Using Syndromic Surveillance Data to Model Strategies to Increase Influenza Vaccine Coverage for the 2015-2016 Influenza Season

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Background

- Healthy People 2020: 70% annual influenza coverage
- Goals of annual influenza vaccination:
  - Prevent community-wide spread of influenza
  - Prevent individual cases of influenza, especially vulnerable populations and health-care workers

Background

- Adequate vaccine coverage to prevent widespread transmission of disease is a function of the effectiveness of the vaccine and the infectiousness of the virus or bacteria of concern
- For influenza:
  - Is 70% coverage sufficient?
  - What will it take to reach 70% coverage?
  - Is timing important?

"An annual seasonal flu vaccine … is the best way to reduce the chances that you will get seasonal flu and spread it to others. When more people get vaccinated against the flu, less flu can spread through that community."
CDC. http://www.cdc.gov/flu/protect/keyfacts.htm

Rationale

Pooled Average Vaccine Effectiveness (VE)

Age range (yrs.)	Average VE	Range
0.5–4	52%	39%-67%
5–19	50.25%	46%-59%
20–64	50%	46%-52%
≥65	37.5%	32%-43%

(Adapted from Foppa, *et al*. Vaccine, 2015)

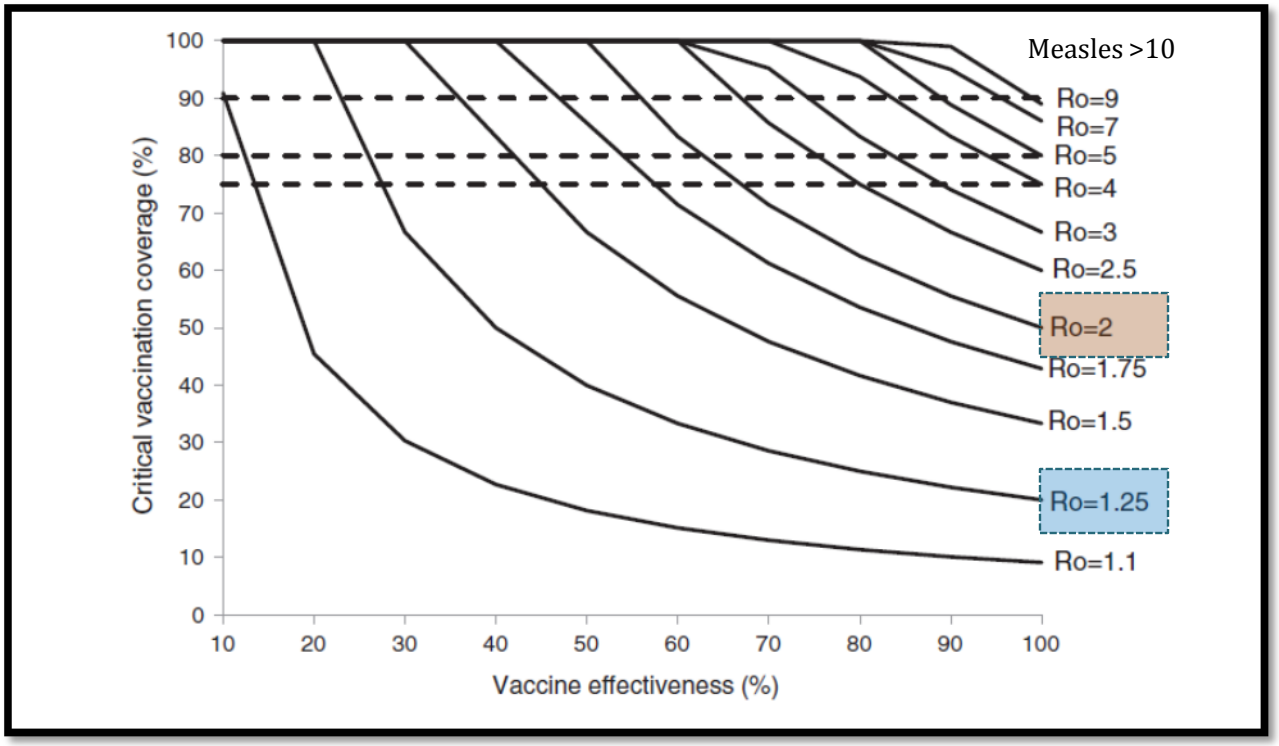
Rationale

Estimated Critical Vaccine Coverage Needed for Typical Seasonal and Pandemic Influenza

