

Assessing Change with IIS

- Steve Robison
- Oregon Immunization Program

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Oregon Immunization Program

Overview

- IIS Use in Public Health
- Static vs Dynamic Assessment
- Working Around IIS Imperfections
- How to Use IIS Strengths
- Modeling Change
- Examples of IIS Use for Change

IIS & Immunization Surveillance

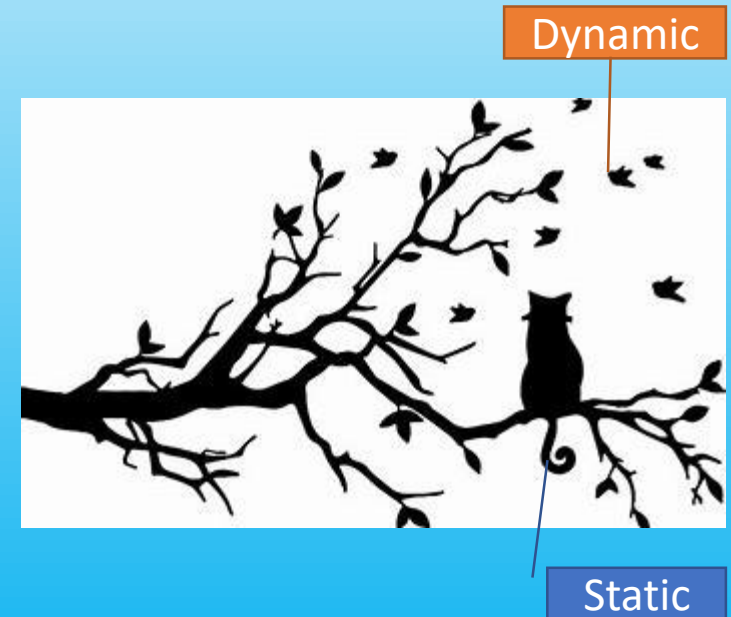
- IIS started as clinical support tools
- In late 1980's, IIS role expanded to surveillance
- Goals of early surveillance were
 - population rate assessment
 - Looking for pockets of need
- Generally done annually- not on the fly
 - long lag times for reporting and processing



Two Types

IIS Immunization surveillance has two types:

- Static (rate) assessment
 - Done at regular intervals
 - Predictable, repeatable, routinized
 - Useful for tracking trends
 - Long period of analysis- (ie: rates per year)
- Dynamic assessment
 - Done on the fly
 - Typically question-driven
 - Shorter time-interval focus and quicker reporting
 - Likely customized for situation; may not be repeated



Type Examples

Static

- Yearly two year old rates
- Yearly adolescent rates

Dynamic

- Hep A uptake in a local area after a public health announcement regarding a food-borne outbreak
- Week by week influenza immunization uptake during a season

Dynamic Impetus: Did Something Change?

- Question-based in the form of: *did X change Y?*
- Typically follows something in the real world:
 - Either something we did (example: outbreak response)
 - Or external, real world event (example: news story about deaths from VPD)
 - Specific, affected population, geography, or time.

Working With IIS Imperfections

- Issues of capture/accuracy/mobility can weigh heavily against generating static rates;
- But such issues may not matter if our question is about change.
- Basic principle- looking at change as likelihoods(ratio of rates) will cancel out most IIS data imperfections and biases.

