	26	7%	(3% - 12%)
Any hepatitis B vaccination	109	29%	(20% - 38%)
Ever in drug treatment	316	84%	(75% - 90%)
In drug treatment, 12 months	168	47%	(36% - 58%)
Obtained new sterile syringes, 12 months			
None from needle exchange or pharmacy	25	10%	(5% - 16%)
Yes, any from needle exchange	272	65%	(56% - 77%)
Yes, any from pharmacy	228	62%	(52% - 71%)
Obtained free cookers, cottons, water, 12 months			
No	94	34%	(23% - 44%)
Yes, any from needle exchange	304	73%	(61% - 84%)
Yes, none from needle exchange	33	7%	(4% - 13%)
Obtained free condoms, 12 months			
No	92	23%	(16% - 32%)
Yes, any needle exchange	141	36%	(26% - 46%)
Yes, none from needle exchange	138	42%	(31% - 51%)

IDU=Injection drug user, NHBS=National HIV Behavioral Surveillance

In the NHBS data, race is the only variable with a significant (p = .01) association with syringe sharing in logistic regression models including terms for age, race, sex, education, drug most frequently injected, number of years injecting, male to male sex, and exchange sex (defined as exchanging sex for "money, drugs, shelter, transportation or other things"). Compared to Whites, Blacks were significantly less likely to share syringes (OR = 0.42; 95% Confidence Interval [C.I.]: 0.23 - 0.79) and Hispanics more likely (OR = 1.62; C.I: 0.69 – 3.81), although the latter figure did not attain significance. In both the RAVEN and Kiwi populations Blacks had also been less likely to report syringe sharing than Whites.

Sexual Behaviors

Data on sexual behavior are presented in Table 3. Differences between males and females in the number of sexual partners were modest. The median number of sex partners was one for females and two for males, with three males and four females reporting over 100 partners in the previous 12 months. Exchange sex was reported by 25% of females and 17% of males. Among males reporting such sexual transactions, 75% reported a female exchange partner.

Overall, 10% of participants were estimated to have had both heterosexual and homosexual sex within the previous 12 months, including 9% of males and fully 19% of females. Male-to-male oral or anal sex was reported by 33 participants (12% of males), of whom 19 (57%) reported male-to-male anal sex. Two percent of males reported sex exclusively with other males.

Among 298 participants reporting any vaginal or anal sex, 44 (22%) reported no unprotected sex, that is, sex without a condom; 14% reported having practiced both unprotected vaginal and unprotected anal sex. Using any report of unprotected sex as the outcome, logistic regression models were investigated analyzing associations with age, race, sex, education, drug most frequently injected, number of years injecting, number of sex partners, male-to-male sex and exchange sex. No significant association with condom use was found for any of these variables.

Participants were queried about characteristics of their last sex partnership in terms of a number of different categories: main vs. casual partners and same sex vs. opposite sex. An individual participant could thus potentially contribute information to multiple categories, or none. Condom use was relatively infrequent with the last main heterosexual partner (17%) but significantly more likely with last main male-to-male partner (67%). Rates were substantially higher with the last casual heterosexual partner (52%) than with hetersexual main partners and comparable with levels with the last casual male-to-male partner (58%).

A substantial proportion of participants reported knowledge of the last sex partner's HIV status, with higher proportions reporting knowledge of their last main partner's status than their last casual partner's in both heterosexual and male-to-male sex. Further, a majority of participants reported discussing both their own and their last partner's HIV status before having sex for the first time within each category of partnership.

The degree to which condom use practice was influenced by knowledge of partners' HIV status was investigated by evaluating condom use in partnerships where the partner's status was unknown and also in which both partners were reported to be HIV negative. Rather contrary to expectations, condom use was less frequent among casual heterosexual partners of unknown status (37%) than when both were reported to be HIV negative (62%).

Health related characteristics and behaviors

HIV testing was widespread in the NHBS population, with 98% reporting ever having been tested and 79% being tested in the past two years (Table 4). Only four participants (0.3%) reported themselves positive for HIV. In RAVEN, 2.3% of participants self-reported being HIV positive and in Kiwi 1.9%. Amont participants testing HIV postive by serology, 73% self-reported HIV postitivity in RAVEN and 61% in Kiwi. The low proportion of NHBS participants who self reported being HIV positive implies that the levels of HIV seropositivity or the level of awareness of HIV status among positives was lower among NHBS participants than in the other studies.

Hepatitis C testing was also widespread among NHBS participants (90%). Among the 740 Kiwi participants who were asked about hepatitis C testing, 71% reported being tested, 44% reported being hepatitis C positive and 64% of those testing serologically positive were aware of their status. Hepatitis B vaccination coverage among NHBS participants was modest, with 29% reporting any vaccination, although this was higher than the 16% reported by RAVEN participants and the 18% in Kiwi.

Among NHBS participants, the needle exchange was by far the most common source of new sterile syringes, with 73% of participants having obtained syringes there. In RAVEN 74% of participants reported getting syringes from the exchange and in Kiwi, with a substantial recruitment from south King County, where there were fewer needle exchange sites, the figure was 63%. In addition, 62% of NHBS participants reported pharmacies as a source of new syringes. Of Kiwi participants, 44% had obtained syringes from pharmacies and in RAVEN the figure was 62%. Only 25 NHBS participants reporting obtaining no needles from a pharmacy or the needle exchange.

The needle exchange was named by 59% of participants as a source of free cookers, cottons and sterile water. In addition, over three-quarters (77%) of NHBS participants reported obtaining free condoms. While the needle exchange was the most frequently mentioned source of condoms (by 36%), several other sources were also mentioned: Street Outreach Services (by 8%), Department of Social and Health Services (by 9%) and Public Health research study offices (by 6%).

Comments

The NHBS study population differed substantially from the earlier RAVEN and more recent Kiwi populations in age and geographic distribution. While there were also differences between the RAVEN and Kiwi populations, RAVEN and Kiwi participants tended to resemble one another more closely, except for gender, than either resembled the NHBS population. Though we cannot determine with assurance which study population, if any, most accurately reflects the underlying IDU population, we think it likely that the coupon based peer recruitment of the NHBS did not access the full universe of Seattle area IDU. Given these reservations, it is difficult to determine the extent to which differences between NHBS and previous studies, such as in syringe sharing, represent changes over time or are due to sampling different subpopulations of IDU.

When condom use was evaluated in terms of the number of sexual partners with whom participants reported any sex without a condom (the overwhelming majority of participants did report unprotected sex) we could identify no potentially predictive variables. Any unpro-

tected sex may be an overly restrictive measure, as even in the most conscientious partnerships occasional unprotected sex is likely to occur. Evaluating condom practices in terms of any condom use in the Kiwi population had previously found instructive associations with age, the number of sexual partners, male to male sex and amphetamine injection.[12] "Condom use with the last sex partner" occurred at frequencies in the NHBS population which suggest that such a variable may be able to offer an even more sensitive means of investigating condom use. There is a need to develop informative, generally accepted and widely applied measures of condom use as well as other periodic risk behaviors, such as syringe sharing.

The high rates of HIV and hepatitis C testing in this population are worth noting. This information allows IDU to seek medical treatment and practice selective syringe sharing and condom use based on knowledge of their own and their partners' serostatus. While the present data suggest considerable knowledge of and discussion about sex partners' HIV status among IDU, our evaluation of the extent to which this information actually influenced condom use practices was limited. It would help to develop effective measures to evaluate the extent to which knowledge of HIV and hepatitis status influences risk behavior in sexual and injection equipment sharing partnerships.

The NHBS data indicate that a substantial proportion of Seattle area IDU are sharing syringes and an even higher proportion share other injection equipment. Condom use falls well short of a standard of consistent and correct use even with casual partners. Hepatitis B vaccination levels were low. Self-reported prevalence of hepatitis C infection was high and likely to underestimate the true rates.[13] While self-reported HIV prevalence was low, there appears to be substantial potential for HIV transmission in this population. Continuing efforts to encourage IDU to reduce injection equipment sharing, become aware of their serostatus and encourage condom use are well warranted.

