Demonstrating the Benefit of MCIR Using Two Dose Influenza Recommendations

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Children's Flu Vaccine Recommendations

- Children are at high risk for influenza-related complications
  - Chronic medical conditions and less than 2 years old
  - Annual average of 20,000 children under the age of 5 are hospitalized

Year	Recommendation
Pre-2002	high-risk medical conditions
2002	6-23 months encouraged
2004	6-23 months recommended
2006	6-59 months recommended
2008	all children 6 months -18 years

2013-14 ACIP Recommendations: www.cdc.gov/mmwr/preview/mmwrhtml/rr6207a1.htm?s_cid=rr6207a1_e

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Two Dose Flu Recommendations

- Ensure children develop protective antibody levels
- Two doses recommended when children receive their first flu vaccination
  - 1981[1]: 6 months through age 28 years
  - 1982-1989: 6 months through 12 years
  - 1990 – 2009: 6 months through 8 years
- Prior to 2009, no need to repeat 2-dose series with seasonal changes in vaccine
- 2009 H1N1 Pandemic
  - Children naive to the new virus
  - More complicated recommendations

1. MMWR does not have online files prior to 1981

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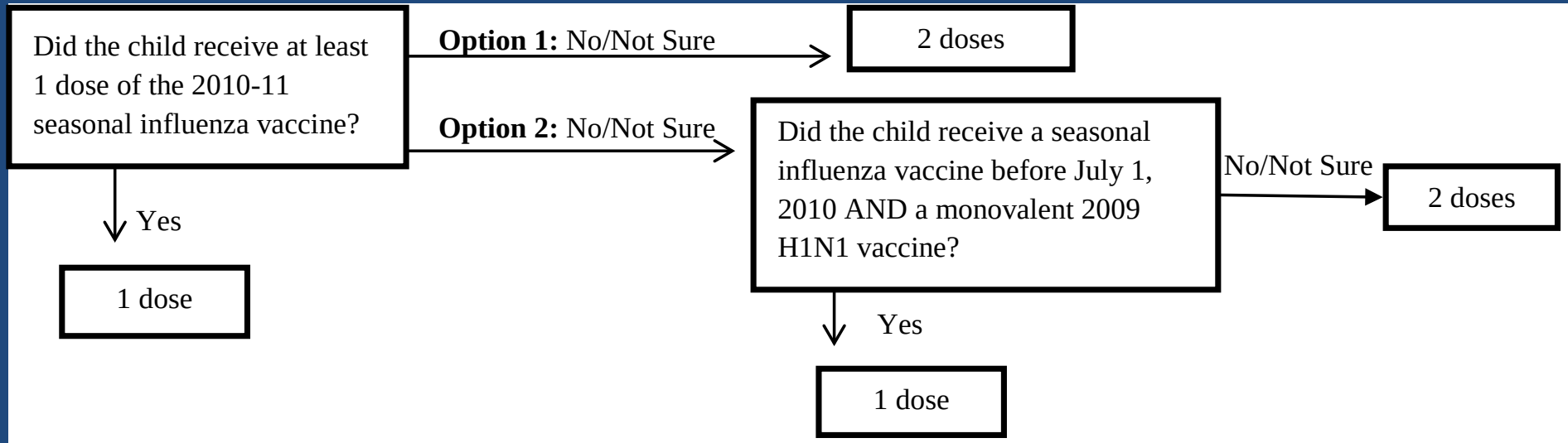
2010-11 & 2011-12 Seasons

- 2010-11: children who did not receive at least one dose of a monovalent 2009 H1N1 (pH1N1) or whose vaccination history was unknown ⟶ 2 doses
- 2011-12*:



*The ACIP discussed this, however it was not presented in the final recommendations:
http://www.cdc.gov/vaccines/acip/meetings/downloads/min-archive/min-jun11.pdf

