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Murder rates in New Orleans, 2004 to 2006

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Abstract

The murder rate in New Orleans during 2005 was 65.3 per 100,000 person-years of exposure. This is approximately 14% higher than the rate for 2004, when it was 57.1. The rate during the rebuilding year of 2006 increased substantially, compared to both the relatively normal 2004 and compared to 2005, the year Hurricane Katrina devastated and depopulated the city. The degree of increase in 2006 depends somewhat upon which population projection is used to calculate exposure, but even the most optimistic scenario results in a substantial rise in the murder rate. The “best estimate” trajectory yields a murder rate of 96.6 for 2006. This rate for 2006 is over two-thirds (69%) higher than was the case in 2004, and nearly half again as high (48% higher) as the rate in 2005. Compared to 2005, quarterly rates were substantially elevated during the second, third, and fourth quarters of 2006. Compared to cities of comparable size, murder rates in New Orleans have been substantially higher since at least 2004, and the disparity has been worsening since then.

Introduction

In response to a rash of killings that marred the end of the year, New Orleans Police Chief Warren Riley stressed on New Year’s Day that the city experienced only 161 murders during 2006, one of the lowest numbers in decades (*The Times-Picayune*, January 2, 2007). Trends are of course reflected by rates rather than by numbers because only the former account for how much exposure a population has to the risk of being murdered. And to properly calculate a rate, one must not only be able to estimate accurately how many people were at risk, but also for how long.

Unfortunately, much of the recent discussion about murder trends in New Orleans has relied upon murder rates calculated for 2005 and 2006 that are incorrect, due to the fact that they use mid-year or end-of-year population point estimates to approximate exposure. Because of the extreme de-population and re-population that occurred during

these two years, such estimates provide severely biased estimates of both exposure and murder rates.

Rate calculations for typical years, e.g., New Orleans in 2004

A rate is defined as the number of events (murders,¹ in this case) divided by exposure, i.e., person-years lived in the population during the period of interest. During a typical year, new people are added to a population through birth and in-migration at a steady pace; and subtracted through death and out-migration at a steady pace. Under such typical circumstances, the mid-year population provides a reasonable approximation of how much exposure – or how many person-years – a city had during that year. During the last full calendar year pre-Katrina, 2004, exposure was properly estimated by the city’s population at mid-year; an official mid-year population estimate is provided during normal years by the U.S. Census Bureau using a component-of-population-change method.²

This basic idea underlying a rate is illustrated in Figure 1, where the shaded area represents the amount of exposure, or person-years lived, in New Orleans during 2004. To estimate this exposure, one can imagine a population of about 462,269 persons (U.S. Census Bureau, 2004) living an entire year in New Orleans during 2004; this would equal 462,269 person-years of exposure. This approximation is never perfect. As noted above, some additions and subtractions will occur throughout the year, but generally these things happen at a steady pace and mostly cancel each other out. And even if a population ends up with more (or less³) people at the end of a year than it had at the beginning, under normal circumstances the changes occur at a gradual and steady pace throughout the year and the mid-year population still provides a good approximation of the number of person-years lived by the population during the year. This is the way that exposure is conceptualized and estimated under typical circumstances. Given the 264 murders that occurred in New Orleans during 2004, the murder rate is easily and properly calculated as 57.1 per 100,000 person-years.

Rate calculations for atypical years, e.g., New Orleans in 2005 and 2006

Circumstances during 2005 and 2006 were anything but typical in New Orleans. The city was essentially emptied by Hurricane Katrina at the end of August 2005, and remained sparsely populated for the remainder of that year. A substantial degree of re-population occurred throughout 2006. The mid-year population would provide an extremely biased estimate of exposure for 2005, and likely would for 2006 as well. Very few of the 454,863 persons who were here on July 1, 2005 (U.S. Census Bureau, 2007a), went on to live here for the last 4 months of the year. Similarly for 2006, using the mid-year (and most assuredly the end-of-year) population estimates as a measure of exposure would

¹ The term “murder” is used here to be consistent with terminology employed in official federal, state, and local crime statistics. The numerator of the murder rate includes what are legally known as homicides.

² For the latest official figures and key methodological details, see U.S. Census Bureau, 2007.

³ The long term trend for New Orleans has been a decline in population, currently at about a rate of about -1.62% per year.

distort the murder rate since so many of those persons counted later in the year did not contribute any exposure during the early part of the year.

