

# **Timeliness of Childhood Vaccinations in Yap State, Federated States of Micronesia (FSM), 2006/2008**

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## Objectives

- ❑ Describe vaccination coverage in Yap State, Federated States of Micronesia (FSM)
- ❑ Explain the importance of including timeliness in assessment of vaccination coverage
- ❑ Discuss what can be learned about the population and immunization program from measuring timeliness of vaccination

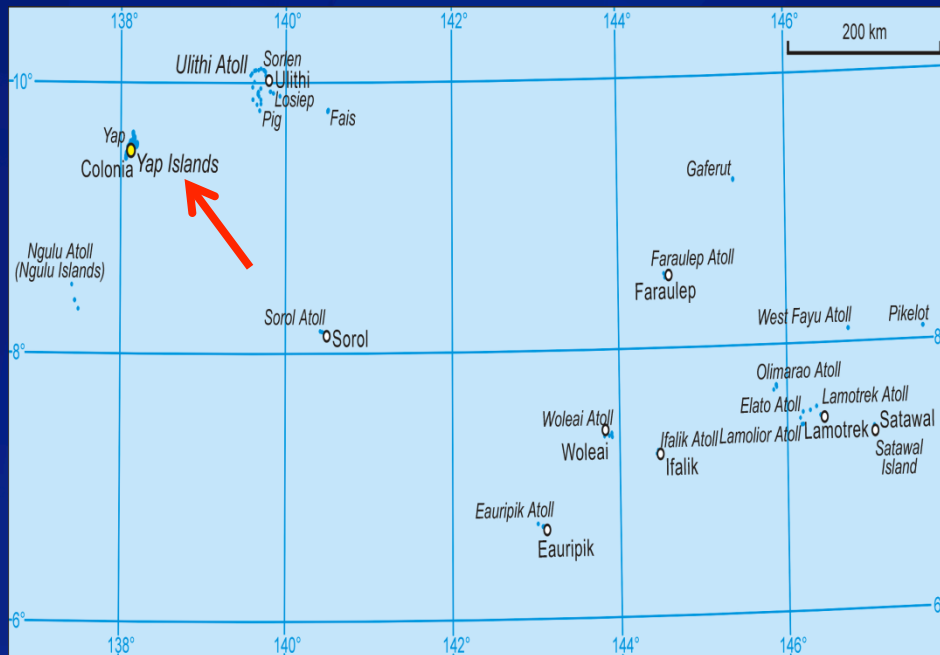
# **Presentation Outline**

- I. Introduction**
- II. Survey Methods and Key Outcomes**
- III. Results**
- IV. Discussion**
- V. Recommendations**
- VI. Acknowledgements**

# INTRODUCTION

# Yap State

## Yap Proper and Neighboring Islands



<https://www.cia.gov/library/publications/the-world-factbook/index.html>

## Yap Proper



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# Yap State

## ❑ Yap State Vaccination Program

### ■ Yap Proper

- Vaccinations administered by the public health center and community health centers (CHCs)
- CHC workers bring in children due for vaccination
- Radio announcements remind parents to bring children in for vaccines

### ■ Neighboring Islands:

- Vaccination visits several times a year by surveillance ship

### ■ Vaccines procured through the Centers for Disease Control and Prevention (CDC) and UNICEF

# Federated States of Micronesia Childhood Immunization Schedule

- ❑ **DTaP** – diphtheria, tetanus, and acellular pertussis
- ❑ **Polio**
- ❑ **MMR** – measles, mumps, and rubella
- ❑ **HepB** – Hepatitis B
- ❑ **Hib** - *Haemophilus influenzae* type b
- ❑ **BCG** - tuberculosis

Age	Vaccine
Birth	BCG, HepB 1
2 Months	DTaP1, Polio1, HepB2, Hib1
4 Months	DTaP2, Polio2, Hib2
6 Months	DTaP3, Polio3, <b>HepB3</b>
12 Months	<b>DTaP4, Polio4, MMR1, Hib3</b>
13 Months	<b>MMR2</b>
School entry	DTaP5