Age Group	VE	Ro	Critical Vaccine Coverage Needed
6 months to 64 years	50%	1.28 (1.19-1.37)	~40%
≥ 65 years	37.5 %	1.28 (1.19-1.37)	~55%
6 months to 64 years	50%	1.84 (1.47-2.27)	>90%
≥ 65 years	37.5 %	1.84 (1.47-2.27)	100%

(Adapted from Biggerstaff, *et al*. BMC Infectious Diseases 2014)

Critical vaccination coverage as a function of vaccine effectiveness for given level of R_o

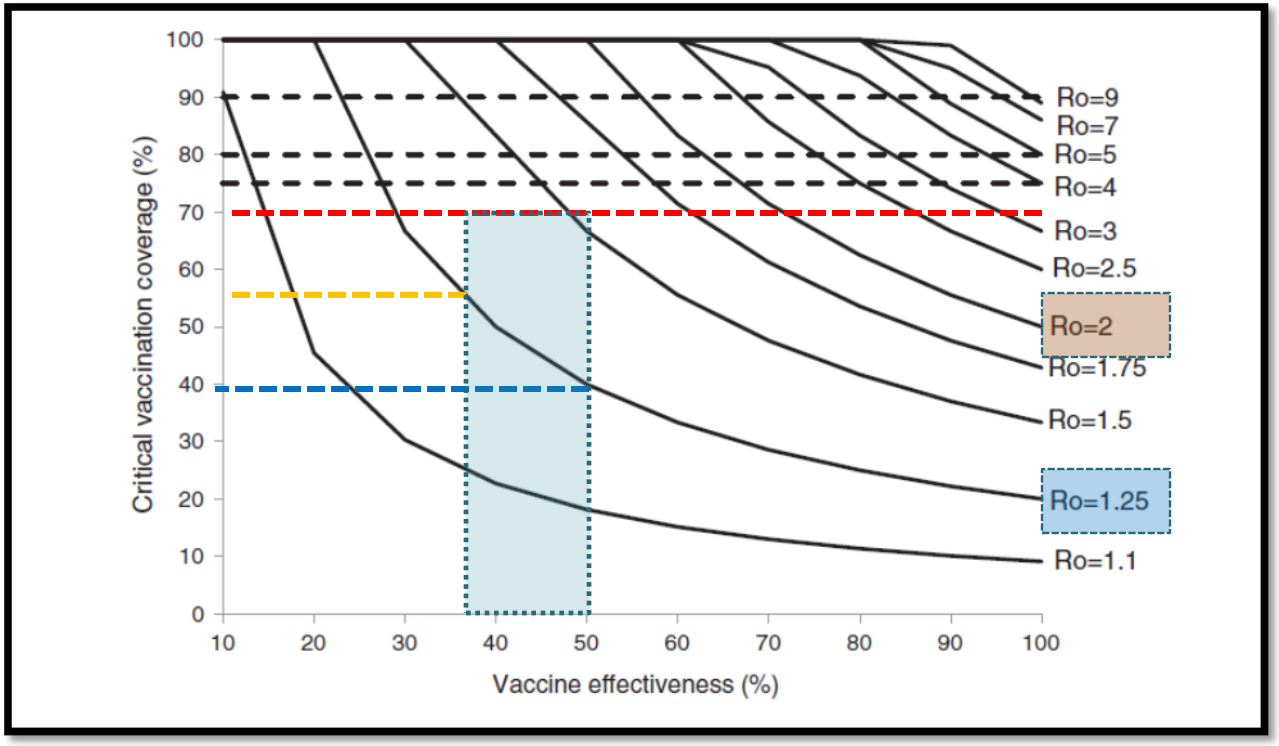


Average Seasonal flu: **Ro=1.3**

1918 Pandemic flu: **Ro=2.0**

(Adapted from Plans-Rubio, *et al*, 2012)[3]

