

## *Lawrence S. Mayer, MD, PhD*

### **Assessment of the Presentations of Drs. Kim-Farley and Kerndt**

I have reviewed three PowerPoint presentations concerning sexually transmitted diseases (STD's) in the adult film industry (AFI), one authored by Robert Kim-Farley, MD, MPH and two by Peter R. Kerndt, MD, MPH. These presentations purport to give scientifically valid estimates of prevalence of chlamydia and gonorrhea among performers in the AFI within Los Angeles County and compare these to rates for other citizens of the county. They are fundamentally flawed and so poorly documented that it is difficult to tease out the flaws. However, it is clear that inferences based on this analysis are without basis in science, including epidemiology. Therefore, the conclusions, analysis and advice in these three presentations should be discarded.

Estimating prevalence requires both a denominator (accurate count of the population or the units of risk) and a numerator (the number of cases, e.g., those with a positive test). Among the various data reported by Drs. Kim-Farley and Kerndt, only one study, an 18-month pilot among "straight" AFI performers, uses actual counts as numerators and denominators (Kerndt, Public Health Issues, Slide 48). The remaining prevalence figures are based on gross estimates of the number of adult film performers active during a given time period, typically between 2000 and 3000 per year. Perhaps more importantly, most of the analyses reported by Drs. Kim-Farley and Kerndt lack transparency. They do not document the methodology used to derive their estimates. In the absence of this detail, it is not possible to confirm the validity of their results.

#### Dr. Kim-Farley: *STD/HIV Disease and Health Risks among Workers in the Adult Film Industry*

In his presentation, *STD/HIV Disease and Health Risks among Workers in the Adult Film Industry*, Dr. Kim-Farley claimed, with no explanation of how the data were collected, that, between 2004 and 2008, 3228 chlamydia and gonorrhea cases were reported among AFI performers to the LA County Public Health Department, (Kim-Farley, Slide 14). Thus he gives me no way to validate or criticize these counts. This is poor science and inexcusable in epidemiology which can be characterized as the science of estimating risk from counts.

Kim-Farley estimates that there were between 2000 and 3000 performers per year (LA County STD Program, 2008) in order to estimate prevalence. Based on these counts and his claim regarding the number workers, he posits that, "up to one-fourth of all performers are diagnosed with at least one infection of chlamydia and/or gonorrhea each year." (Kim-Farley, Slide 14)

Although Kim-Farley provides no details for this calculation, I believe he estimated 2500 performers per year—a total of 12500 performer-years—and divided this into 3228, yielding an estimated 25.8% with infections. Kim-Farley provides no information on turnover or longevity in this industry, the proportion of cases that were re-infections, or multiple testing of performers, so his statement that, "one-fourth of all performers are diagnosed," is unfounded and misleading. This calculation is defective. The correspondence between the numerator and denominator are critical to the validity of an

epidemiological analysis. Consequently the statements based on it are in error and misleading to those who are relying on the analysis.

He then breaks down the count of these infections, again without citation or reference

STD	N
Chlamydia	1933
Gonorrhea	1055
Chlamydia and Gonorrhea	240
Total	3228

(Kim-Farley, Slide 16)

He also states, without reference, that 27.3% of these cases are male, and 72.6% female.

On the next slide, Dr. Kim-Farley provides a year-by-year breakdown of infections among AFI performers in LA County, 2000-2008, again without reference or citation:

	Chlamydia	Gonorrhea	Syphilis
2000	26	10	0
2001	38	12	0
2002	70	36	0
2003	297	170	1
2004	426	205	0
2005	423	378	1
2006	335	331	1
2007	532	225	2
2008	457	156	0

(Kim-Farley, Slide 17)

The counts of infections for years 2004-2008 sum to 2173 for chlamydia and 1295 for gonorrhea, which is consistent with data from Slide 16, above: (1933+240 for chlamydia) and (1055+240 for gonorrhea). This is one of the few calculations that can be validated in his entire presentation.