- *Contributed by Richard Burt and Hanne Thiede*

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Trends in *Neisseria gonorrhoeae* incidence among HIV-infected men in Washington State, 1996-2005

Background

Considerable evidence exists to suggest that co-infection with HIV and bacterial sexually transmitted infections (STIs) can act synergistically to facilitate HIV transmission[1]. Clinical studies have demonstrated that infection with *Neisseria gonorrhoeae* can significantly amplify the concentration of HIV in seminal fluid[2] and can promote viral replication in human dendritic cells[3], which serve as a reservoir for delivery of virus to activated CD4+ T lymphocytes[4]. Monitoring and evaluating trends in co-infection may be an important consideration in forecasting future HIV incidence as well as for appropriately targeting group and patient-level prevention interventions.

Routine monitoring of population-level trends in HIV co-infection has traditionally been inhibited by structural differences in surveillance systems, incompatible data standards and administrative barriers between organizational units responsible for STI and HIV surveillance. While medical record abstractions can be invaluable to document co-infection in cohorts of clinic patients, population level data sources are not routinely available to document the HIV status of men being diagnosed with gonorrhea. To address this deficiency in case surveillance, Washington State has integrated HIV and STI surveillance by creating a merged HIV/STI data warehouse specifically for monitoring trends in co-infection. Our integrated data warehouse is ephemeral in that personal identifiers for merged records are not retained and the dataset is routinely rebuilt for each new analysis to take advantage of increasing completeness in case ascertainment.

Methods

Statewide surveillance registries for HIV and gonorrhea reported in Washington State between 1996 and 2005 were integrated by matching cases using patient name, date of birth and gender. We used a weighted, multi-element deterministic matching algorithm tuned to maximize specificity; matched cases were merged into a single dataset for analysis, including dates and characteristics of gonorrhea and HIV diagnoses, reported HIV exposure risk and patient demographics. The annual gonorrhea incidence rate among HIV-positive men ages 18 to 44 was calculated using gonorrhea cases reported as the numerator and HIV prevalence estimates developed from core surveillance data adjusted for reporting delay as the denominator. Annual gonorrhea incidence rates among HIV-positive men were compared to the annual incidence rates of gonorrhea among men not known to be HIV-positive. Significance of trends in annual incidence was assessed by Chi Square (Mantel-Haenszel) and by linear regression. Incidence trends for HIV-positive versus presumed HIV-negative groups were compared using the Z-statistic calculated from the regression coefficients.

Results

We identified 800 cases of gonorrhea between 1996 and 2005 among men ages 18 to 44 known to be HIV-infected at the time of their gonorrhea diagnosis and 11,576 cases among men presumed to be HIV-negative. Gonorrhea incidence among presumed HIV-negative males in the same age group and for the same time period increased significantly from 7.6 per 10,000 in 1996 to 13.0 per 10,000 in 2005 (Figure 1). The annual incidence of gonorrhea for HIV-positive males in this age group also increased significantly from 92.1 per 10,000 in 1996 to 294.6 per 10,000 in 2005. (Figure 2) While the incidence trend increased significantly ($p < 0.01$) for both groups, the rate of gonorrhea incidence among HIV-positive men was more than ten-fold higher and accelerated significantly faster than the rate among HIV-negative men across the study time period.

Discussion

While there are significant limitations involved in matching records between separate case registries, we have tuned our matching algorithm such that the direction of bias would be toward underestimating coinfection by excluding potentially true matches between the datasets if any of the criteria elements failed to match. In light of this limitation, these data still indicate that as many as 3% of all HIV-positive men in Washington State may have been diagnosed with gonorrhea at some time during 2005.

These data imply an alarmingly high level of ongoing sexual risk-taking among HIV-infected men. Additional research into the factors associated with HIV-infected men being diagnosed with gonorrhea, including geographic distribution, demographic characteristics, individual risk behaviors, sex partner network characteris-

Figure 1: GC rate and incidence trend among presumed HIV-uninfected males 18 - 44, Washington State, 1996 - 2005

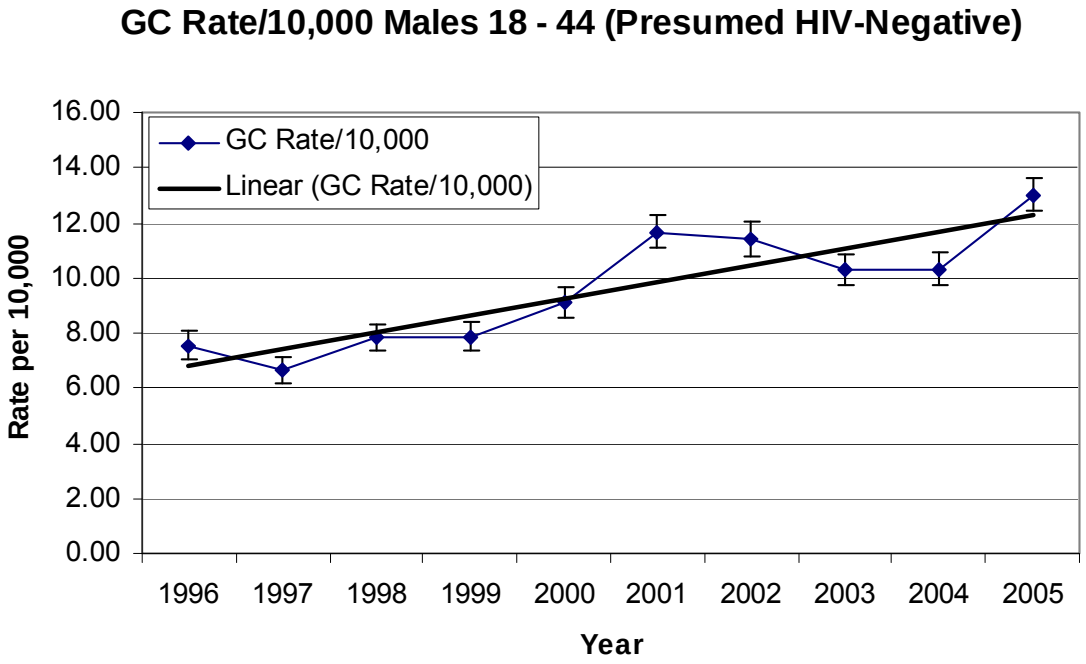
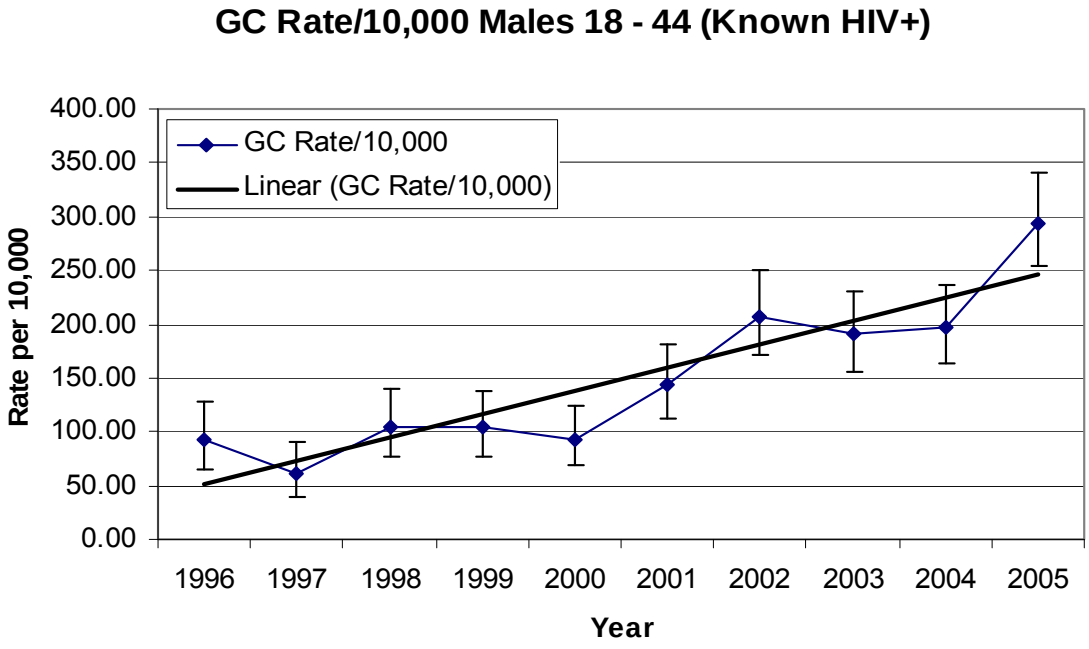


Figure 2: GC rate and incidence trend for HIV-uninfected males 18 - 44, Washington State, 1996 - 2005



tics and serosorting practices is needed to better inform HIV prevention efforts. Moreover, these findings demonstrate the importance of more fully integrating HIV and STI program and clinical services to help reduce the risk of ongoing HIV transmission due to resurgent gonorrhea among HIV-infected men.