Critical vaccination coverage as a function of vaccine effectiveness for given level of R_o



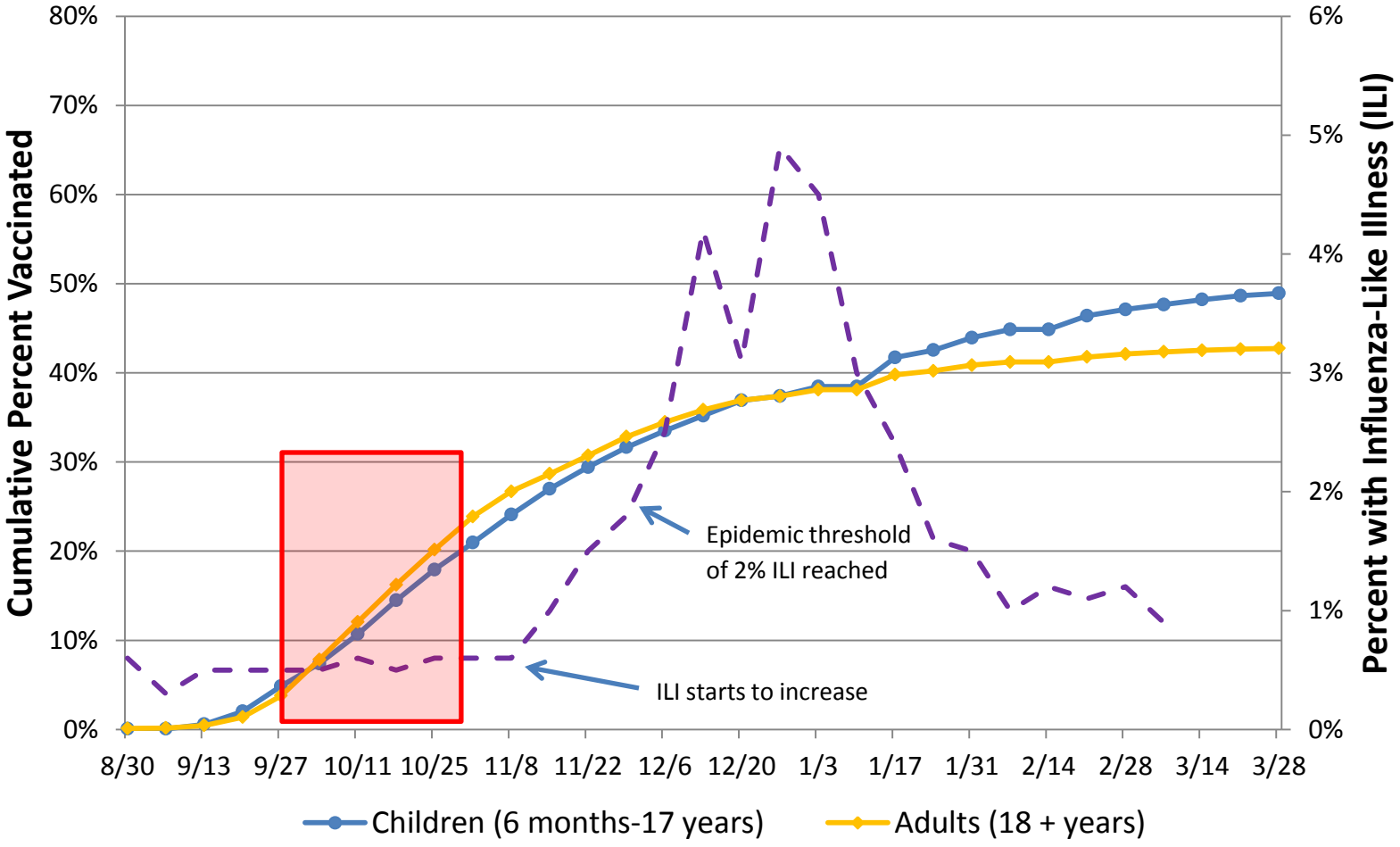
Critical vaccine coverage 0.5-64 years (~40%)	- - - - -
Critical vaccine coverage ≥ 65 years (~55%)	- - - - -
Healthy People 2020 goal (70%)	- - - - -