Kim-Farley ,, on Slide 24, states that the annual prevalence rate of chlamydia and gonorrhea in the AFI is between 15% and 25%. He cites LA County STD Program, 2008 in a footnote on this slide but gives no details of the nature of the data .

Although I did not have access to sufficient information I tried to reconstruct, or at least approximate, his estimates from Kim-Farley’s Slide 17 (above) by calculating an estimate of period prevalence of Chlamydia+Gonorrhea from his data. I used his estimates of 2000 and 3000 for the number of performers per year in the calculations in the table below. Again, these estimates seem to be just “guess-timates”, estimates obtained by guessing.

It must be noted that his estimation of the prevalence is based on the false assumption that performers are never re-infected nor re-tested within any one year. He could have estimated the rates of re-infection and re-testing and adjusted for both although it would lead to a less startling, albeit more accurate, result. The oversight is particularly bothersome and misleading because the AFI performers

are re-tested as many as 12 times a year or more. It would be rare indeed for randomly chosen member of the public to be tested so often. Based on 2000 performers per year, my estimate of the period prevalence (using Kim-Farley's undocumented counts and faulty assumptions) is 30.7% for 2008. Based on 3000 performers per year, my estimate using Kim-Farley's undocumented counts and faulty assumption, is 20.4% for 2008. These numbers are close but not identical to those reported by Kim-Farley in the paragraph immediately above, giving us some confidence that we are approximating his calculations since he did not deign to tell his audience, or the people relying on his assertions, how he did his calculations.

Estimates of Period Prevalence based on Kim-Farley's Counts

Chlamydia		Gonorrhea		Chlamydia+Gonorrhea	
/2000	/3000	/2000	/3000	/2000	/3000
1.3%	0.9%	0.5%	0.3%	1.8%	1.2%
1.9%	1.3%	0.6%	0.4%	2.5%	1.7%
3.5%	2.3%	1.8%	1.2%	5.3%	3.5%
14.9%	9.9%	8.5%	5.7%	23.4%	15.6%
21.3%	14.2%	10.3%	6.8%	31.6%	21.0%
21.2%	14.1%	18.9%	12.6%	40.1%	26.7%
16.8%	11.2%	16.6%	11.0%	33.3%	22.2%
26.6%	17.7%	11.3%	7.5%	37.9%	25.2%
<b>22.9%</b>	<b>15.2%</b>	<b>7.8%</b>	<b>5.2%</b>	<b>30.7%</b>	<b>20.4%</b>

Dr. Kim-Farley compares his estimates of the prevalence rates of chlamydia and gonorrhea in the AFI (according to his estimate, between 15% and 25%) to the rates in the LA County population of 18-29 years old and the rates of residents of the county of all ages. He concludes, falsely, that the annual prevalence of chlamydia and gonorrhea among AFI performers is 8.5-to-18 times greater than that in LA County residents 18-29 years old, and 34-to-60 times greater than that in all LA County residents (Kim-Farley, Slide 24, citing LA County STD program, 2008).

He provides estimates of annual prevalence (per 100,000) for chlamydia and gonorrhea among AFI performers and the population of LA County. These appear to be based on the numbers for 2008 in the table above. To amplify his estimates, I've added percentages parenthetically in the table below.

	Chlamydia	Gonorrhea
Based on 2000 AFI performers	23750 (23.8%)	7750 (7.8%)
Based on 3000 AFI performers	15167 (15.2%)	5167 (5.2%)
LA County (age 18-29)	1756 (1.8%)	291 (0.3%)
LA County (all ages)	443 (0.4%)	85 (0.09%)

(Kim-Farley, Slide 25)

These data suggest that AFI performers are 15.4 times as likely (based on 2000 performers) or 9.9 times as likely (based on 3000 performers) to be infected with chlamydia or gonorrhea as 18-29 year-olds in LA County. They are 59.7 times as likely (based on 2000 performers) or 38.5 times as likely (based on 3000 performers) to be infected with chlamydia or gonorrhea compared to all residents of the county

In summary, Dr. Kim-Farley's estimates of infection prevalence among AFI performers and the comparison of these estimates to other populations are fatally flawed. He does not have accurate counts of the population exposed, and so uses counts of 2000 and 3000 performers to derive prevalence estimates. These counts are not justified in the presentation.