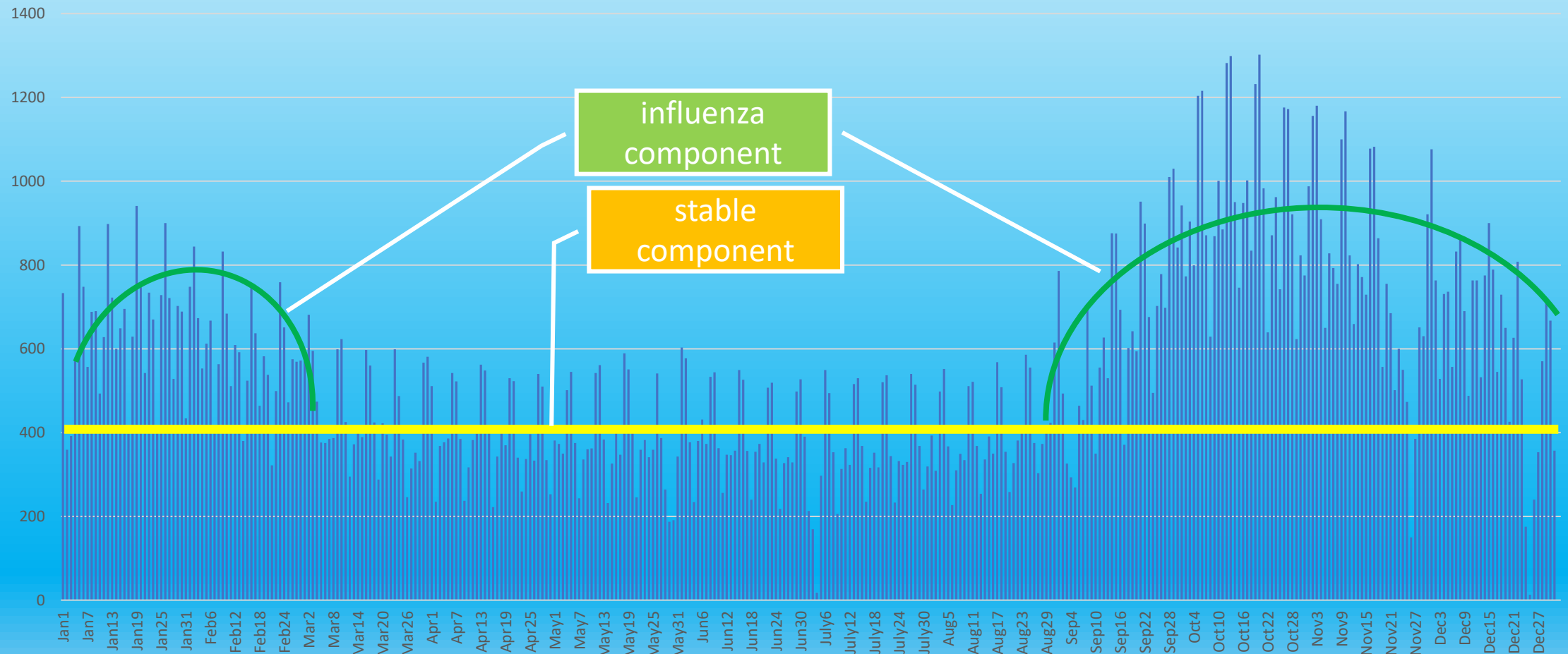
Likelihood Example

For HPV series completion-

- Assume we have 140% IIS denominator inflation, and 10% under-reported shots for 13-17 year olds;
- If a true HPV UTD rate is 60%, the IIS rate will be 38.6%.
- If a true increase of 10% occurs in the next year, then the IIS increase will appear to be 6.4%.
- Ratio of 70%/60% = 1.17;
- Ratio of (38.6%+6.4%)/38.6% = 1.17.
- IIS ratios of change are more likely to be accurate than simple rates

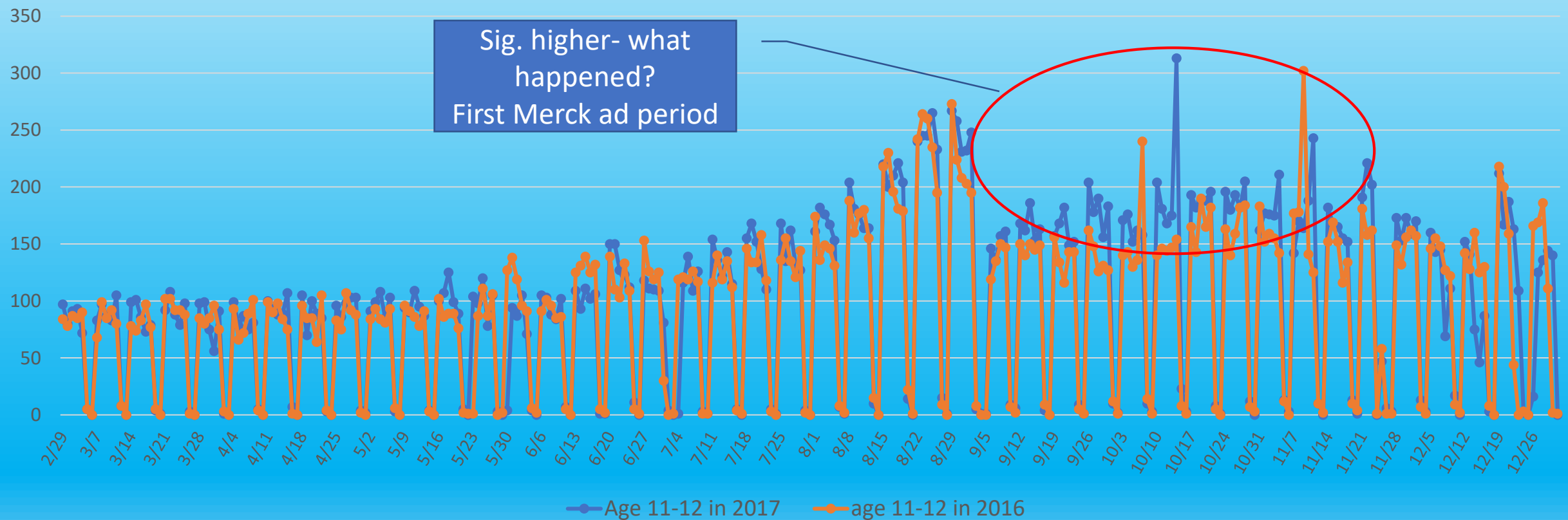
IIS Strengths for Assessing Change-Stability