(Adapted from Plans-Rubio, *et al*, 2012)[3]

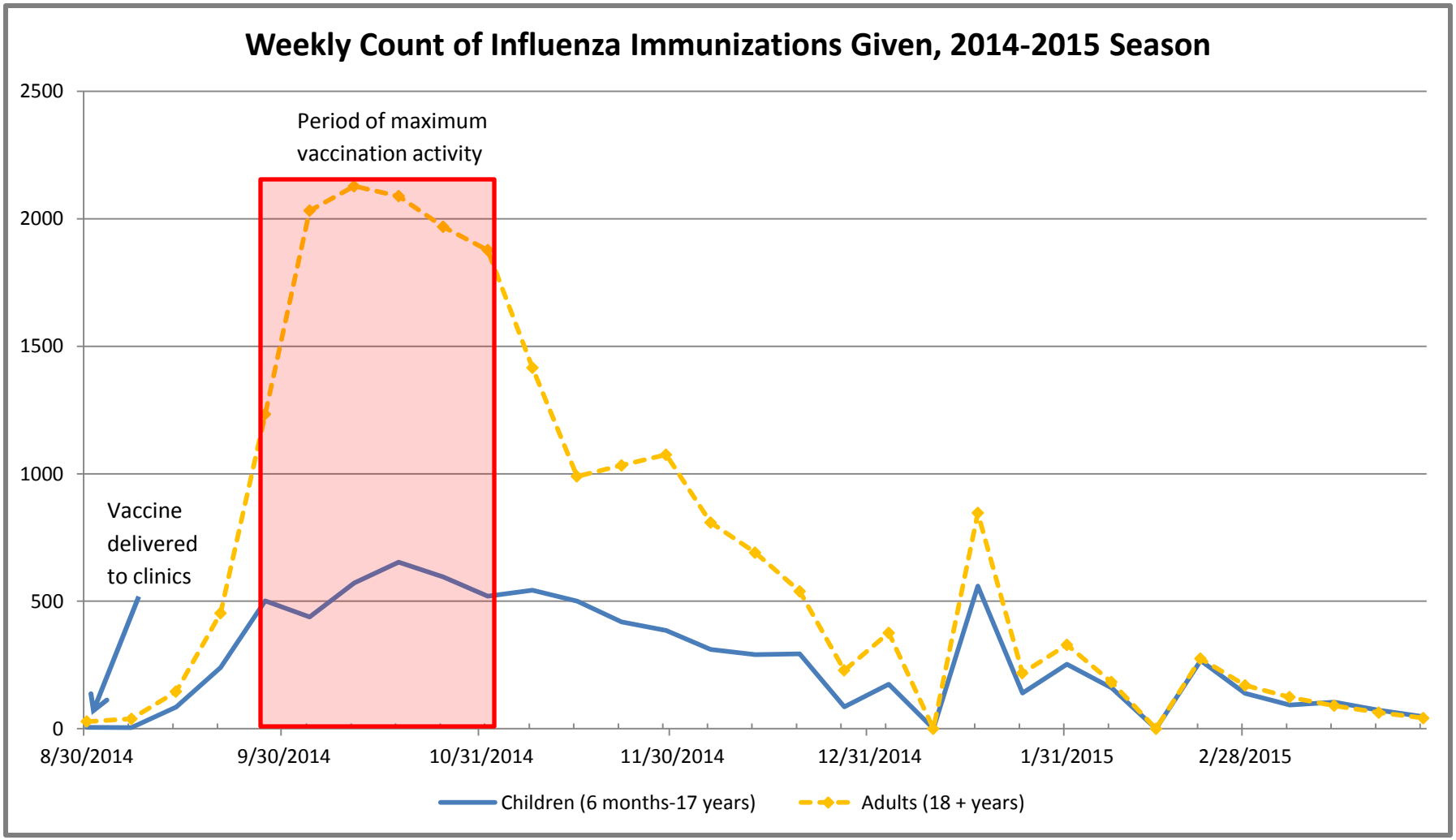
Methods

- Data obtained from IHS Influenza-like Illness Awareness System (IIAS)
- IIAS collects daily reports from participating clinics
- Includes total daily visits, diagnosis of Influenza-like Illness (ILI) and certain chronic conditions, flu vaccination status, age
- ILI- defined by 36 ICD-9 codes + fever (T≥100)
- Data aggregated by IHS Area and disseminated to immunization coordinators weekly
- Projected models computed based on changes to current timing of vaccination activities and overall capacity of the system