A murder rate comparable to those computed under more typical circumstances requires a non-biased estimate of the number of person-years lived in New Orleans during those two unusual years. For 2005, the calculation reported here accounts for the fact that New Orleans' usual population lived in the city for the first 8 months. During and immediately following Hurricane Katrina, which struck on August 29, 2005, an extremely small number of officials, police, and rescue personnel were in the city. Beginning in late September, people living in un-flooded zones of the city near the river were allowed to return. The precise numbers who did so are unknown, but these numbers were very small relative to the pre-Katrina population.

The earliest documented and systematic estimates of the city's population took place in December 2005. One estimate by the City of New Orleans Emergency Operations Center (EOC) put the city's overnight population at 134,000 at that time. A second estimate by Rand put it at 91,000. The Rand estimate is based upon a projection driven primarily by the availability and occupancy of habitable housing (Rand 2006). The EOC account is based upon a survey conducted over two weekends in November and December 2005 (EOC 2006b). Both accounts find or employ similar proportions of dwelling occupancy. What likely drives the difference in estimates (the Rand estimate is about 68% of the EOC estimate) is that fact that EOC conducted its surveys over the weekends, when there was a surge of people returning to New Orleans to work on their damaged property and to take care of other issues.⁴ These weekend estimates are useful in many ways, e.g., by providing perspective on the trajectory of increase of the weekend population over time. It should also be noted that both of these teams have provided useful estimates under very trying circumstances, and with very limited time and resources. That said, the Rand estimate is likely a closer approximation of the actual population usually residing in the city in December 2005, since it excludes displaced, i.e., weekend-only, residents. But both of these estimates contribute to the calculation of the proper denominator for 2005 that would provide the most accurate basis for a comparison of rates with other cities and with other years.

Levels of population and exposure for New Orleans during 2005 are illustrated graphically in Figure 2. Each member of the city's normal population contributes about 8 person-months of exposure, up until the evacuation of the city over the weekend before August 29, 2005. The population at the midpoint of this 8 month interval, i.e., May 1, 2005, can be estimated by interpolation from census estimates to be about 456,089.

This results in 304,059 person-years of exposure (see Table 1). Each of the 71,000⁵ or so early-returners to the un-flooded sections contributes about 2.5 person-months if one

⁴ The team tried to minimize this problem in their final (late January 2006) estimate by asking weekend residents whether they planned to sleep in the city at least 15 of the upcoming 30 nights (EOC 2006a).

⁵ The New Orleans EOC group did a small survey during late October, 2005, and from this calculated the city's population to be approximately 105,000 (personal communication, 01-08-07) – the results and methods of this initial study are not included in the two reports cited at the end of this paper. Given the

assumes that their average arrival date was around mid-October. The estimate of 91,000 for the end of year population implies an additional 20,000 residents contributing an additional 1.5 person-months each, assuming that their average arrival date was in mid-November.

These total to 321,351 person-years of exposure in New Orleans during 2005, and thus the 210 reported murders equal a rate of 65.3, a 14% increase over 2004. Adjusting the population estimates for October and December 2005 upward (i.e., using the EOC estimates) has little influence on the 2005 murder rate, since individuals returning towards the end of 2005 contribute only small amounts of exposure during that calendar year.⁶

For 2006, there are disagreements regarding re-population trajectories in New Orleans and in other Katrina-affected areas. The recently released Census estimate of 223,000 for New Orleans for July 2006 is very much at odds with the other systematic and well-documented estimates, the rest of which indicate a mid-year population of about 170,000 to 180,000 and a level of around 200,000 near the end of the year.⁷ There is less consensus among population estimates for the early part of the year, and these differences have implications for the murder rate, since those individuals arriving early contribute exposure throughout the year.

These differences lead to two scenarios of re-population during 2006: a more optimistic one based on early estimates by the EOC; and a more conservative one based on early estimates by Rand. The conservative trajectory inspires confidence because of the close correspondence between Rand's subsequent estimate of 198,000 for September 2006 and the LRA estimate of 200,000 for November 2006. The EOC estimate is likely to overestimate the usual population of the city given the weekend sampling issue discussed above. Still, the EOC-based estimate is very useful for projecting an upper bound for exposure, and a lower bound for the city's 2006 murder rate.⁸

The more conservative "best estimate" scenario begins with 91,000 around the beginning of the new year and ends with around 212,000 on December 31, 2006 (see Figure 3 and

issues regarding weekend sampling discussed above, I estimate the usual population at this time to be about 68% (91,000/134,000) of this, or 71,000, and assume an average date of arrival of October 15, 2005.