Worse, he does not take into account re-infection rates and testing frequency.

The comparisons to other groups of LA County residents are not valid. AFI performers, due to the nature of their work, may be at higher risk for sexually transmitted diseases than the average resident of the county. The general population of 18-to-29 year-olds (as well as all ages) in LA County comprise a mix of many subgroups, some of which may be at high risk and some of which certainly are not. In all likelihood, the vast majority of the persons in his comparison groups is not even tested within any given year for a sexually transmitted disease and may not be sexually active enough to risk re-infection, the two factors for which the counts of AFI performers need to be adjusted.

A much better comparison group for Kim-Farley's prevalence estimates would be comprised of people who are frequently tested for infection, such as women in California correctional facilities. Here are the chlamydia positivity rates among women from California 15 to 24 years of age from various sources: Attending Family Planning Clinics (5.9%), STD Clinics (18.1%), Adult Corrections (12.9%), and Juvenile Detention (12.5%). These rates are from the CDC 2008 Sexually Transmitted Diseases Surveillance Study and are fully documented at their web-site (<http://www.cdc.gov/std/stats08/tables/9.htm>).

The STD Clinic Morbidity Report – 2008, published by the Los Angeles County Public Health Sexually Transmitted Disease Program, reports 44,928 visits to their clinics in 2008. 28,023 patients were tested for chlamydia, and 11.3% were positive. 28,123 were tested for gonorrhea, and 4.6% were positive.

These rates differ strikingly from Kim-Farley's rates of 1.8% for 18-29 year-olds in LA County. This divergence is remarkable since they appear to be from the same county agency. Even more remarkable is that Kim-Farley did not address the sharp differences between these rates. It may have been bad politics to address the differences in the rates but is surely bad science not to have done so.

The CDC 2008 Sexually Transmitted Diseases Surveillance Study ranks Los Angeles as first in number of reported cases of chlamydia among major metropolitan cities, but with a relatively low (all age) rate of 0.47%, similar to Kim-Farley's figure (<http://www.cdc.gov/std/stats08/tables/9.htm>). This same survey ranks Los Angeles third in number of reported cases of gonorrhea among major metropolitan cities, but also with a relatively low (all age) rate of 0.09%. These are close to Kim-Farley's figure (<http://www.cdc.gov/std/stats08/tables/19.htm>) but they measure the rate in the general population while the AFI rate is for those who are tested. So the STD clinic rate, which is the rate of positive tests, is a more appropriate comparison for the AFI rate.

Dr. Kerndt: *Public Health Issues in the Adult Film Industry: Policy Implications of an Outbreak*

Dr. Kerndt, in a presentation entitled, *Public Health Issues in the Adult Film Industry: Policy Implications of an Outbreak*, reports the results of an 18-month pilot study (June, 2000 – December, 2001) among “straight” [his word] AFI performers. He provides the following breakout (Kerndt, Public Health Issues, Slide 48)

- Females (n=390)
  - Chlamydia: 7.7%
  - Gonorrhea: 2.0%
- Males (n=435)
  - Chlamydia: 5.5%
  - Gonorrhea: 2.0%

Dr. Kerndt claims that, among female performers, chlamydia prevalence is 3-fold greater than among similarly-aged LA County females: 7.7% vs. 2.6%. For gonorrhea, the prevalence is 5-fold greater than among similarly-aged LA County females: 2.0% vs. 0.4%. For male performers, chlamydia prevalence is nearly 7-fold greater than among similarly-aged LA County males: 5.5% vs. 0.8%. Gonorrhea prevalence is 6-fold greater than similarly-aged LA County males: 2.0% vs. 0.3%. The data are sourced to the STDP Sexually Transmitted Disease Morbidity Report 1998-2002.