Cumulative Percent of Active User Population Receiving Influenza Immunization and ILI Activity Portland Area IHS 2014-2015 Season



Weekly count of influenza vaccine doses given in Portland Area IHS for the 2014-15 influenza season



Strategies to increase the uptake of influenza vaccine in the Portland Area IHS

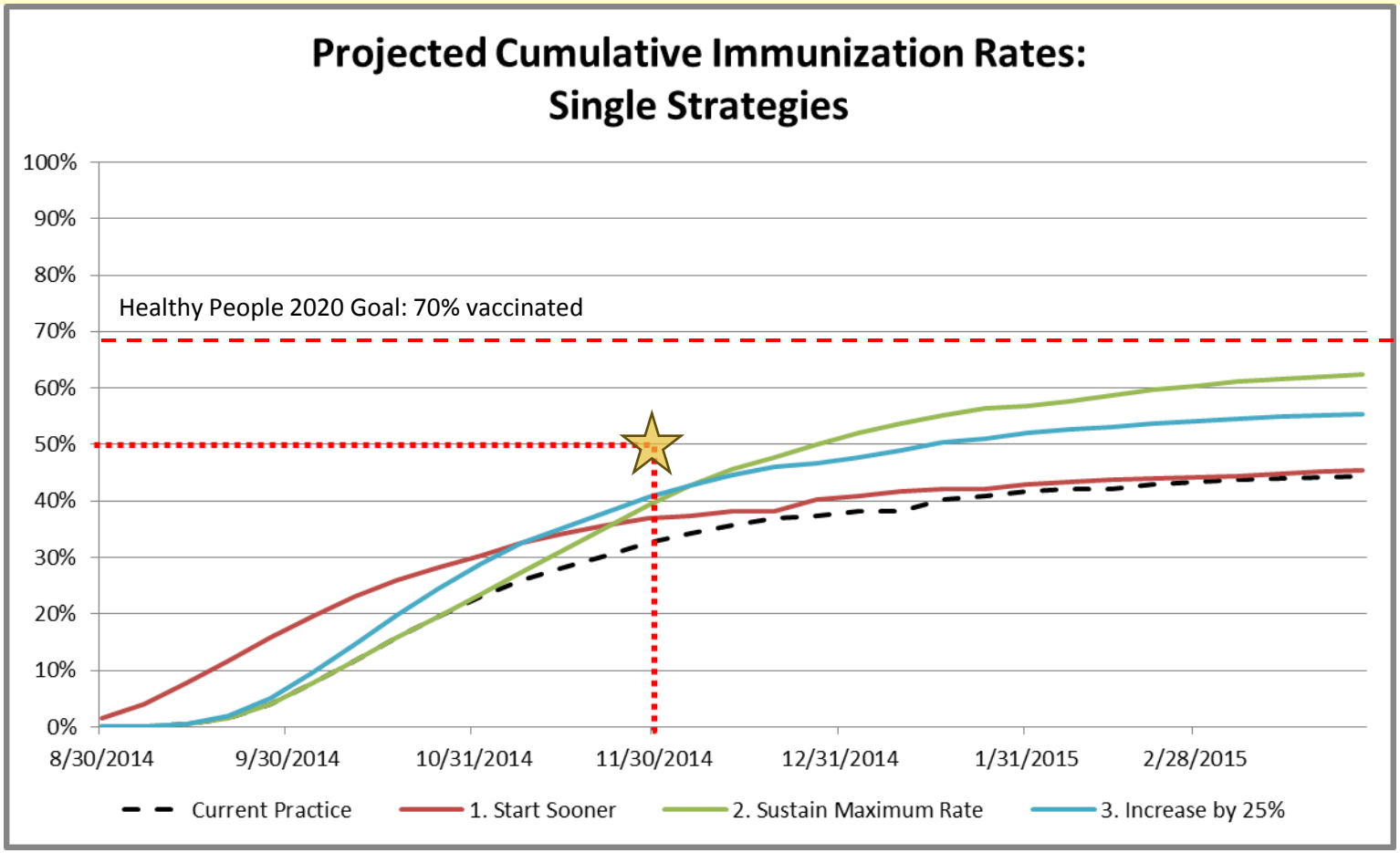
1. **Starting sooner:** Begin influenza vaccination activities as soon as possible