# Vaccination Assessment in Yap State, FSM

- ❑ Outbreaks of vaccine-preventable diseases in U.S.-Affiliated islands: Marshall Islands (2003, Measles); American Samoa (2008, Mumps); Federated States of Micronesia (2008, Pertussis; 2010, Mumps); Guam (2010, Mumps & Pertussis)
- ❑ Before 2005 used various methods, conducted sporadically, with limited time and resources
- ❑ In 2005, CDC began a new approach
- ❑ CDC, the FSM Immunization Program and Yap State Immunization Program conducted first survey in Yap
  - Yap Proper: 2006
  - Yap Neighboring Islands: 2008



# Measuring Vaccination Coverage

## ❑ Ways of defining “up-to-date” coverage

- Completion of all recommended doses regardless of the timing of vaccination
- Timely completion: coverage at the recommended age
  - Were all doses of a vaccine given by the final recommended age?

## ❑ Reasons for incorporating timeliness into vaccination coverage assessment

- Completion beyond the recommended age: doesn't take timeliness into account
- Timely completion identifies delays in vaccination that put children at risk of contracting vaccine-preventable diseases (VPDs)

# **METHODS AND KEY OUTCOMES**

# Survey Methods

- ❑ **Full census of Yap Proper and Yap Neighboring Islands (NI)**
  - Yap Proper: all households visited by survey staff
  - Yap NI: families gathered in central location for interviews
- ❑ **Eligibility for inclusion:**
  - Children 12–35 months or 6 years
- ❑ **Informed consent was given for interview and review of medical records**
- ❑ **Household, child, and maternal demographic information and shot card dates recorded**
- ❑ **Vaccines and dates of vaccination recorded from vaccination records**

# Analytic Methods

- ❑ **Coverage assessed in children 19 to 35 months using shot card and medical record combined (“combined record”)**
- ❑ **Demographic measures – Child, maternal, household**
- ❑ **Outcomes**
  - Completion of 4 DTaP, 3 Polio, 3 HepB, 3 Hib, 1 MMR, 2 MMR (Yap State, Yap Proper Yap NI)
  - Completion by recommended age (Yap Proper and NI)
    - 4 DTaP – 12 months
    - 3 Polio – 12 months
    - 3 HepB – 6 months
    - 3 Hib – 12 months
    - 1 MMR – 12 months
    - 2 MMR – 13 months
  - Coverage with 4 DTaP and 1 MMR by age in months (Yap Proper and NI)
- ❑ **Factors associated with not receiving any vaccine on time (Yap Proper Only)**

# **Analytic Methods**

## **Demographic Measures**

### **☐ Child**

- Sex
- Race/Ethnicity
- Place of birth
- Location of birth

### **☐ Maternal**

- Ethnicity
- Age
- Place of birth
- Education level
- Marital Status

### **☐ Household**

- Number of people living in household
- Number of children in household
- Income
- Telephone service

## **Analytic Methods**

- ❑ **Coverage with 4 DTaP and 1 MMR by age in months**
  - Cumulative percentage of children up-to-date at each month
  - No censoring for coverage beyond 19 months
- ❑ **Factors associated with not receiving any vaccine on time (Yap Proper Only)**
  - Significance of factors assessed using “24% Rule” (see Results section)
- ❑ **All analyses completed using SAS v9.2**

# RESULTS

## Household and Population Information

	Yap Proper	Yap NI	Total
<b>Total Number of Households Visited</b>	1216	563	1779
<b>Total Number of Children 19 to 35 Months</b>	128	103	231
<b>Shot Card</b>	71	82	153
<b>Vaccination Record</b>	122	102	224
<b>Combined*</b>	125	103	228