- *Contributed by: Mark Stenger, Maria Courogen, and Jason Carr*

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Variant, Atypical, and Resistant HIV Surveillance (VARHS) update: Cluster of multi-class drug resistance (MDR) among 8 individuals in King County, Washington

Since July 2003, Public Health - Seattle & King County (PHSKC) has conducted surveillance for resistance to anti-retroviral (ARV) drugs among treatment-naïve individuals newly diagnosed with HIV infection. The objectives of this surveillance activity are to monitor the prevalence of circulating resistant strains and non-B subtypes in the community, and to identify characteristics and follow the outcomes of individuals with and without drug resistant strains of HIV. Variant, Atypical and Resistant HIV Surveillance (VARHS) - formerly Antiretroviral Drug Resistance Testing (ARVDRT) - began at the local PHSKC laboratory. With the goal of expanding to a more population-based surveillance system for HIV drug resistance, in 2005 the project expanded to include specimens from a second local laboratory, and by the end of 2006 we began accepting test results from one regional laboratory. We estimate that approximately 50% of newly diagnosed cases in King County are currently captured by VARHS and we are preparing to routinely receive genotype test results (obtained from genotypic testing in routine clinical practice) from a second large regional laboratory.

Standard ARV genotypic assays test for resistance in three of four ARV drug classes: protease inhibitors (PI), nucleoside reverse transcriptase inhibitors (NRTI), and non-nucleoside reverse transcriptase inhibitors (NNRTI). Among the 517 VARHS eligible specimens that have been successfully genotyped to date, approximately 12% show evidence of high-level resistance to drugs in at least one ARV class (Table 1). NNRTI drug class resistance remains the most common (10%), while both NRTI and PI class resistance are less prevalent (3%). Multi-class drug resistance (MDR), defined as high-level resistance to one or more ARV in each of at least two drug classes, exists in 15 (3%) specimens. Of these 15 MDR cases, eight (53%) have resistance to all three drug classes.

MDR cluster

VARHS staff initially identified two cases of HIV-1 infection with similar drug resistance profiles in 2006. Four additional antiretroviral naïve individuals and two treatment-experienced patients (eight total cases) have been identified by VARHS, were reported to PHSKC by medical providers, or found by phylogenetic tree data base matching in a participating laboratory by mid 2007, all of which had patterns of drug resistance similar to the first two cases. Seven cluster members have had a second genotypic resistance test performed on blood drawn on a different day that confirmed the initial results, and consistent phenotype results have been received for three cluster members. Phylogenetic tree analysis showed that the viruses from all eight individuals were very similar strains of HIV-1.

Follow-up investigation through medical record abstraction and enhanced partner counseling and referral services (PCRS) confirmed that all cluster members were distinct individuals. All eight men reported histories of recent methamphetamine use and sex with approximately five to 40 male, mostly anonymous, partners in the year prior to HIV-1 diagnosis. Four cases reported use of erectile dysfunction drugs, and two reported use of amyl nitrate (poppers). All cluster members also reported meeting sexual partners through the internet, bath-houses, and/or sex parties.

HIV-1 diagnosis dates ranged from 2005 through 2007 for the six antiretroviral-naïve individuals. Four had evidence of recent infection at the time of their diagnosis, with a prior negative HIV-1 test ranging from five to 18 months earlier. One of the four also had an indeterminate Western Blot combined with clinically diagnosed acute HIV seroconversion syndrome. MDR was diagnosed within one month of HIV-1 diagnosis for the six antiretroviral-naïve individuals, and more than 10 years after HIV-1 diagnosis for the two treatment-experienced individuals. Data suggest that one of the treatment-experienced cases may have acquired drug resistance as a superinfection.

The cluster of MDR HIV-1 infections in the Seattle and King County area illustrate the importance of local surveillance for ARV drug resistance. Knowledge of primary resistant strains of HIV-1 on a population level may be useful for prevention and health planning (e.g., for monitoring the transmissibility of a given strain or in choosing ARV regimens for post-exposure prophylaxis), while on the individual level knowledge of pre-existing ARV resistance can help providers counsel patients regarding ARV adherence and select drug regimes to achieve optimal outcomes. Because of the benefits of monitoring HIV-1 drug resistance, medical providers are encouraged to notify the Public Health – Seattle & King

Table 1: Demographic characteristics of patients with genotype results, VARHS 2003-2007

	% of genotyped N=517	% of MDR N=15
Registration status		
Confidential	69	73
Anonymous	31	27
Gender		
Male	86	93
Female	9	7
Unknown	4	0
Age in years		
<25	14	7
25-44	66	67
45+	16	27
Unknown	4	0
HIV risk category		
MSM	62	80
IDU	3	0
MSM/IDU	10	13
Other, including no risk identified	24	7
Race/ethnicity		
White	56	80
Black	18	13
Latino/Hispanic	12	0
Asian/Pacific Islander	5	0
Other, including Native American & Mixed	1	0
Unknown	8	7
County of origin	Excluding 196 (38%) with missing data	Excluding 5 (33%) with missing data
US	75	90
Other	25	10
Viral load	Excluding 222 (43%) with missing data	Excluding 5 (33%) with missing data
<20,000	34	60
>=20,000	66	40
Genotype results		
Any high level resistance	12	100
PI	3	73
NRTI	3	87
NNRTI	10	80
Multi-class resistance	3	100
HIV-1 subtype		
B	88	73
Non-B	8	13
Unknown	3	13

County HIV/AIDS Epidemiology Unit when drug resistance –and especially MDR– is diagnosed in treatment naïve individuals. The form for reporting MDR HIV-1 (in addition to other HIV drug resistance information) is available at our new VARHS website: http://www.metrokc.gov/health/apu/epi/varhs.

- *Contributed by Libby C Page and Christina Thibault*

International Society for STD Research (ISSTDR) meeting in Seattle

The 17th biennial International Society for STD Research (ISSTDR) was held this summer at the Washington State Convention and Trade Center in Seattle. The official meeting was Sunday night through Wednesday, July 29 to August 1, 2007, and there were a host of auxiliary conferences before and after the meeting. With over 1200 attendees, this was the largest ISSTDR conference to date and included 119 oral and 652 poster peer reviewed presentations, with over 30 plenary and satellite sessions.

Major themes from the conference include: Sexual behavior is the second most important cause of disability-adjusted life-years lost globally, and perhaps even more important among underdeveloped countries. Although this includes disability due to other STI (sexually transmitted infections) besides HIV, such as hepatitis, PID, and syphilis, HIV/AIDS is the major cause of STI mortality and the 4th leading cause of death globally.

Peter Piot's estimate of six **new HIV infections for every single HIV-infected individual placed on antiretrovirals** in 2006 brought to light the lack of sustainability that any HIV program might have by focusing on treatment alone. Prevention and treatment are both key to fighting HIV/AIDS. There have been positive developments towards broader treatment coverage and some HIV/STI prevention programs with promise, including the licensure of an HPV vaccine, lowered HIV incidence in Uganda, Thailand's successful 100% condom campaign among sex workers, reductions in US teen pregnancy rates, and the diagnosis and successful treatment of many antimicrobial-resistant STI/organisms. Dr. Piot and others at the conference have urged prevention programs to employ multiple methods and to make HIV prevention dollars matter. With about 8,000 people dying of AIDS daily, we need to halt mother-to-child transmission and drastically reduce all other transmission with both crisis management and sustainable interventions.