Pneumococcal Conjugate Vaccine (PCV) Receipt at Age 65, by Administration Date, (2013-2017)



IIS Strengths for Assessing Change-Sensitive

Oregon HPV Immunization Counts by Day for Tweens (11-12) in 2016 and 2017,

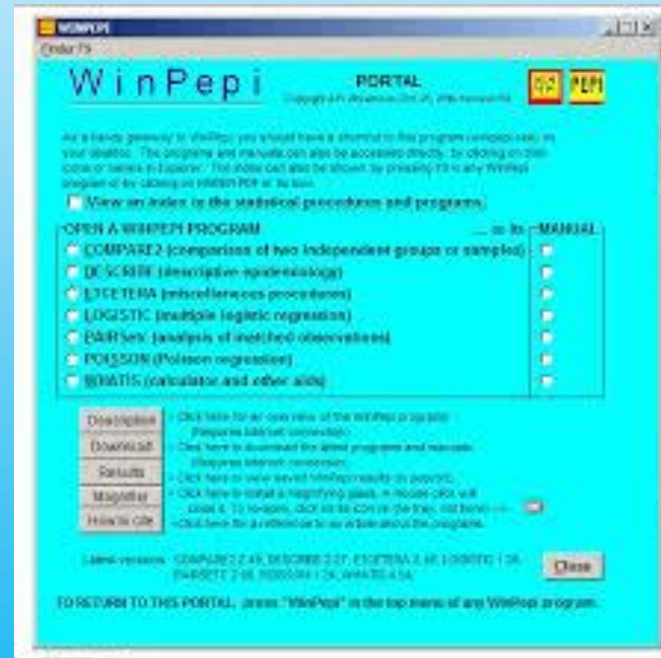


Modeling Change

- Putting these pieces together:
 1. Refine base question- did something change- to did the pattern of immunizations in the IIS change in a short time period?
 2. Two flavors of this- did an immunization total jump after an event? Or (more sophisticated) did an increase above seasonal pattern occur?
 3. Calculate rates before and after events of concern- choose a short time period (week as default)
 4. Calculate the ratio of rates
 5. If seasonality or other base differences are suspected, repeat 3&4 for the prior year
 6. Calculate the ratio of the two ratios- this is an odds ratio