Dr. Kerndt also provides the numbers in the table below, based on STDs reported by “straight” AIM members. 2002 data were self-reported, and 2003-to-2005 data were reported by AIM or a laboratory. No denominator data are provided for years 2003-through-2005. A footnote indicates that, “Not all individuals tested and reported by AIM are necessarily AFI performers.” (Kerndt, Public Health Issues, Slide 51). It is not clear what this disclaimer means or how it affects the numbers below. Again, epidemiology is about counts not policy. To treat counts so casually cuts against the basic grain of epidemiological reasoning. If the goal was to put numbers on the table to justify changes in policy then why not fabricate the entire analysis?

Year	Chlamydia	Gonorrhea	Syphilis
2002	36/735 (7.7%)	20/736 (2.7%)	0/236 (0.0%)
2003	271	157	2
2004	383	182	0
2005 (through May 15)*	174	89	2

(Kerndt, Public Health Issues, Slides 49-50)

Kerndt notes that, during 2003-to-2005, AIM reported that 114 individuals were diagnosed with at least one STD in two of the three years, and 12 individuals were diagnosed with at least one STD in all three years. Again, no denominator data are provided, so prevalence cannot be estimated.

Dr. Kerndt suggests, without argument or foundation, that there are 1200 sex performers in LA County based on anecdotal information from “industry sources.” (Kerndt, Public Health Issues, Slide33) No date is provided. Perhaps he and Dr. Kim-Fairly should compare notes!

Dr. Kerndt: *Worker Health and Safety in the Adult Film Industry: Policy Implications*

In a presentation entitled, *Worker Health and Safety in the Adult Film Industry: Policy Implications*, Dr. Kerndt reports that, during an 18-month period, STDs were 10-fold greater than among a similarly-aged LA County population: 7% vs. 0.7% (chlamydia) and 2% vs. 0.2% (gonorrhea). (Kerndt , Policy Implications, Slide 40) For his comparison, he provides the following data for chlamydia and gonorrhea infections in LA County for 2000 - 2008:

Year	Chlamydia	Gonorrhea	Syphilis
2000	26	9	1
2001	38	9	2
2002	70	35	6
2003	295	168	3
2004	428	203	1
2005	425	371	1
2006	340	341	2
2007	525	222	3

(Kerndt , Policy Implications, Slide 41)

These numbers differ slightly for each year from a table used in Dr. Kerndt’s other presentation, and differ from the table given above from Dr. Kim-Farley’s presentation. Science is based on replicability and replicability is dependent on the accuracy of data. These discrepancies should have been addressed.

DR. Kerndt also provides a table listing “STD comorbidity among AFI performers: April 2004-March 2008.” ((Kerndt , Policy Implications, Slide 42) The total number of chlamydia cases listed is 1721 and the total number of gonorrhea cases is 1120. These numbers differ somewhat from those cited in Kerndt’s other presentation for 2004-2008: 2173 for chlamydia and 1295 for gonorrhea. While the difference may be easily explainable that is all the more reason for it to have been explained.

No denominator data are provided for the table above; however, on Slide 43, Kerndt notes that, between April 2004 and March 2008, 1884 AFI performers experienced 2847 infections. 1430 (76%) performers had only one infection, and 454 (24%) had multiple infections.