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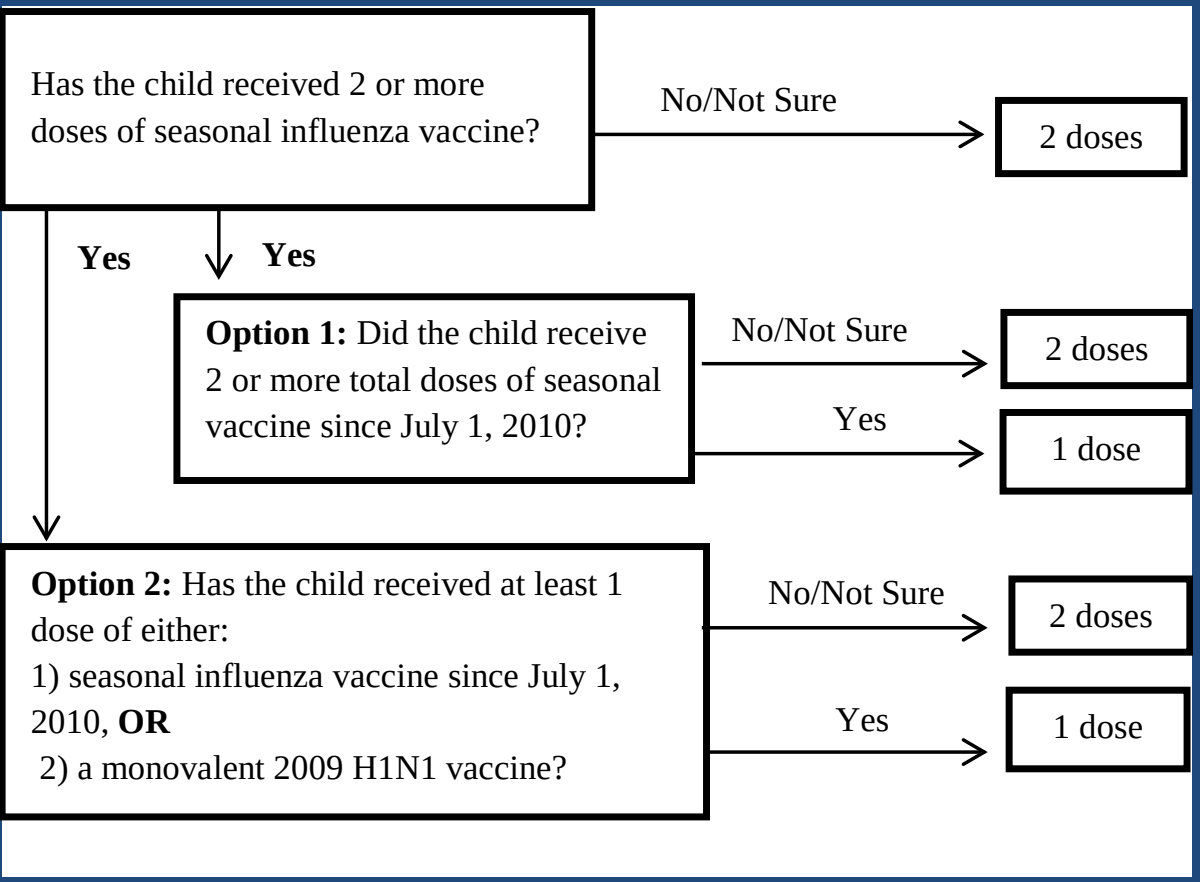
2012-13 & 2013-14 Seasons



OPTION 2 Examples:

Jane (Born 1/1/2008)

seasonal: 10/1/2008

seasonal: 11/15/2009

seasonal: 2/6/2010

seasonal: 12/6/2011

John (Born 1/1/2006)

seasonal: 10/11/2008

seasonal: 11/22/2009

pH1N1: 1/5/2010

2013-14 ACIP recommendations:
http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6207a1.htm?s_cid=rr6207a1_e

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Michigan Care Improvement Registry (MCIR)