Non-Commercial Product Endorsement

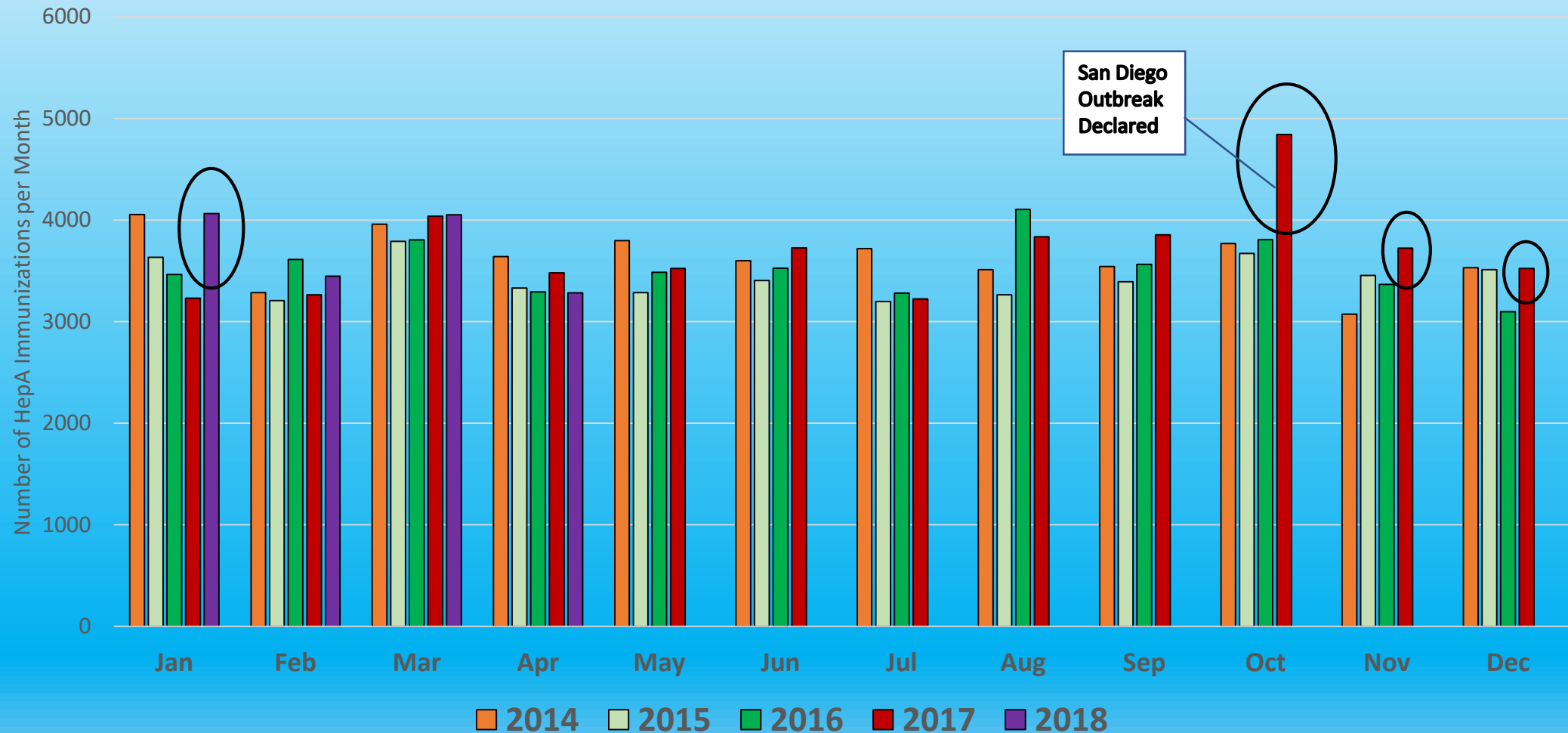
- A great little tool for these calculations is WinPepi
- Freeware
- Written by an Epidemiologist, Joe Ahbrams (deceased)



Example: Oregon Adult Hepatitis A Immunization After San Diego (2017)

- Wide media attention around San Diego homeless Hepatitis A outbreak
- Emergency declared September of 2017- Lifted February of 2018.
- So in neighboring Oregon, was there an increase in adult Hepatitis A immunization following San Diego?
- Oregon –background rate of HepA immunization for travel; look at amount above background for effect.

Oregon Adult (Age >18) Hepatitis A Immunization by Month and Year



Oregon Adult Hepatitis A Immunizations Compared to Prior Averages and Trends, 2017-18					
	<u>Compared to 3-Year Prior Means</u>			<u>Month to Month Trend (Prior Year)</u>	
Month	Ratio	95% CI		Odds Ratio	95% CI
May 2017	0.99	.94 to 1.04		0.96	.90 to 1.02
June 2017	1.05	1.00 to 1.10		1.04	.98 to 1.11
July 2017	0.94	.89 to .98		0.93	.87 to 1.0
August 2017	1.04	.99 to 1.09		0.95	.89 to 1.01
September 2017	1.09	1.04 to 1.14		1.16	1.09 to 1.23
October 2017	1.28	1.22 to 1.33		1.18	1.1 to 1.25
November 2017	1.11	1.06 to 1.17		0.87	.81 to .93
December 2017	1.03	.98 to 1.08		1.03	.96 to 1.10
January 2018	1.13	1.07 to 1.17		1.11	1.03 to 1.19
February 2018	1.03	.97 to 1.07		0.84	.78 to .90
March 2018	1.04	.98 to 1.07		0.95	.89 to 1.02
April 2018	0.96	.90 to .99		0.94	.88 to 1.01