2. **Sustain maximum vaccination rate longer:** extend the maximum rate of vaccinations/week throughout the month of

3. **Increase weekly vaccination uptake by a defined percentage (e.g, 25%):** requires that the clinics/systems adapt to provide more vaccinations/week than last year.

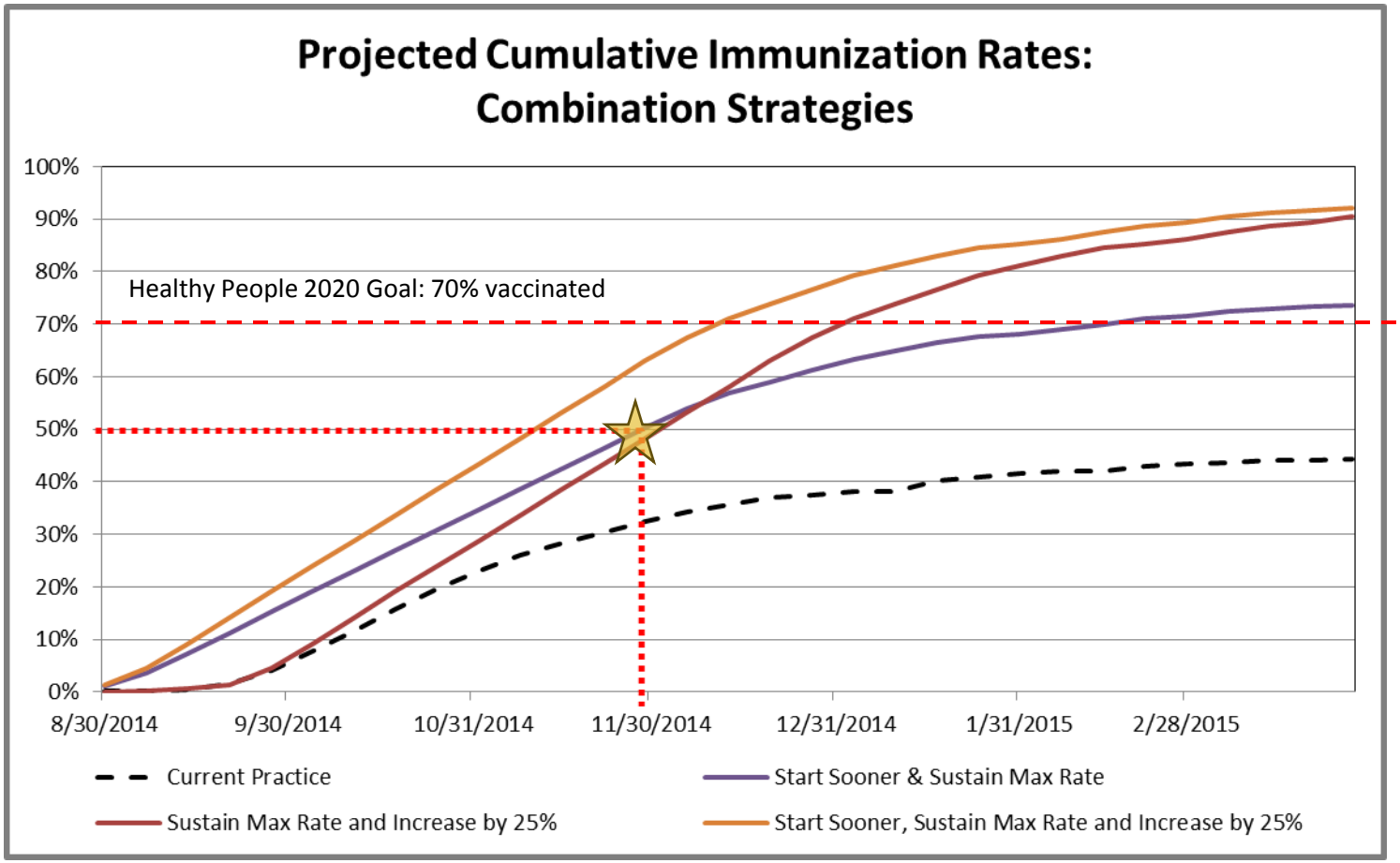
4. **Combination Strategies:** would use two or more of these strategies in combination.