⁶ Substituting an October 2005 population of 105,000 and a December 2005 population of 134,000 decreases the murder rate for 2005 only slightly to 63.7, or a 12% increase over 2004.

⁷ Systematic population estimates for the second half of 2006 include an estimate for September by Rand (McCarthy et al. 2006), estimates for October and November by the Louisiana Recovery Authority (LRA 2006; *Times-Picayune* Nov 29, 2006), and an analysis of postal service change of address requests for late June (*Times-Picayune*, Aug 8, 2006).

⁸ At the time of this writing, there are no official population estimates from the Census Bureau for Orleans Parish for 2006. However, the Census Bureau has been involved in both the EOC and LRA estimation efforts, and also completed a separate (unofficial) set of estimates for January 1, 2006 based on postal change-of-address requests (U.S. Census Bureau, 2007b). This latter estimate for Orleans Parish is 158,353; it is also a very optimistic estimate since many displaced individuals will not have officially changed their address by that date. Substituting this figure for the EOC figure on January 1, 2006, in the most optimistic calculation of the murder rate has only a tiny effect, resulting in a most optimistic estimate of the 2006 murder rate of 84.4.

Table 2). The end-of-year figure is extrapolated assuming a steady rate of increase from March through December. This trajectory of increase is remarkably consistent with reported estimates for October and November from the LRA surveys and with reported estimates for June based upon postal change of address requests (*The Times-Picayune*, August 8, 2006; October 6, 2006; November 29, 2006). The more optimistic “upper-bound” scenario begins with 134,000 around the beginning of the new year and also ends with the extrapolated estimate of around 212,000.

Using the “best estimate” figures, the murder rate in New Orleans during 2006 was 96.6, a 69% increase over 2004 and a 48% increase over 2005 (see Table 3). Using the more optimistic figures (which imply a larger population and more person-years of exposure), the murder rate in New Orleans during 2006 was 84.8, a 49% increase over 2004 and a 30% increase over 2005.⁹ Simply dividing the number of murders by the new mid-year Census estimate would yield a murder rate of 72.6, an estimate that severely understates those calculated using the full set of systematic and well-documented population estimates.

Murder rates by quarter, New Orleans, 2006 versus 2005

Number of murders by quarter for the first three quarters of 2005 and 2006 are available on the City New Orleans website (City of New Orleans 2007); the fourth quarter can be calculated by subtraction. Using the “best estimate” population projection to calculate exposure, the annualized murder rates for New Orleans for the four quarters of 2006 were 55.3, 100.6, 110.9, and 105.1, respectively, per 100,000 person-years of exposure (see Table 4).

Comparison by quarters for the two years shows little difference between the first quarters of the two years (2006 first quarter rates were 3% lower than in 2005). The second and third quarters of 2006, however, show increases of 66% and 24%, respectively, over 2005. While the fourth quarter murder rate in 2006 was over double the rate in 2005 (when only 8 murders occurred), the fourth quarter of 2005 was a singular period in the city’s history. Moreover, the fourth quarter of 2005 has little impact on the overall murder rate for 2005, since there was so little exposure during this final quarter.

New Orleans murder rates versus national rates, 2004-2006

The murder rate for other U.S. cities of similar size was 13.2 during 2004; thus the New Orleans rate of 57.1 was over 4 times as high as the national average for comparable cities (FBI 2005). This comparable national rate dropped slightly during 2005 to 12.9; thus the New Orleans rate (65.3) was over 5 times as high as the comparable national rate (FBI 2006) during that year. The comparable national rate for 2006 is not yet available, but if holds steady at 12.9, the New Orleans rate (96.6) will be over 7 times as high as the national average.

⁹ If the trajectory implied by the August and October estimates from the LRA series are simply projected to the end of 2006, the results are the same.