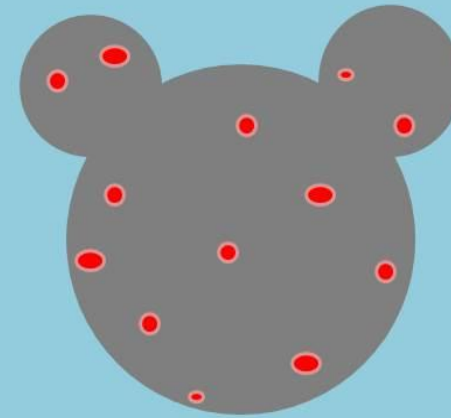
HAV Summary

- Defined the period of effect as Sept of 2017 through Jan of 2018
- Compared this effect period to the prior year period as a ratio
- Finding that for the effect period, adult HAV increased 18% more than expected (LR = 1.18)
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Remember This?

- Original measles case in Disneyland, CA, Jan 2015
- Susceptible visitors took measles home
- Oregon was lucky we didn't get a secondary outbreak

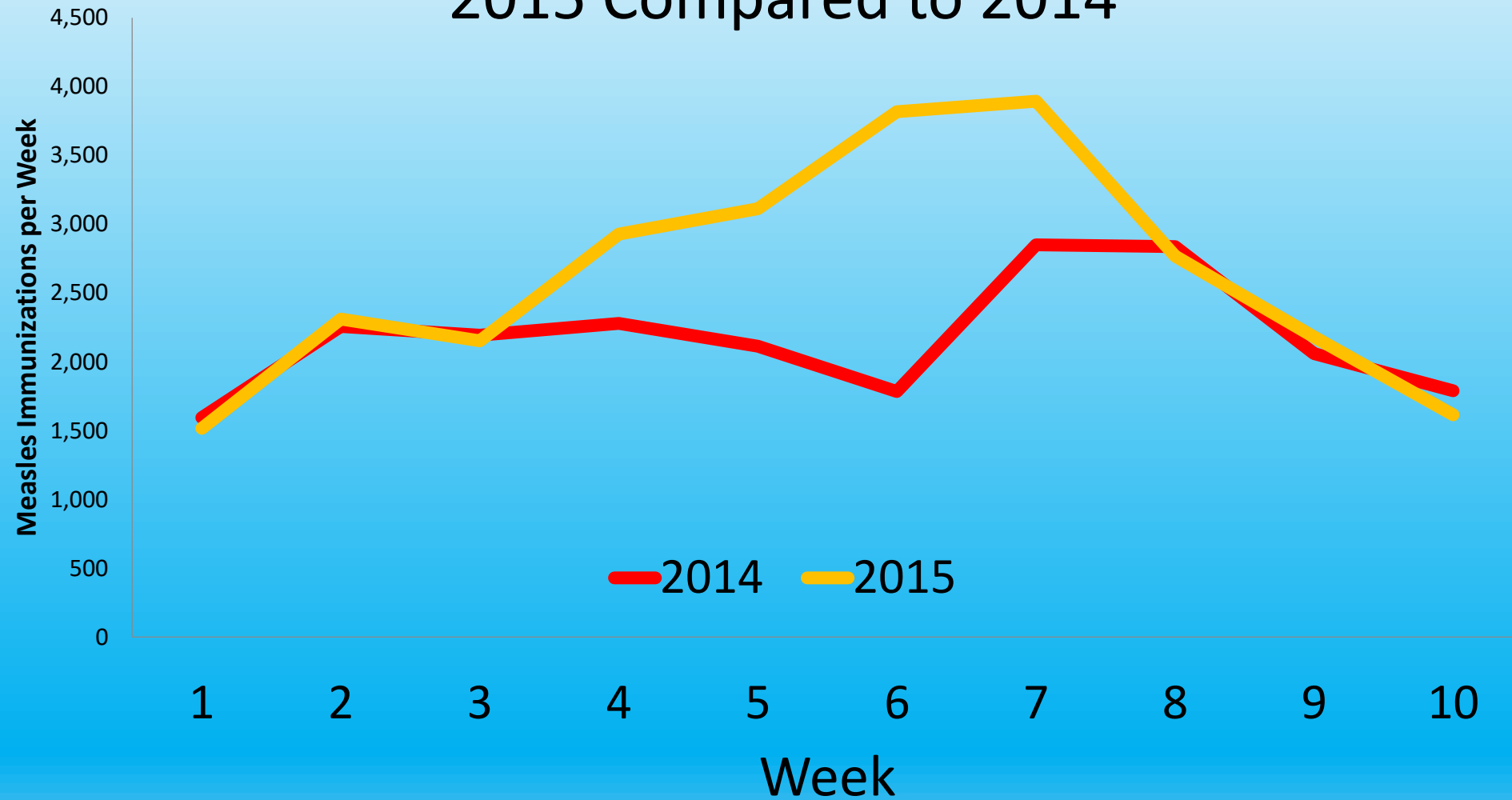
Mickey Measles