Socio-economic inequalities, including famines, poverty, war (and massive migrations due to these), stigma, and forced sex work are but a few of the drivers of unequal HIV and other STI burdens globally. Several speakers pointed out that although there is a general perception that the HIV epidemic in Africa is due to higher numbers of sexual partners, there really is not a big difference in the average number of sexual partners between developed and less developed parts of the world. Instead a greater tendency towards having concurrent partners, and lack of clear and effective education on the cause of AIDS (think of South Africa's leaders' HIV denialism) and lack of availability of HIV prevention tools (condoms!) may be the most important things explaining differential HIV prevalences. Drs. Dennis Fortenberry and Richard Hayes presented a plenary session on HIV/STI in adolescents addressing many of these factors. Dr. Hayes did have some promising results in a Western Kenya campaign that showed a single 40 minute intervention could reduce teen pregnancy by one-third. This intervention had even greater impact on reducing, by 61%, teen pregnancies that were a result of partnerships between older men and teenage girls where HIV risk to the teenagers is greatest.

Suppressive therapy for herpes simplex virus, type 2 (HSV2, or genital herpes) has not yet been shown to reduce HIV acquisition. This finding was based on one large African trial with low adherence. In this trial the HIV protection achieved among the subset with higher, > 90%, HSV treatment adherence, was notable at about 40% but there was inadequate power to achieve statistical significance. A second large international trial with greater adherence (about 94% by pill count) with results to be released later this year may produce more promising results. HSV2 suppressive treatment does have some indirect beneficial impact on HIV (increasing CD4 counts and reducing viral loads) and therefore may be useful in delaying the need for anti-retroviral treatment.

While **male circumcision** will likely be greatly useful to the underdeveloped world in reducing HIV acquisition among heterosexual men (about 60% based on three randomized clinical trials), there are no data yet on its value in protecting men who have sex with men (MSM, the largest at-risk group in the Americas, Australia, and W. Europe) from HIV acquisition. However, high viral load, above 50,000 copies per mm^3 reduces or eliminates the protective effect of male circumcision. Also, circumcision may increase short term risk of acquiring an STI unless safer sexual activities are strictly adhered to until full healing of the surgery has occurred. Longer term STI protection of circumcision is better; it may be important to conduct male circumcisions before commencement of sexual activity. Currently circumcision is not recommended for uncircumcised MSM in the devel-

oped world except in individual circumstances including those who would adhere to safer sex while healing and those with lower viral loads.

Vaccination for HPV appears highly effective in preventing cancer-associated HPV strains in women, but it is not yet affordable in most of the world, and not yet recommended for boys and men. It should have a major impact on transmission of HPV and its associated cancers when and if it does become affordable.

Trials of **topical microbicides as an STI/HIV prevention method have been disappointing to date. Topical microbicides are urgently needed as an HIV prevention method that can be controlled by women and male anal receptive partners.** An ideal microbicide should be "pleasant" (not disrupting healthy cells, with a pleasing odor and taste for oral sex), should not need to be applied right before sex, should have broad range efficacy against a variety of organisms, non-toxic, and have a contraceptive effect. Three trials of candidate microbicides have either had negative findings or produced results showing an increased HIV risk. These included trials of *Savvy* gel (a surfactant that breaks down the lipid membranes of enveloped viruses and bacteria) which failed; cellulose sulfate gel (an attachment inhibitor which provides a physical barrier between pathogens and the cell wall of the vagina or rectum) actually led to higher HIV infection rates; and previously the spermicide nonoxynol-9 also led to higher HIV transmission rates. Although theoretically appealing (low technology and wide availability) lemon and lime juice are similar to nonoxynol 9 in disrupting cervical cells, causing epithelial bleeding and not good candidates for HIV prevention. Trials of antiretroviral-based gels may show some promise.

Staff and students affiliated with Public Health – Seattle & King County had many presentations at ISSTDR. These included five posters summarized below.

Dr. Matt Golden ran a short anonymous survey among roughly 200 HIV-infected patients each year 2005-2007 at the Northwest's largest HIV clinic. He found **~20% of HIV-infected individuals stated they had unprotected sex with partners who were HIV-uninfected or of unknown serostatus**. **Also ~20% admitted to telling sexual partners they were not infected with HIV** after they had in fact been diagnosed with HIV.

Tamarind Keating, RN, MPH, presented data on characteristics and treatment of individuals with HSV infection followed by the Seattle Adult/Adolescent Spectrum of Disease (ASD) project. ASD was a longitudinal, dynamic, medical record review surveillance project conducted in Seattle and 10 other metropolitan areas around the country. HSV was clinically diagnosed in 21% of the population. Among those diagnosed with HSV, she found that 79% were given episodic treatment, and 47% received suppressive treatment for HSV. **Individuals with more health service usage, MSM, people diagnosed with AIDS, and those prescribed HAART were all more likely to be treated for HSV**.

Erin Kahle, MPH, compared individuals with and without drug resistance in the Variant, Atypical, and Resistant HIV Surveillance project. Although small numbers precluded finding statistically significant results, her findings suggested effect modification of baseline CD4 count on CD4 cell response following diagnosis among individuals with drug resistance versus those without. That is, if examined in **aggregate people with drug resistance had a mean increase of two CD4 cells per mm^3 relative to those without drug resistance who had a 25 cells per mm^3 increase**. However, if stratified to baseline CD4 of less than 350 versus 350 and higher, those with drug resistance in the lower CD4 categories seemed to have an improved immune response relative to those without drug resistance – perhaps due to more careful follow-up by medical providers. In the higher CD4 category CD4 responses among those with and without drug resistance were similar.

Bill Reidy, soon to complete his PhD, presented results from two MSM bathhouse/sex club surveys. The latter survey, with a 61% response rate, was shorter and predominantly conducted to validate the former survey, which was more in-depth but had only a 30% response. He found a substantial level of drug and alcohol use (ranging from 11% for methamphetamine to 31% for alcohol) and an average of three sexual partners in each visit. Overall 14% of MSM reported being HIV-infected, and of these, 12% reported having unprotected anal intercourse with a partner presumed not infected with HIV or of unknown HIV status during their current bathhouse/sex club visit. **Overall 14% reported any unprotected anal intercourse (UAI) at their visit.** UAI was more likely among men who also had UAI elsewhere (odds ratio = 4.3, 95% CI = 2.2 - 8.5), and among visitors of two particular venues (odds ratio = 3.1, 95% CI 1.3-7.6 and odds ratio = 2.9, 95% CI 1.1-7.9 versus referent bathhouse/sex club site).

Harnik Gulati, MPH, presented survey results from 308

MSM in Seattle comparing MSM who used the internet to find sex partners (IMSM) with those who did not use the internet to find sex partners (non-IMSM**).** IMSM were defined as having one or more anal sex partners in the past 30 days whom they met on the internet (27%, n=82). Non-IMSM (73%, n=226), were those who did not have anal sex in the past 30 days with a man they met on the internet at some point in time. Note that the sizes of the samples do not reflect the likelihood of MSM using these two methods of finding partners, but were just the numbers recruited. Almost half (46%) of the non-IMSM group did report using the internet to find sex partners at some point in time. **IMSM reported significantly higher rates of recent STD transmission than non-IMSM: gonorrhea 13% vs 4%, chlamydia 12% vs 5%, syphilis 5% vs 0%. IMSM were significantly more likely get paid for sex (7% vs <1%); and to hire someone for sex (3% vs 0%).** The frequency of condom use was significantly lower with primary sex partners than internet and non-internet sex partners. One-third of those who never used condoms with their primary sex partners had concurrent internet and non-internet sex partners. Half of this group used condoms with these concurrent partners and half did not. There were no significant differences in risk behaviors (condom use, disclosure, drug use, etc) with internet and non-internet sex partners.

70th Birthday Party and symposium: The ISSTDR conference kicked off the previous Saturday with an early birthday celebration for Dr. King Holmes who turned 70 in September. King's credentials include MD and PhD degrees, Professorships in both Medicine and Epidemiology and chair of the new Global Health program at the University of Washington. He helped initiate the ISSTDR (which is celebrating its 30th birthday), and has been responsible for training and mentoring a huge number and proportion of the leaders in this line of research and practice. The UW is establishing a new professorship in his name and he is just finishing his update of the globe's most authoritative textbook on STD. Largely because of him, Seattle is hailed as the leading center for STD/HIV education and research on the globe.

