Proportions Test (MSM vs IDU)

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### Mortality Analysis for the period 2003 to 2014

#### *HIV Mortality Analysis*

In order to explore HIV Mortality in Puerto Rico, we conducted a crude analysis using the data from the HIV Surveillance System for 2003 to 2014. The trend in HIV mortality can be seeing in figure 1:

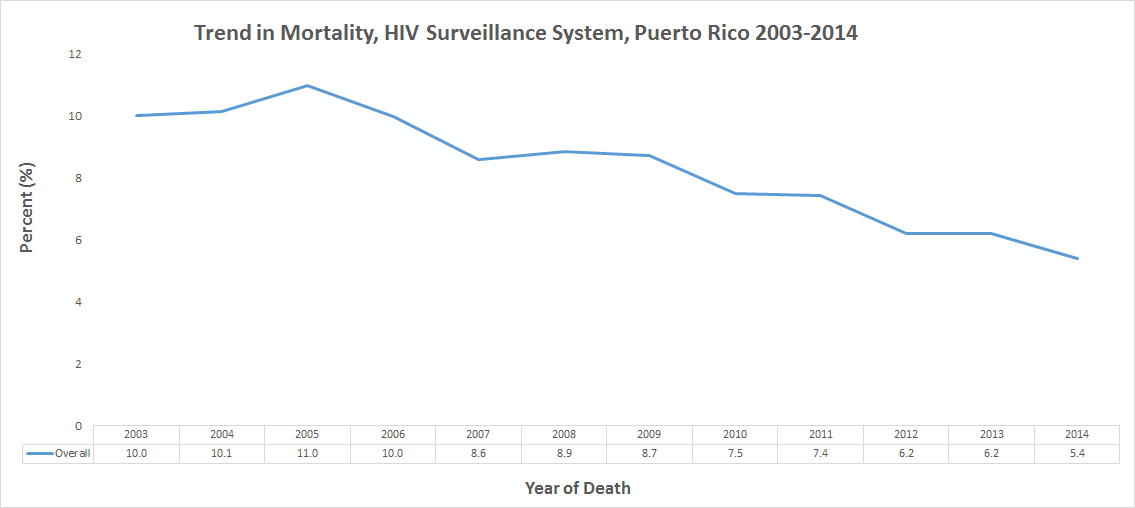


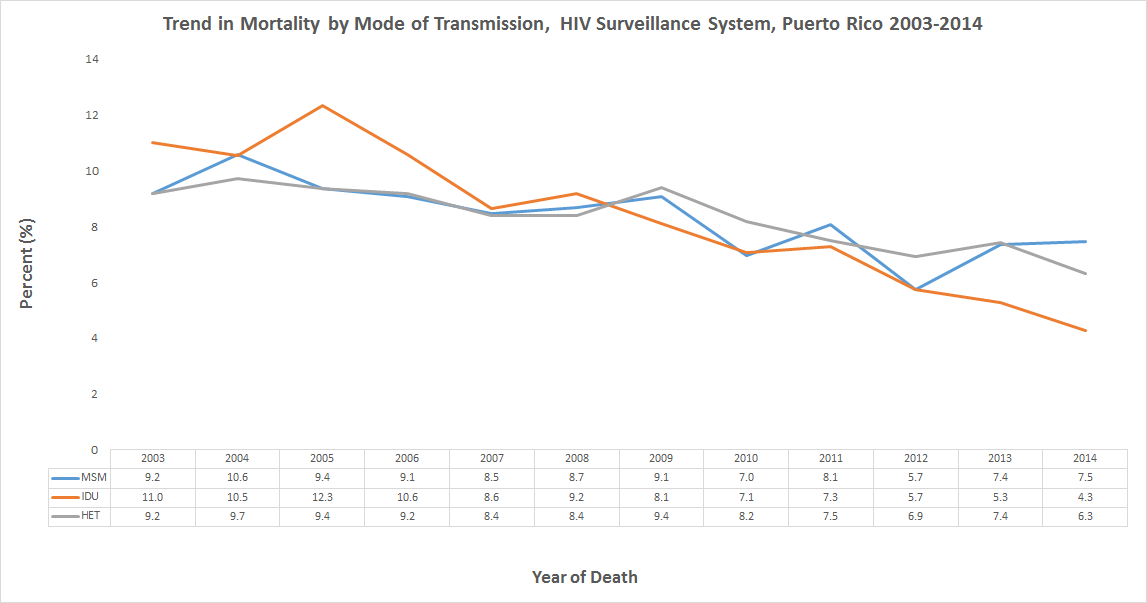
Figure 1 shows the crude HIV mortality trend in Puerto Rico for the period 2003-2014. This preliminar analysis shows a decreasing HIV trend of 4.6% (10.0% in 2003 compared with 5.6% in 2014) in Puerto Rico. In figure 2 we stratified by mode of transmission (Men who have Sex with Men, Injection Drugs Users and Heterosexual Contact):  
  


Figure 2 also shows a decreasing trend in HIV in Puerto Rico. In the IDU group, we can see a decrease of almost 7% which might explain the reason why the overall mortality is also decreasing.

#### *Comparing deaths of Men who have Sex with Men (MSM) and Injected Drugs Users (IDU)*

In order to compare deaths among MSM and IDU, we calculate the absolute difference between years (according to the CDC mathematical model) and verify whether there was a significant difference between these groups. The raw file can be accessed [here.](https://github.com/kramus/proptest/blob/master/propt3.csv)   
The structure of the data is as follows:

## year 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014  
## type case   
## msm yes 14 12 3 6 2 4 21 11 23 16 1  
## no 196 198 183 174 170 176 159 149 137 130 147  
## idu yes 17 66 64 72 20 39 38 7 57 17 36  
## no 793 842 844 708 656 637 560 529 479 405 352

The absolute differences of MSM and IDU cases for 2004-2014 are:

## ------------------  
## year MSM IDU   
## ------ ----- -----  
## 2004 0.071 0.021  
##   
## 2005 0.061 0.078  
##   
## 2006 0.016 0.076  
##   
## 2007 0.034 0.102  
##   
## 2008 0.012 0.03   
##   
## 2009 0.023 0.061  
##   
## 2010 0.132 0.068  
##   
## 2011 0.074 0.013  
##   
## 2012 0.168 0.119  
##   
## 2013 0.123 0.042  
##   
## 2014 0.007 0.102  
## ------------------

To perform the analysis we used a function to divide the dataset by year to calculate whether there was a difference between cases of HIV for MSM and IDU by specific years. The p-values were:

|  |  |
| --- | --- |
| Year | p\_value |
| 2004 | 0.0013 |
| 2005 | 0.5179 |
| 2006 | 0.0081 |
| 2007 | 0.0139 |
| 2008 | 0.2814 |
| 2009 | 0.0811 |
| 2010 | 0.0278 |
| 2011 | 0.0005 |
| 2012 | 0.2458 |
| 2013 | 0.0040 |
| 2014 | 0.0009 |
|  |  |

We can see that for years 2005, 2008, 2012 the results were not statistically significant (0.5179, 0.2814, 0.2458 respectively). Further investigation will be needed in order to have a better insight of the behavior of HIV mortality in Puerto Rico.