Conclusions

Using the available set of systematic, scientific, and reliable population estimates to correctly calculate person-years of exposure is the proper way to compare New Orleans' murder rates in 2005 and 2006 to other periods and places, for which and when the mid-year population generally provides an un-biased approximation of exposure. Using this approach, it is clear that the murder rate in New Orleans for 2006 increased substantially over both 2004 and 2005. The degree of increase in 2006 depends somewhat upon which population projection is used to calculate exposure, but even the most optimistic population estimates demonstrate a substantial rise in the murder rate. The "best estimate" trajectory implies a murder rate over two-thirds higher in 2006 than was the case in 2004, and nearly half again as high as the rate in 2005. Compared to 2005, quarterly rates were substantially elevated during the second, third, and fourth quarters of 2006. Compared to cities of comparable size, murder rates in New Orleans have been substantially higher since at least 2004, and the disparity has been worsening since then.

The spate of killings in New Orleans over and just after the 2006 New Year's holiday was not only horrific; it was also not an anomaly. These killings reflect elevated rates of murder in the city over the past few years with respect to cities of comparable size; a higher level of murder in the city over the past two years than in 2004; and a much higher level beginning around last April.

Table 1: Person-years of exposure, New Orleans, 2005

<u>Source</u>	<u>Date of estimate</u>	<u>Population size</u>	<u>Increase between dates</u>	<u>Estimated avg beginning date of interval</u>	<u>Person-years lived</u>
Census; interpolation	May 1, 2005	456,089	-----	Jan 1, 2005	304,059
Author's calculation	Oct 31, 2005	71,000	71,000	Oct 15, 2005	14,792
Rand	Dec 31, 2005	91,000	20,000	Nov 15, 2005	2,500
Total	-----	-----	91,000	-----	321,351

Table 2: Person-years of exposure, New Orleans, 2006

<u>Source</u>	<u>Date of estimate</u>	<u>Population Size</u>	<u>Increase between dates</u>	<u>Estimated avg beginning date of interval</u>	<u>Person-years lived</u>
“Best estimate” trajectory					
Rand	Jan 1, 2006	91,000			91,000
Rand	Mar 31, 2006	155,000	64,000	Feb 15, 2006	56,000
LRA	Oct 1, 2006	191,139	36,139	July 1, 2006	18,070
EP*	Dec 31, 2006	212,255	21,116	Nov 15, 2006	2,640
Sub-total	-----	-----	212,255	-----	167,709
Optimistic trajectory					
EOC	Jan 1, 2006	134,000			134,000
EOC	Jan 31, 2006	190,000	56,000	Jan 15, 2006	53,667
LRA	Oct 1, 2006	191,139	1,139	June 1, 2006	664
EP*	Dec 31, 2006	212,255	21,116	Nov 15, 2006	2,640
Sub-total	-----	-----	212,255	-----	190,971

Notes:

* By extrapolation.

Rounding has slight effects on the column subtotals for person-years.

Table 3: Murder rates for New Orleans, 2004 – 2006

<u>Year</u>	<u>Source of population estimates</u>	<u>Number of homicides</u>	<u>Person-years of exposure</u>	<u>Homicide rate per 100,000 person-years</u>	<u>Relative to 2004 level</u>	<u>Relative to 2005 level</u>
2004	Census	264	462,269	57.1	-----	-----
2005	Census/EOC/Rand	210	321,351	65.3	114%	-----
2006	EOC/LRA*	162	190,971	84.8	149%	130%
2006	RAND/LRA**	162	167,709	96.6	169%	148%

Notes:

*Optimistic-estimate population trajectory.

**Best-estimate population trajectory.

Table 4: Annualized murder rates for New Orleans by quarter, 2005 and 2006

Quarter	Homicides*		Exposure**		Rate per 100,000 person-years (annualized)		2006 rate relative to 2005
	2005	2006	2005	2006	2005	2006	
1	65	17	114,022	30750	57.0	55.3	97%
2	69	39	114,022	38750	60.5	100.6	166%
3	68	53	76,015	47785	89.5	110.9	124%
4	8	53	17,292	50424	46.3	105.1	227%
Total	210	162	321,351	167,709	65.3	96.6	148%

Notes:

*Source: New Orleans Police Department website.