Measles Immunizations in Oregon, Post-Disneyland

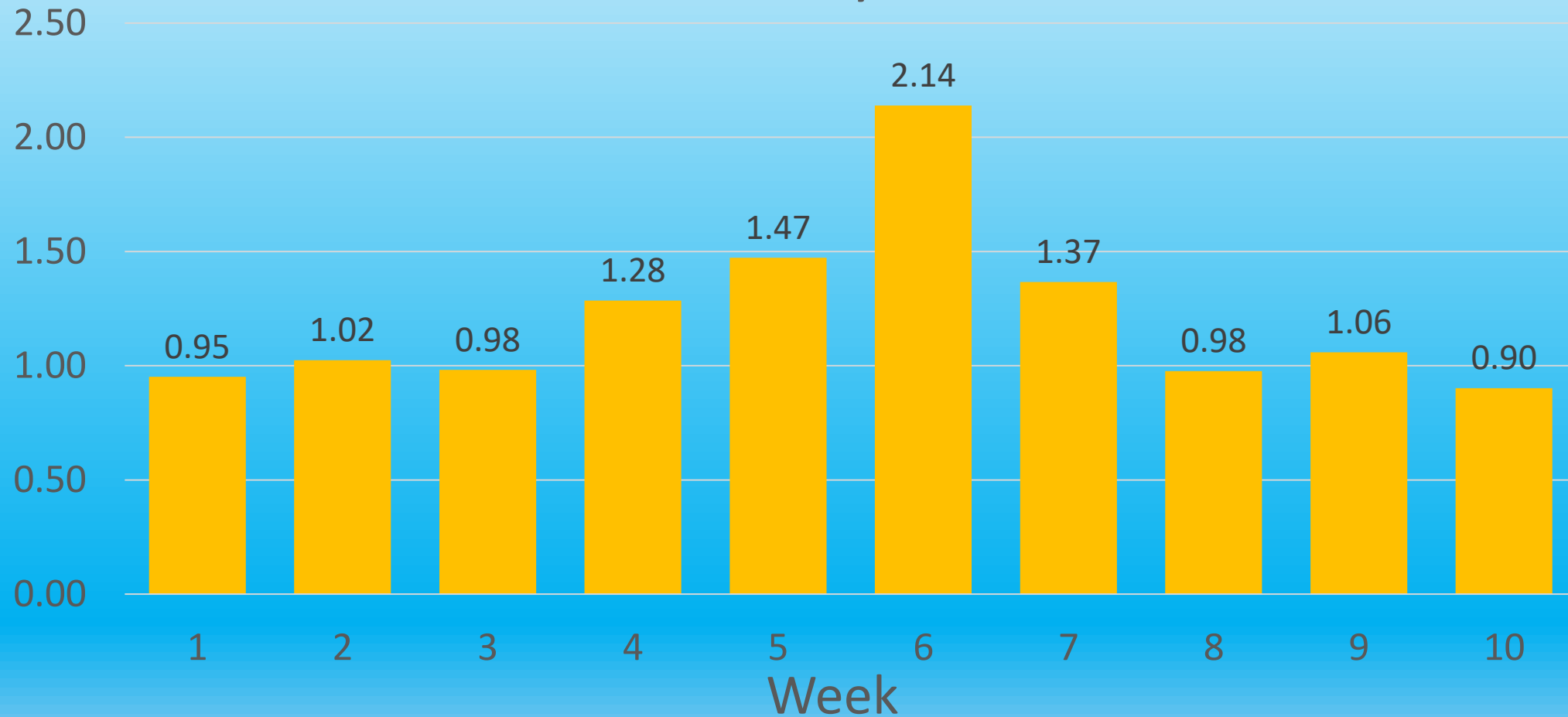
- Questions-
 - Did the wide publicity around the Disneyland measles outbreak lead Oregonians to seek more immunizations?
 - How long did this effect last?
- Methods-
 - Look at count of measles cases per week in Oregon, prior and post announcement of outbreak.

Oregon Measles Immunization per Week, 2015 Compared to 2014



Effects of Disneyland Measles Outbreak on Oregon Measles Immunizations, 2014 to 2015

Likelihood Ratios by Calendar Week



Questions?

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