Among Saturday's highlights, Dr. Walt Stamm presented some research **on *E. coli* as a pathogen involved in recurrent urinary tract infections in women**. Although most *E. coli* infections follow an ascending pattern of infection from the peri-anal region, not all do. Many factors disrupt the healthy flora of a normal vagina, making women more susceptible to UTIs, including having new sexual partners, douching, lowered estrogen levels, antimicrobials, and spermicides. As cranberry juice and lactobaccilus, including L. crispin, reduce the risk of UTI, Dr. Stamm concluded with a slide showing a suggested anti-UTI breakfast including yogurt, a blueberry muffin (as blueberries may also show a benefit in UTI prevention), and cranberry juice.

Dr. Laura Koutsky summarized results of **HPV vaccine** trials. She said that HPV's "time was up, it had a great run with the young and sexually active, but now a new sheriff is in town" -- the HPV vaccine. Both the currently licensed and the soon-to-be licensed HPV vaccines are at least 90% effective. Not as much is known about the natural history of HPV in men as in women but trials of HPV vaccine in men are underway with preliminary results expected next year. Men may play a key role in the reduction of HPV and cervical cancer due to the herd immunity effects of increased vaccination.

Dr. Matt Golden presented some promising findings **regarding patient delivered partner therapy (PDPT) or expedited partner therapy (EPT**), where medical providers give therapy to their patients with chlamydia and/or gonorrhea for the patient to give to their sexual partner(s). These findings include increased levels of partner treatment and reductions in chronic disease and recurrence of the index patient.

Dr. Connie Celum presented a talk on the "**Long and Winding Road of HIV Prevention**" including the myriad of prevention methods needed for successful declines in HIV incidence. Treatment alone is unlikely to be effective, even when more widely available, due to the need to know each person at risk's serostatus and the lengthy times prior to recommended start of antiretrovirals. ABC (practice Abstinence, Be faithful, use Condoms) alone isn't practical for many – for example, women in serodiscordant relationships. Many researchers and prevention workers are eagerly awaiting the results of Dr. Celum's HPTN 039 trial where a higher rate of adherence to HSV suppressive therapy may show whether or not HSV suppression can reduce HIV incidence.

Dr. Tom Quinn discussed many cofactors associated with **HIV transmission, including infectiousness and acquisition**. He showed the data from Rwanda where antiretroviral use in the infected partner of HIV serodiscordant couples led to an 81% reduced relative risk (odds ratio = 0.19, 95% CI = 0.05 – 0.80) in HIV.

On the other hand, genital ulcer disease was associated with a many-fold increase in the risk of transmission approaching an incidence close to one per 100 sex acts. Prior to working with HIV he worked on malaria, and he brought the two fields together in presenting data on malaria increasing viral load two to seven-fold in co-infected individuals.

Dr. Larry Corey presented some surprising data on the frequency of **HSV recurrences and the extremely short duration of many of the outbreaks**. By study participants collecting samples four times a day, researchers were able to estimate that nearly half of all HSV recurrences lasted 12 hours or less. Individuals shed virus 34-40% of days they tested, although this decreased with increasing time from HSV infection.

- *Contributed by Susan Buskin and Bob Wood*

HIV testing pregnant women in Washington State

Perinatal HIV transmission occurs when a mother transmits HIV to her infant during pregnancy, delivery or through breastfeeding. It is estimated that worldwide, 1,600 infants a day are born infected with HIV[1]. In the United States, approximately 300 cases of perinatal HIV transmission are reported annually[1]. Only two cases of perinatal transmission among residents of Washington State have been verified since the year 2000. Perinatal transmission is relatively uncommon in the U.S. because of the availability of highly active antiretroviral drug therapies (HAART). Pregnant women who are unaware of their HIV status or those not treated with HAART transmit HIV to their infants at a rate of about 25%[1]. Transmission rates drop below 1% among women utilizing HAART and presenting with an undetectable HIV viral load at time of delivery[2].

Another reason that perinatal transmission is rare in the United States is because of the implementation of more aggressive perinatal HIV screening policies enabling practitioners to identify and treat their infected pregnant patients[3]. Although no states have required mandatory testing of pregnant women, an increasing number are adopting a CDC sanctioned opt-out screening policy whereby all pregnant women are HIV tested routinely or as part of their standard battery of prenatal tests. Under the opt-out approach there is less emphasis on pretest counseling, risk assessment and informed consent. Women are notified that an HIV test will be done and that they may refuse testing[4]. Other screening policies include opt-in (provider offers testing) and voluntary testing (patient-initiated testing).[4] The opt-out approach has been found to be more effective and cost effective at screening pregnant women for HIV when compared to the other approaches[5,6]. With the opt-out approach women perceived as "low risk" are more likely to be tested, and those at "high-risk" are no longer singled out and are more likely to accept testing.

Washington State adopted an opt-out policy in 2002[7]; until that time an opt-in policy was in place. The current policy states that an HIV test will be provided unless the pregnant woman refuses to give consent. If a woman refuses testing, it must be documented in their medical record. Informed consent can be obtained separately or as part of the consent for a battery of other routine tests, but women must be specifically informed that a test for HIV is being done. Washington State has also recommended that hospitals follow CDC guidelines calling for rapid HIV testing of women during labor if there is no HIV test result in their prenatal medical record[4]. However, there is no information available regarding how many women undergo rapid testing during labor.

It is important that all pregnant women get HIV tested during pregnancy, as many who might be infected do not know they are at risk. There are numerous reasons why women either accept or decline testing. Previous research has suggested that racial or ethnic minority women, those less than age 25, recipients of Medicaid, those with less than a high school education, and those who sought prenatal care in public health settings as opposed to private care settings were more likely than their counterparts to have been HIV counseled and tested during pregnancy[8]. The purpose of this article is to describe HIV testing during pregnancy for Washington State women having live births in 2005.

Methods

Data from the 2005 Pregnancy Risk Assessment Monitoring System (PRAMS) were used for the following analyses. PRAMS is a national CDC research project administered by the Washington State Department of Health's Maternal and Child Health Program. It is an ongoing population-based survey using a stratified systematic sampling design. Postpartum mothers are surveyed either by mail or telephone shortly after they deliver and asked to answer questions about their behaviors and experiences before, during and soon after their pregnancy. Mothers' responses to the PRAMS survey are linked to extracted birth certificate data from the state's vital records system. This provides more demographic and medical information. The PRAMS data are weighted so that they are representative of all women who had live births in Washington.

In 2005, 1,395 women were selected to be surveyed from a sampling frame of eligible birth certificates. The 2005 (Phase 5) PRAMS survey included questions asking recent mothers if their prenatal care provider discussed HIV testing, if they were offered an HIV test during their prenatal care, and if they were HIV tested; if they were not tested, they were asked if they declined testing, as well as the reason(s) why they declined. These items were examined by demographics and other respondent characteristics. Findings reported from

PRAMS include a 95% confidence interval (CI) with most findings in order to show readers where the true value of each measure would fall, with 95% certainty, if all women with live births had been surveyed. Associations are considered statistically significant at or below the 0.05 probability level.