Projected cumulative influenza immunization rates using three single strategies compared to current practice.



Minimum herd immunity threshold to be reached by 11/30/2015 is shown in red. All three strategies are projected to show increased coverage but no single strategy will reach the goal of 50% before ILI activity begins nor would they reach HP2020 goal of 70%

Projected cumulative influenza immunization rates using three combination strategies compared to current practice



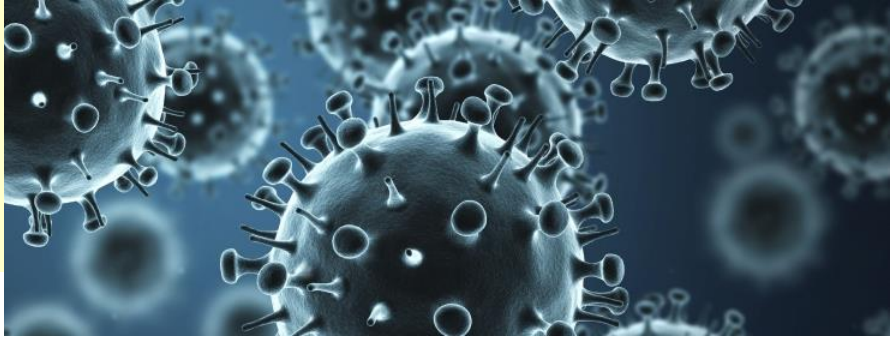
Minimum herd immunity threshold to be reached by 11/30/2015 is shown in red. All three strategies could meet/exceed the goal of 50% before ILI activity begins.

Recommendations

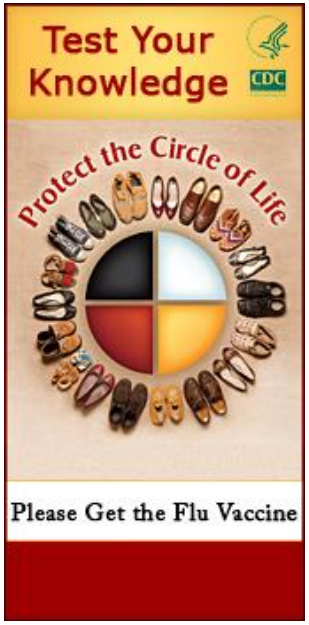
IHS Areas should consider the following:

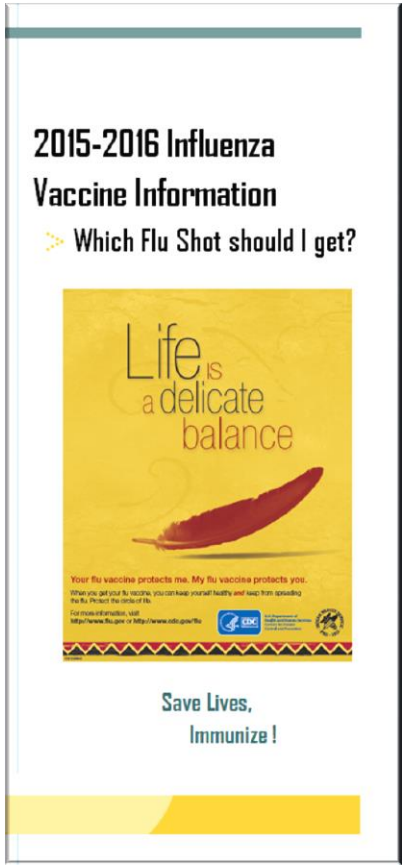
- Review local influenza policies and practices
- Review data on influenza immunization levels in prior years
- Set goals to achieve immunization levels that approach the IHS/HP2020 goal of 70% coverage for all aged 6 months and older.
- Consider adopting more than one single strategy
- Identify the primary and secondary drivers of flu vaccine uptake and adopt new policies and practices aligned with those drivers.
- At the clinic level:
  - Engage ALL staff in efforts to receive and provide influenza immunizations.
  - Engage patients through media/outreach materials (posters, postcards, PSAs and articles) and open communication.