**Exposure for 2006 based on best-estimate population trajectory.

Figure 1: Person-years of exposure, 2004

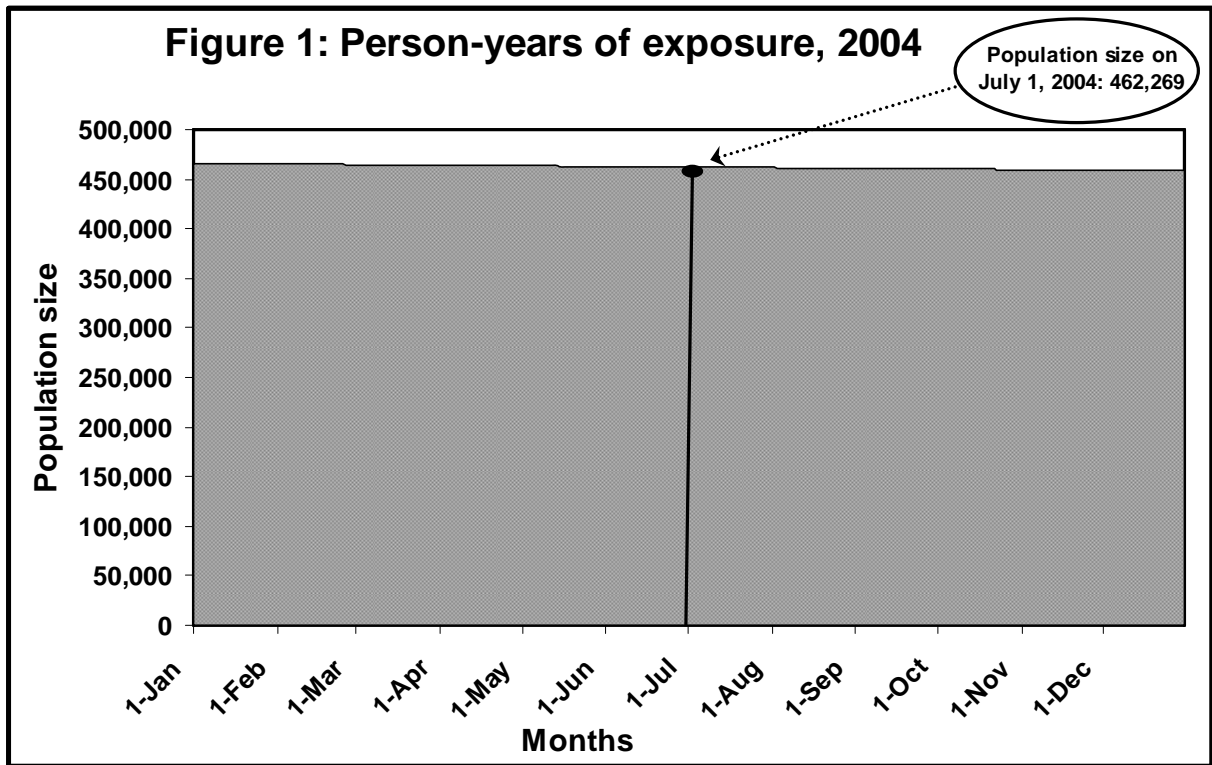
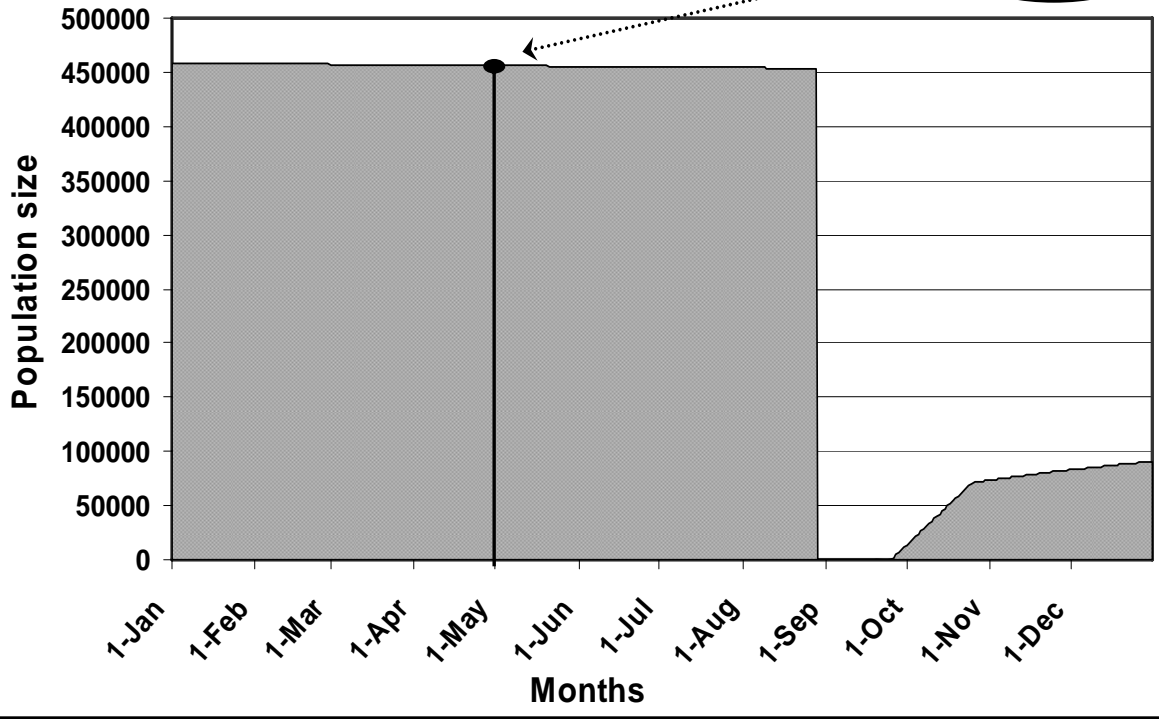
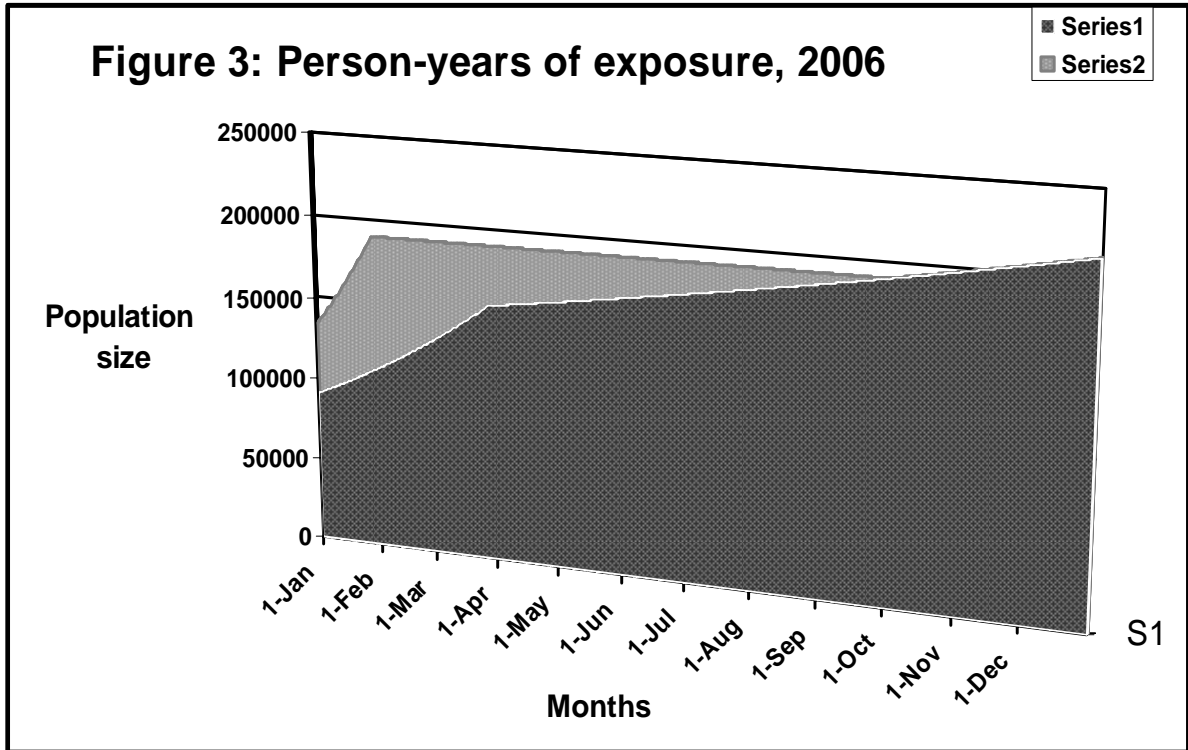


Figure 2: Person-years of exposure, 2005

Population size on
May 1, 2005: 456,089





Notes:

Series 1 – based on “best estimate” trajectory

Series 2 – based on “Optimistic” trajectory

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