Results

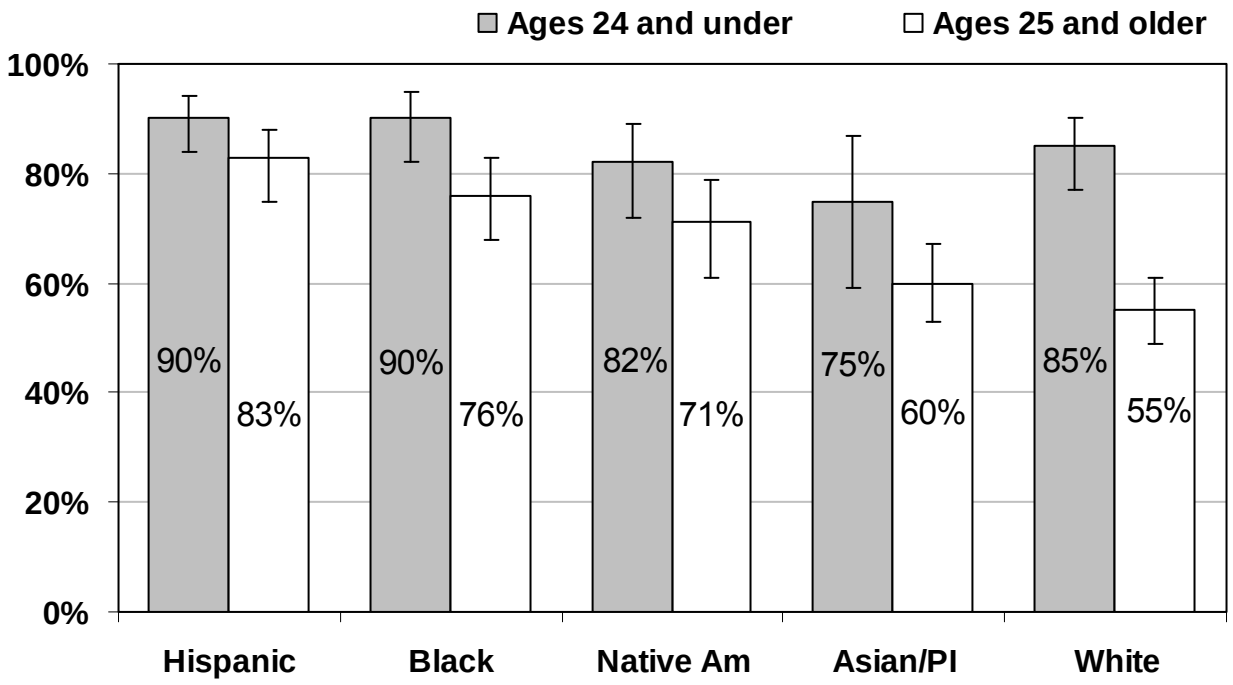
When Washington State women having live births in 2005 were asked if a health care worker discussed HIV testing at some time during their prenatal care, 84% (CI=82-87) said they had. Hispanic women, those under the age of 25, single mothers, those with high school or less education, those with annual incomes under $25,000 and women using Medicaid to pay for prenatal care were most likely to report having been counseled about HIV testing (see Table 1). Significant differences were found indicating that single women (91%, CI=87-94) were more likely than married women (81%, CI=77-84), and women with annual incomes less than $25,000 (89%, CI=85-92) were more likely than those with incomes over $25,000 (80%, CI=76-84) to have had HIV testing discussed during their pregnancy.

A high proportion of women giving birth in 2005 also reported that a health care worker asked them if they wanted HIV testing during their prenatal care (82%, CI=79-85). Results by demographic and economic factors yielded similar results indicating that Hispanic women, those under 25, single women, those with high school or less education, those with annual incomes less than $25,000 and those using Medicaid were most likely

Table 1: Proportion of women having live births indicating that a health care worker discussed HIV testing and if they were asked if they wanted an HIV test during Their prenatal care, by demographic and socioeconomic characteristics, 2005, Washington State

	Health Care Worker Discussed HIV Testing		Health Care Worker Asked If They Wanted an HIV Test	
	Estimate	95% CI	Estimate	95% CI
Race/Ethnicity				
Hispanic	90%	(86-93)	88%	(83-91)
Black	87%	(82-91)	81%	(75-86)
Native American	87%	(81-91)	86%	(80-90)
Asian/Pacific Islander	84%	(78-88)	78%	(72-83)
White	82%	(78-86)	81%	(77-85)
Age				
24 and under	90%	(85-93)	87%	(82-90)
25 and over	81%	(78-85)	80%	(76-83)
Marital Status				
Single	91%	(87-94)	84%	(79-88)
Married	81%	(77-84)	81%	(77-84)
Annual Income				
Under $25,000	89%	(85-92)	85%	(81-88)
$25,000 and over	80%	(76-84)	79%	(75-83)
Education				
High school or less	87%	(83-90)	84%	(80-88)
Some college or more	82%	(78-85)	80%	(76-84)
Medicaid Paid for Care				
Yes	86%	(82-90)	84%	(80-88)
No	82%	(78-86)	80%	(76-84)
Overall	**84%**	**(82-87)**	**82%**	**(79-85)**

Figure 1: Proportion of women having live births that were tested for HIV during pregnancy, by race/ethnicity and age, 2005, Washington State



to have been offered an HIV test. However, none of the differences within these groups were statistically significant.

Overall, 69% (CI=66-73) of women having live births in 2005 reported that they were tested for HIV during their prenatal care. Since the PRAMS data are statistically representative of all Washington women with live births, we can estimate that approximately 57,011 of the 82,625 live births in Washington State in 2005 were to mothers that were HIV tested during their pregnancy. Whether or not a woman was HIV tested during pregnancy significantly varied by race/ethnicity and age (see Figure 1.). The highest testing rates for women under the age of 25 were found among Hispanic (90%, CI=84-94), Black (90%, CI=81-95), and White (85%, CI=77-90) women; Native American (82%, CI=84-94) and Asian/Pacific Islander (75%, CI=58-87) women under age 25 were less likely to report testing; however, there were no statistically significant differences among race/ethnicity categories for women under the age of 25. In regard to women ages 25 and over, the highest testing rates were also among Hispanic (83%, CI=75-88) and Black (76%, CI=68-83) women; the lowest rates were among Asian/Pacific Islander (60%, CI=53-67) and White (55%, CI=49-61) women. Furthermore, Hispanic and Black women ages 25 and older were significantly more likely than Asian/Pacific Islander and White women of the same ages to have been tested during their last pregnancy.

HIV testing during pregnancy was also found to be associated with social and economic characteristics including marital status, education, income and use of Medicaid. A smaller proportion of married women (62%, CI=58-66), those with some college or more education (62%, CI=57-66), annual incomes of $25,000 or more (59%, CI=54-64), and those not using Medicaid to pay for care (61%, CI=56-66) indicated that they were HIV tested, compared to single women (84%, CI=79-88), those with high school or less education (81%, CI=76-85), annual incomes less than $25,000 (81%, CI=76-85), and Medicaid users (79%, CI=74-83). It should be noted, however, that these characteristics were also associated with race/ethnicity and age. White and Asian/Pacific Islander women and women ages 25 and older were more likely to report being married, having higher education and income and were less likely to use Medicaid to pay for care when compared to Hispanic, Black and Native American women and those under age 25.

HIV testing was examined by race/ethnicity and age together with these other characteristics in a multivari-

ate logistic regression analysis. It was found that race/ethnicity, age and marital status were the only statistically significant factors explaining differences in HIV testing while controlling for all variables. Results indicate that, when controlling for all factors, Hispanic women were 2.5 (CI=1.5-4.3) times more likely than White women and 2.6 (CI=1.5-4.5) times more likely than Asian/Pacific Islander women to have tested for HIV during their pregnancy; Black women were about twice as likely as White women (2.1, CI=1.3-3.3) and Asian/Pacific Islander women (2.1, CI=1.3-3.6) to have been tested; women under age 25 were 2.4 (CI=1.5-4.0) times more likely than those 25 and older, and single women were 1.7 (1.0-2.9) times more likely than married women to have been tested.

About 31% (CI=27-34) of women with live births in 2005 indicated that they were not HIV tested during their pregnancy. Of the women not tested, 46% (CI=39-52) indicated that they were not offered testing and 53% (CI=46-60) were offered but declined testing (1% indicated they were offered and did not decline). Overall, 19% (CI=16-22) of women who were offered an HIV test during their pregnancy reported that they declined testing. Whether or not testing was declined by those offered testing varied by demographic and economic characteristics (see Table 3). White women (24%, CI=20-30), ages 25 and over (24%, CI=20-28), married (24%, CI=20-29), those with some college or more education (24%, CI=20-29), those with incomes more than $25,000 (28%, CI=23-34) and those not using Medicaid (26%, CI=21-32) were most likely to decline testing. Multivariate logistic regression analysis for women offered testing indicated that race/ethnicity was the only significant factor associated with whether or not testing was declined. While controlling for age, marital status, education, income and use of Medicaid, White women were 4.2 (CI=2.0-9.2) times more likely than Hispanic Women, 3.9 (CI=1.9-8.1) times more likely than Black women, and 2.3 (CI=1.3-4.1) times more likely than Asian/Pacific Islander women to decline testing.