**Re-infections accounted for 46% of all infections.** This re-infection rate almost destroys Kim-Farley’s prevalence estimates since it shows how critical it is to adjust counts for re-infections. I explore this issue further:

Dr. Kim-Farley’s method of estimating prevalence rates diverges sharply from that recommended by the US Center for Disease Control (CDC). In calculating period prevalence, the CDC uses the following methodology:

***Prevalence Monitoring: Reporting of Chlamydia Positivity***

Chlamydia test positivity was calculated by dividing the number of women testing positive for chlamydia (numerator) by the total number of women tested for chlamydia (denominator includes those with valid test results only and excludes unsatisfactory and indeterminate tests) and is expressed as a percentage. The denominator may contain multiple tests from the same individual if

that person was tested more than once during the period for which screening data are reported. The numerator may also contain multiple positive test results from the same individual if that person tested positive more than once during the period for which screening data are reported. (<http://www.cdc.gov/std/chlamydia2008/default.htm>) (emphasis added)

The STD Clinic Morbidity Report – 2008, published by the Los Angeles County Public Health Sexually Transmitted Disease Program, also uses visits as the denominator, and if one patient visited multiple clinics for the same event, they would be counted multiple times in the denominator.

Prevalence, as calculated in the presentations we’ve received, appears to use all positive tests in the numerator, but does not take into account the number of tests the subjects received. AFI performers are tested every four weeks. Kim-Farley and Kerndt, lacking a denominator, used an estimate of number of AFI performers (2000 or 3000) when they should have used an estimate of the number of tests given to the performers. . The two methodologies yield very different results.

**AFI Performer Data**

Application of the CDC methodology of calculating period prevalence to the AFI chlamydia and gonorrhea data I received for years 2004-2010, yields the following prevalence estimates:

Year	Total Tests	Chlamydia +	Chlamydia Prevalence	Gonorrhea +	Gonorrhea Prevalence
2004	9532/9499*	390	4.1%	210	2.21%
2005-2006	AFI data incomplete and lacking denominators				
2007	13678	282	2.06%	130	0.95%
2008	12941	351	2.71%	126	0.97%
2009**	13823	271	1.96%	152	1.10%
2010***	7174	97	1.35%	100	1.39%

\*Number of Chlamydia tests/ Gonorrhea tests

\*\*January excluded because no denominator data.

\*\*\*January through July only.

If the number of tests is used as the denominator for prevalence calculations, as recommended by the CDC, chlamydia and gonorrhea prevalence among AFI performers is much closer to that of the general population than Kim-Farley and Kerndt claim. The difference lies in the frequency with which AFI performers are tested. As illustrated in the table below, prevalence estimates for chlamydia are lower than those reported among women in high-risk subgroups, based on the CDC 2008 Surveillance Study.

Prevalence Calculated Based on Number of Tests Performed

Source	Chlamydia	Gonorrhea
AFI performers (2008)	2.71%	0.97%
LA County (age 18-29)*	1.8%	0.3%
LA County (all ages)*	0.4%	0.09%
The CDC 2008 STD Surveillance Study (all ages)	0.47%	0.09%
California Profile from CDC 2008 Surveillance Study (women 15-24):		
Family Planning Clinics	5.9%	
STD Clinics	18.1%	
Adult Corrections	12.9%	
Juvenile Detention	12.5%	
Other	5.4%	
STD Clinic Morbidity Report – 2008 (all ages)	11.3%	4.6%

\*Calculated from Kim-Farley, Slide 25

It is clearly not appropriate to compare prevalence rates of AFI performers to those of Los Angeles County residents using differing methodologies, as Drs. Kim-Farley and Kerndt have done. Their methods do not take into account multiple tests and re-infections. Their comparison data, based on similarly-aged subgroups and all ages do not take into account the fact that many people are not tested each year for sexually transmitted diseases.

In conclusion,

Drs. Kim-Farley and Kerndt did not document their data or methodology and have produced reports and presentations inconsistent with scientific data. Their reports are not only inaccurate, but also misleading and inflammatory toward the risk of contracting an STD in the adult film industry. Estimating this risk is a serious issue, it should have been given serious analysis.

Respectfully Submitted,

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