Resources



- NPAIHB Breaking News 2015-2016 Flu Season
- www.cdc.gov/flu
- https://www.ihs.gov/Flu/
- *www.facebook.com/IHSHPDP*
- www.flu.gov
- Wes Studi Flu Video
- More CDC Resources





References

1. Deaths averted by influenza vaccination in the U.S. during the seasons2005/06 through 2013/14. I Foppa, P Cheng, S Reynolds, D Shay, C Carias, J Bresee, I Kim, M Gambhir, A Fry. Article in Press, Vaccine (2015), http://dx.doi.org/10.1016/j.vaccine.2015.02.042
2. Estimates of the reproduction number for seasonal, pandemic, and zoonotic influenza: a systematic review of the literature. M Biggerstaff, S Cauchemez, Carrie Reed, M Gambhir, Lyn Finelli. BMC Infectious Diseases (2014) 14:480 http://www.biomedcentral.com/1471-2334/14/480
3. The vaccination coverage required to establish herd immunity against influenza viruses. P Plans-Rubió. Preventive Medicine (2012) 55:72–77

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Driver Diagram for Improving Influenza Vaccine Coverage

Strategy (Change Concept)	Primary Drivers	Secondary Drivers	Constraints
Start vaccinating **sooner**	Clinic Readiness	• Pre-scheduled walk-in flu vaccine clinics • Pharmacists, Mas and nurses trained and ready to vaccinate • All necessary supplies in place prior to arrival of vaccines (gloves, syringes, needles, alcohol wipes, etc)	Highly dependent on timely vaccine supply delivery to clinic
	Community Readiness	• Pre-placed articles/ads in local newspapers about when flu vaccines will be given, benefits of flu vaccines, etc • Messaging throughout the community- posters, brochures, PSAs, video-messages, Social Media, radio, etc • Community-based vaccine days/sites pre-planned	

Strategy (Change Concept)	Primary Drivers	Secondary Drivers	Constraints
Sustain period of maximum **vaccination** rate **longer**	Clinic Capability	• Ensure adequate staffing throughout the month of November • Extend/maintain flu vaccine walk-in clinics • Ensure adequate supplies to last for the duration of the extend flu vaccine campaign	• Dependent on a sustained demand from patients/community • May require additional efforts to vaccinate outside of the clinic
	Community Demand or Acceptance	• May need to develop new messaging strategies or repeat messages multiple times • Anticipate and provide information about the benefits of flu vaccine specific to any issues that develop (vaccine mis-match, adverse events, reported "severity" of the circulating flu strain, special populations.	• Mistrust of IHS/CDC • Negative media messages

Strategy (Change Concept)	Primary Drivers	Secondary Drivers	Constraints
Increase weekly number of vaccines given per week by some percent (e.g., **by 25%**)	Clinical systems change to increase capacity	• Remove barriers to getting flu vaccine (standing orders, walk-in clinics, offering to all patients, etc) • Provide multiple types of vaccine (e.g., live attenuated, preservative free, high-dose) • Providers educated and committed to providing flu vaccine to all patients • Vaccinate providers/staff • Create new vaccination venues – evening/weekend, community-based clinics	• System must increase its daily capacity to give vaccines (staff must work harder than previous years) • Staff reluctance to promote vaccine or reluctance to receive their own flu vaccine • Insufficient staff to provide evening/weekend vaccination clinics
	Community Demand or Acceptance	• Develop/repeat messaging strategies • Anticipate and provide information specific to issues that may develop (vaccine mis-match, adverse events, reported “severity” of the circulating flu strain, special populations).	• Mistrust of IHS/CDC • Negative media messages