Women who declined HIV testing (n=139) were asked about reasons that they did not want to be tested. Respondents could give more than one reason, so the following percentages are not mutually exclusive. The most common reason, indicated by 72% of women who declined testing, was because they did not think they were at risk for HIV. Fifty percent indicated the reason was that they were tested before their current pregnancy and did not think they needed to be tested again. Only 2% reported that they were afraid of getting the result; 3% indicated they did not want people to think they were at risk for HIV.

Table 2: Proportion of women having live births and offered an HIV test during pregnancy that declined testing, by demographics and socioeconomic characteristics, 2005, Washington State

	Declined HIV Testing During Pregnancy	
	Estimate	**95% CI**
Race/Ethnicity		
Hispanic	4%	(2-8)
Black	6%	(3-11)
Native American	14%	(10-21)
Asian/Pacific Islander	13%	(9-19)
White	24%	(20-30)
Age		
24 and under	10%	(6-15)
25 and over	23%	(19-28)
Marital status		
Single	7%	(4-12)
Married	24%	(20-29)
Education		
High school or less	10%	(7-15)
Some college or more	24%	(20-29)
Annual income		
Under $25,000	9%	(6-14)
$25,000 or more	28%	(23-34)
Medicaid paid for care		
Yes	11%	(7-15)
No	26%	(21-32)
Overall	**19%**	**(16-22)**

Conclusions

A high proportion of women having live births in Washington State in 2005 indicated that a health care provider discussed HIV testing during their prenatal care (84%). Most also indicated that a health care provider asked them if they wanted to be tested for HIV (82%). The overall rate of testing of women having live births in 2005 was 69%. These results are indicative of the traditional opt-in policy where pregnant women are counseled regarding the need for HIV testing, and then asked if they would like to be tested. The opt-out strategy, which was officially adopted by Washington State in 2002, is designed to make HIV testing routine. It takes the onus off the pregnant women to decide if they

want testing while still giving them an opportunity to refuse. If this strategy were to be utilized universally, we would likely see lower proportions of women asked if they wanted testing and a higher proportion testing. Evidence of opt-out procedures can be seen, however, with the finding that about 27% of women that were not offered testing indicated that they were tested. It is possible that some women that said they were not offered testing and not tested were actually tested and did not recall because it was not discussed at length by their provider. In addition, the questions currently asked on the PRAMS survey may not be clear or comprehensive enough. There may be confusion among women surveyed about being offered an HIV test and given a choice versus being notified of testing and given the opportunity to refuse. It is recommended that the PRAMS survey questions be re-evaluated and potentially changed to ask about being offered testing and given a choice, as well as being notified of testing and given the option to refuse. Furthermore, health care providers should be queried as to what procedures are being used to HIV counsel and test pregnant women.

There are a variety of reasons that women either accept or decline HIV testing. For example, knowledge of the benefits of HAART for reduction of perinatal HIV transmission[9] and encouragement of testing by providers[8] have been linked to greater acceptance of testing. Barriers to testing may include health care providers' perceptions or patient perceptions of low HIV risk or lack of time for HIV counseling or testing[4]. In Washington State, Hispanic, Black, and Native American women under the age of 25 have the highest testing rates during pregnancy. These women are also more likely than their counterparts to have less education and lower income, are less likely to be married and more likely to utilize Medicaid for their prenatal care. White and Asian/Pacific Islander women over the age of 25, and married women are less likely to be tested than their counterparts. Most women, regardless of demographic or economic characteristics, are offered an HIV test. White women, especially those over the age of 25 and married, are significantly more likely than their counterparts to decline HIV testing. The most common reasons for declining testing are because they do not perceive themselves to be at risk for HIV, or that they had already been tested prior to entering prenatal care and did not think another test was necessary.

Although uncommon in Washington State, every perinatal HIV case is a significant health event signaling either a missed opportunity for prevention or a failure of interventions to prevent perinatal transmission. When these infections occur, they highlight the need for improved strategies to ensure that all pregnant women undergo HIV testing. When HIV testing rates for pregnant women were examined in several U.S. states and Canadian provinces it was found that they ranged from 25% to 83% in areas utilizing opt-in policies and 71% to 98% for those utilizing opt-out strategies[10]. Consistent opt-out testing protocols and more universal HIV testing of pregnant women should be encouraged among prenatal care providers in Washington State.

These analyses are subject to several limitations. Approximately 1% of women having live births in 2005 did not enter prenatal care; testing rates for these women are unknown. Furthermore, about 8% of women surveyed indicated that they did not know if they were HIV tested or refused the question, and these women were left out of HIV testing analyses. In addition, maternal self-reported data from PRAMS is collected approximately two to six months after delivery and might be subject to recall bias.

- *Contributed by Todd E Rime*

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2006 CDC HIV testing recommendations and the response of the American Academy of HIV Medicine and the American Medical Association

The Centers for Disease Control and Prevention (CDC) issued Revised Recommendations for HIV Testing of Adults, Adolescents, and Pregnant Women in Health Care Settings in September 2006. These new recommendations suggest making HIV testing a part of routine health care. This is relevant to providers and researchers since more people in need of HIV care and treatment should be identified.

Of the more than one million persons infected with HIV in the United States, approximately 25 percent are unaware of their infection. People who are infected but not aware of their status cannot access and benefit from HIV treatment that would preserve their health. In addition, they may not take the necessary steps to protect their partners from becoming infected with HIV. It has been estimated that the 25% of people who do not know they are infected account for 50% of the new HIV infections transmitted annually. Also, about 40 percent of individuals diagnosed with HIV in the US are diagnosed within one year of developing AIDS, when it may be too late for them to fully benefit from treatment. The CDC recommendations are designed to make HIV screening a routine part of medical care for all patients between the ages of 13 and 64 years.

To make HIV testing routine, the new recommendations unlink counseling from testing and recommend including the consent for an HIV test in the general consent for medical care. The CDC still recommends that consent be obtained, but uses the "opt-out" model rather than a specific more comprehensive consent process. This opt-out approach has been successful in getting most pregnant women in the U.S. tested for HIV and been associated with a resultant dramatic decrease in the number of children born with HIV infection.

Following the publication of the CDC recommendations, the American Academy of HIV Medicine and the American Medical Association co-convened a meeting of over 15 different organizations in Atlanta in October 2006 (in co-operation with the CDC) to discuss the implementation of the new recommendations. The full report of this meeting is available at:
http://www.aahivm.org/images/stories/pdfs/oct_16_report_rout_hiv_test_mtg__final.pdf.

The objectives of the meeting were to:

- Identify tools currently available.
- Determine if tools need to be modified to increase utility.
- Identify process for promotion/dissemination of tools through existing communication networks of partnering organizations, including websites, training opportunities, and newsletters.
- Identify areas where tools need to be developed (gaps).
- Identify regulatory/legislative barriers to implementation of the recommendations.
- Provide input on implementation guidance.

Some of the challenges identified by the group in implementing the new CDC recommendations included:

Existing State and local laws relating to HIV counseling and consent. Some States have laws in place that will limit the implementation of the new recommendations. In Washington, a separate consent is required for an HIV test; this can be documented in the medical record. Additionally, while in Washington pre- and post-test counseling is required, the Board of Health reduced but did not eliminate those requirements with changes in the Washington Administrative Code in June 2005.

The cost of providing routine HIV tests in health care settings. Adequate reimbursement for providing HIV tests must be available. Rapid HIV tests, which greatly streamline the testing process, are more expensive than conventional tests. Additionally the cost in settings which provide a significant amount of uncompensated care is a major obstacle, as is the added time to perform the HIV test

Implementing testing in various health care settings. Questions remain about how health care providers should implement HIV screening in their particular setting. Concerns include: sufficient staff to perform the test; who should provide the test (e.g., nurses or laboratory staff); training/certification for staff providing the test; adequate space for conducting the test; how results should be entered into an electronic medical record if a rapid test is performed in the clinic or ER; and the establishment of appropriate quality assurance measures. Also, finding the additional time in a clinic or ER visit to add HIV testing is a challenge.