- Over 100 million immunization records[1]
- Basic identifiers on 8.1 million persons[1]
- Over the last 6 flu seasons: 8.2 million[1] seasonal flu doses recorded in MCIR
- 2 dose forecasting algorithms built into MCIR
- Central repository for vaccine providers

1. Data as of September 1, 2013

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Study Objectives

- Use immunization history in MCIR to:
  - Determine the potential over-immunization of Michigan children by comparing two dose influenza vaccine recommendations using option 1 vs. option 2
  - Demonstrate the benefit of MCIR as a centralized repository for providers
  - Determine the difference in influenza vaccination coverage using option 1 vs. option 2

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Methods

- Demographic and immunization data from children in MCIR born between July 1, 2003 through January 1, 2013
  - 6 months through 8 years of age in the 2011-12 through the 2013-14 flu seasons
- Flu vaccination season: July 1 through June 30
- Determined the number of recommended doses for children each season using option 1 and option 2

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Results

- 1,279,949 children in the cohort
  - 67% (857,576) had at least one seasonal or pH1N1 vaccine
- 2,562,303 seasonal vaccines
- 376,470 pH1N1 vaccines
- 70.6% (605,577) of the children only received a seasonal flu vaccine
- 26.7% (228,968) received both pH1N1 and seasonal flu vaccine
- 2.7% (23,031) received only pH1n1 vaccine

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Number and Percent of Children Recommended to Receive One Dose by Season and Option

	2011-12 N(%)	2012-13 N(%)	2013-14 N(%)
Population Assessed	985,249 (100)	958,434 (100)	932,371 (100)
Option 1: MCIR Vaccination History after July 1, 2010 used to Forecast Doses	323,460 (32.8)	256,143 (26.7)	347,644 (37.3)
Option 2: Complete MCIR Vaccination History used to Forecast Doses	393,783 (40.0)	382,219 (39.9)	429,279 (46.0)
Potential Doses Saved Using Option 2	70,323	126,076	81,635

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Potential Cost Saving

	2011-12	2012-13	2013-14
Avg. weighted cost of VFC Flu Vaccine	$11.47	$11.38	$12.14
Possible doses spared	70,323	126,076	81,635
Potential Cost Saving	$806,605	$1,434,745	$991,049

- 48% of Michigan children were eligible for the VFC program in 2013
- Cost of vaccine is higher for the private sector compared to VFC program

http://www.cdc.gov/vaccines/programs/vfc/awardees/vaccine-management/price-list/index.html

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Benefit of Centralized Repository

- 78.6% (674,019) had more than one dose of seasonal or pH1N1 vaccine
  - 266,138 (39.5%) had received their doses at more than one provider site
- the number of doses a child received significantly predicted the number of provider sites the child received vaccines at ($p<0.001$)

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Percent of Children Aged 6 months through 8 years Fully Vaccinated

	Option 1	Option 2
2011-12	23.3%	25.4%
2012-13	21.8%	27.0%

- More children are considered up-to-date using detailed immunization history.

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Additional Cost Savings

- Unnecessary office visits
- Administration fees
- Health care professionals' time
- Parent's time
  - Work time-off
  - Transportation to the provider

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Important Tool for Providers

- Increasingly complex childhood immunization schedule
  - 2 dose assessment, live vaccine rules, quadrivalent flu vaccine
  - 2005 study: many providers not up-to-date with 2 dose regimen[1]
- MCIR provides annual updates to the assessment and forecasting algorithms
  - Clinical decision support
  - Reminder/recalls
  - Vaccine inventory management
  - Vaccine coverage reports

1. Dominguez SR, Daum RS. Physician knowledge and perspectives regarding influenza and influenza vaccination. *Hum Vaccin.* Mar-Apr 2005;1(2):74-79

Conclusions

- The immunization history and forecasting algorithms in MCIR could prevent the over-immunization of up to 126,076 children with a second influenza vaccine dose in the 2011-13 flu seasons
  - Potential cost-savings
- The likelihood of receiving flu vaccine at multiple provider locations increases with each dose received
  - Central repository is beneficial to immunization providers and immunization programs

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