Linkage to care. Patients who test positive must be

linked to appropriate treatment, support, and prevention services. Linkages must be in place.

The attendees at this meeting suggested the formation of the following working groups to address implementation issues.

- Policy (including legislative)/state-by-state advocacy effort;
- Educational materials/implementation materials (systems/operations)/communications and marketing;
- Reimbursement/quality initiatives/pay for performance;
- Lab issues;
- Corrections;
- Prevention/care linkage; and scientific review/ evaluation studies.

Over the past 6 months these groups have met to address the above listed issues with the goal of decreasing the number of HIV-infected people in the U.S. who do not know they are HIV-infected. If this new testing strategy is effective, the result will be a significant increase in the number of people with newly-diagnosed HIV infection. These people will be able to benefit from care and should be apprised of the opportunities for research participation in our community. The UW AIDS Clinical Trials Unit continues to conduct studies to evaluate treatment strategies for the initial therapy of HIV and seeks referrals for these and other studies.

- *Contributed by Jeffrey Schouten*

Research Helps - Help Research

Visit our new website at www.uwactu.org and find out about our latest studies, meet our staff, and find out about our outreach programs. You can send your questions, comments, and suggestions to us via email at actu@u.washington.edu.

Key to Terms

3TC: lamivudine (Epivir)
ABC: abacavir (Ziagen)
ACTU: AIDS Clinical Trials Unit
APV: amprenavir (Agenerase)
AZT: zidovudine (Retrovir)
d4T: stavudine (Zerit)
EFV: efavirenz (Sustiva)
FTC: emtricitabine
HAART: highly active antiretroviral therapy
HCV: hepatitis C
LPV/r: lopinavir/ritonavir (Kaletra)
NFV: nelfinavir (Viracept)
NNRTI: non-nucleoside reverse transcriptase inhibitor
NRTI: nucleoside reverse transcriptase inhibitor
PI: protease inhibitor
RTV: ritonavir (Norvir)
TDF: tenofovir
UWMC: University of Washington Medical Center

> : greater than
< : less than
≥: greater than or equal to
+ : positive

Research update from the University of Washington AIDS Clinical Trials Unit

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Seattle, WA 98104
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The following is a list of studies open for enrollment. Screening, lab tests and clinical monitoring that are part of a study are provided free of charge for participants. Enrollment in a study at the ACTU does not replace the role of a primary care provider. The ACTU coordinates efforts with each participant's primary care provider. **Providers and potential enrollees can call the ACTU at 206.731.3184 and ask for Eric Helgeson for appointments or additional information.**

Antiretroviral Studies		
Eligibility	**Study Purpose**	**Study Drug or Treatment**
• Treatment naïve (<7 days of ARV treatment) • HIV RNA >1000 • No evidence of any major resistance (only if already have genotype results – genotype not required)	**(Study #5202)** This study is being done to compare the effectiveness and safety of drug combinations in the initial treatment of HIV infection.	Will be randomized to one of the following groups: **Group A:** EFV plus FTC/TDF plus ABC/3TC placebo. **Group B:** EFV plus ABC/3TC plus FTC/TDF placebo. **Group C:** ATV with RTV plus FTC/TDF plus ABC/3TC placebo. **Group D:** ATV with RTV plus ABC/3TC plus FTC/TDF placebo.

Complications of HIV and Other Conditions		
Eligibility	**Study Purpose**	**Study Drug or Treatment**
• HIV-positive men and women 18 to 65 years old with memory or thinking problems • Worsening mental function • On stable HIV regimen for at least 16 weeks that doesn't include atazanavir. • Not pregnant or breast feeding • Able to sit or stand for at least 2 hours	**(Study #5235)** Study will evaluate if minocycline is safe and effective for treatment of thinking problems in people infected with HIV.	Subjects are randomized at entry to minocycline or placebo. At the end of 24 weeks, may receive open-label minocycline for an additional 24 weeks. Minocycline provided by study. Anti-HIV treatment not provided. **Length of Study:** Step 1: 24 weeks. Step 2: 24 weeks (Optional open

Lipoatrophy		
taps Eligibility	**Study Purpose**	**Study Drug or Treatment**
• Treatment with antiretroviral therapy (ART) for at least 12 weeks prior to study entry that contains AZT or d4T. Must have received at least 24 weeks of AZT or d4T in the past. • Lipoatrophy (fat wasting) of at least 2 of the following: face, arms, legs, and buttocks • HIV viral load ≤5000 copies/mL	**(Study #5229)** To see if NucleomaxX (a nutritional supplement with high amounts of uridine) can reverse the loss of fat in the face, arms, legs, or buttocks in people who are HIV infected and are taking stavudine (d4T or Zerit) or zidovudine (AZT or Retrovir).	NucleomaxX orally three times per day, every other day or to placebo.

Other Studies		
Eligibility	**Study Purpose**	**Study Drug or Treatment**
• No active or chronic heart or lung disease • No cigarette smoking in last 90 days • Not pregnant • No use of inhaled nasal or lung medication • No respiratory infection or bronchitis within 3 weeks	**(Study #080)** To see if alveolar macrophages are a reservoir for HIV	No study drug or treatment The macrophage cells will be collected by a bronchoalveolar lavage procedure (BAL) in the pulmonary lab
Eligibility	**Study Purpose**	**Study Drug or Treatment**
• HIV-positive men and women 18 years or older • Currently on HIV drugs for at least 6 months • CD4 T cell count less than 200 • HIV viral load less than 200 copies/mL for at least 6 months • Not pregnant or breast feeding • No use of androgens (corticosteroids, growth factors or investigational agents) • No evidence of pancreatitis	**(Study #5212)** To see if palifermin can increase CD4+ T cell counts in HIV-infected individuals.	**Arm A:** palifermin placebo (no active medication) daily for 3 days **Arm B:** palifermin 20 mcg/kg IV daily for 3 days **Arm C:** palifermin 40 mcg/kg IV daily for 3 days **Arm D:** palifermin 60 mcg/kg IV daily for 3 days

Studies for HIV 'negative' participants		
Eligibility	**Study Purpose**	**Study Drug or Treatment**
• HIV negative • Age 18-65 years • No active heart or lung disease • No hypertension • Not pregnant • No blood draws or donations within 6 weeks of screening	**(Study #084)** To study factors that control HIV infection in the test tube in a type of white blood cells called macrophages. This study may also help us learn more about how HIV infects cells.	• Up to 5 study visits • Screening • 3 on-study visits at ACTU for 100cc blood draw • Two thirds of participants will undergo a leukapheresis procedure at the Clinical Research Center at UWMC
Eligibility	**Study Purpose**	**Study Drug or Treatment**
• HIV negative • Male or non-pregnant female, age 18-40 • No history of heart, liver, or kidney disease • No history of cardiac disease, abnormal EKG, or bradycardia • No smoking for at least one month before and throughout the study. • No history of diabetes or a family history of type 2 diabetes and a fasting glucose >110 mg/dl.	**(Study #165)** To determine if cytochrome P450 (CYP) enzymes and the multidrug resistant transporter (P-gp), are significantly induced after chronic administration of ritonavir and nelfinavir	**Part One** (First 14 subjects) *Visit Set One :* **Day 1:** Mini-cocktail (digoxin & midazolam) **Day 2:** 4-drug cocktail (caffeine, tolbutamide, dextromorphan, & midazolam) **Day 3-17:** Randomized to nelfinavir or rifampin *Visit Set Two:* **Day 17:** Mini-cocktail (digoxin & midazolam) **Day 18:** 4-drug cocktail (caffeine, tolbutamide, dextromorphan, & midazolam) **Day 19-44:** No drugs administered **Day 45-59:** If randomized to nelfinavir on day 3, will receive rifampin. If randomized to rifampin on day 3, will receive nelfinavir *Visit Set Three:* **Day 59**: Mini-cocktail (digoxin & midazolam) **Day 60:** 4-drug cocktail (caffeine, tolbutamide, dextromorphan, & midazolam) **Part Two** (Next 14 subjects) Same as above, except ritonavir will be used in place of nelfinavir) ~~ALL ON-STUDY VISITS WILL BE AT THE CLINICAL~~ RESEARCH CENTER AT UWMC

- *Contributed by Jeffrey Schouten*