\*Number of children with either a shot card, medical record, or both



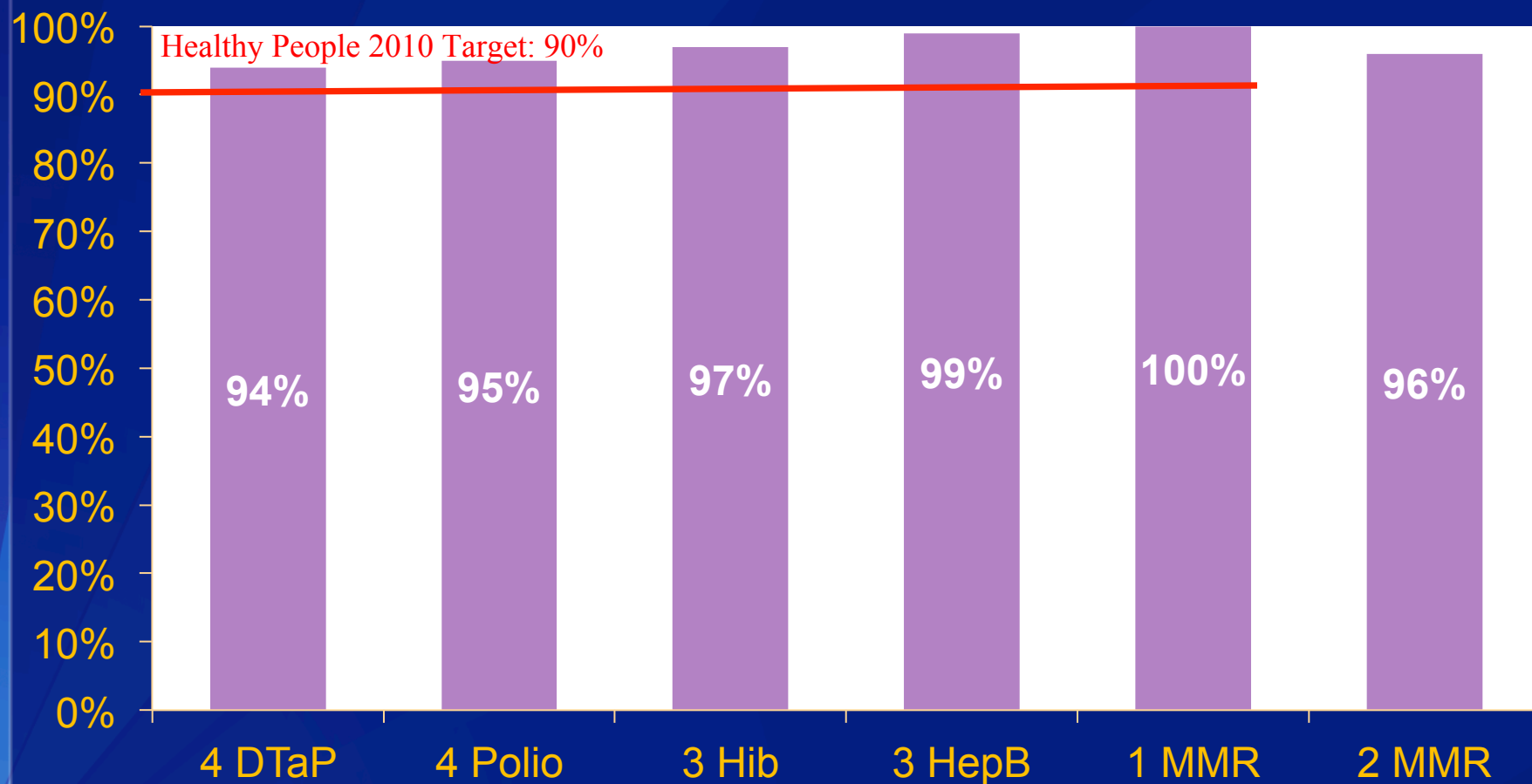
# Demographic Characteristics of Children 19-35 Months, Yap Proper 2006 and Yap NI 2008

Demographic Characteristic	Yap Proper n=128	Yap NI n=103
Sex	56% Male	58% Male
Race/Ethnicity	89% Yapese	>90% Yapese
Born in Yap	>90%	
Hospital Birth	>90%	70%
Mother's Ethnicity	85% Yapese	>90% Yapese
Mother Born in Yap	>90%	
Mother's Age	~50% <30 yrs	
Mother's Marital Status	81% Married/Living as Married	66% Married/Living as Married
Mother's Education	62% high school graduates	~30% high school graduates

# Demographic Characteristics of Households with Children 19-35 Months, Yap Proper and Yap NI 2006 and 2008

Demographic Characteristic	Yap Proper n=113	Yap NI n=94
Number of Household Members	62% 5 to 10 members	72% 5 to 10 members
Number of Children in Household	58% Three or more children	74% Three or more children
Household Income	79% Subsistence or < \$10,000	85% Subsistence or < \$5,000
Household Telephone Service	48% Landline service 30% Cellular telephone only	90% No telephone service

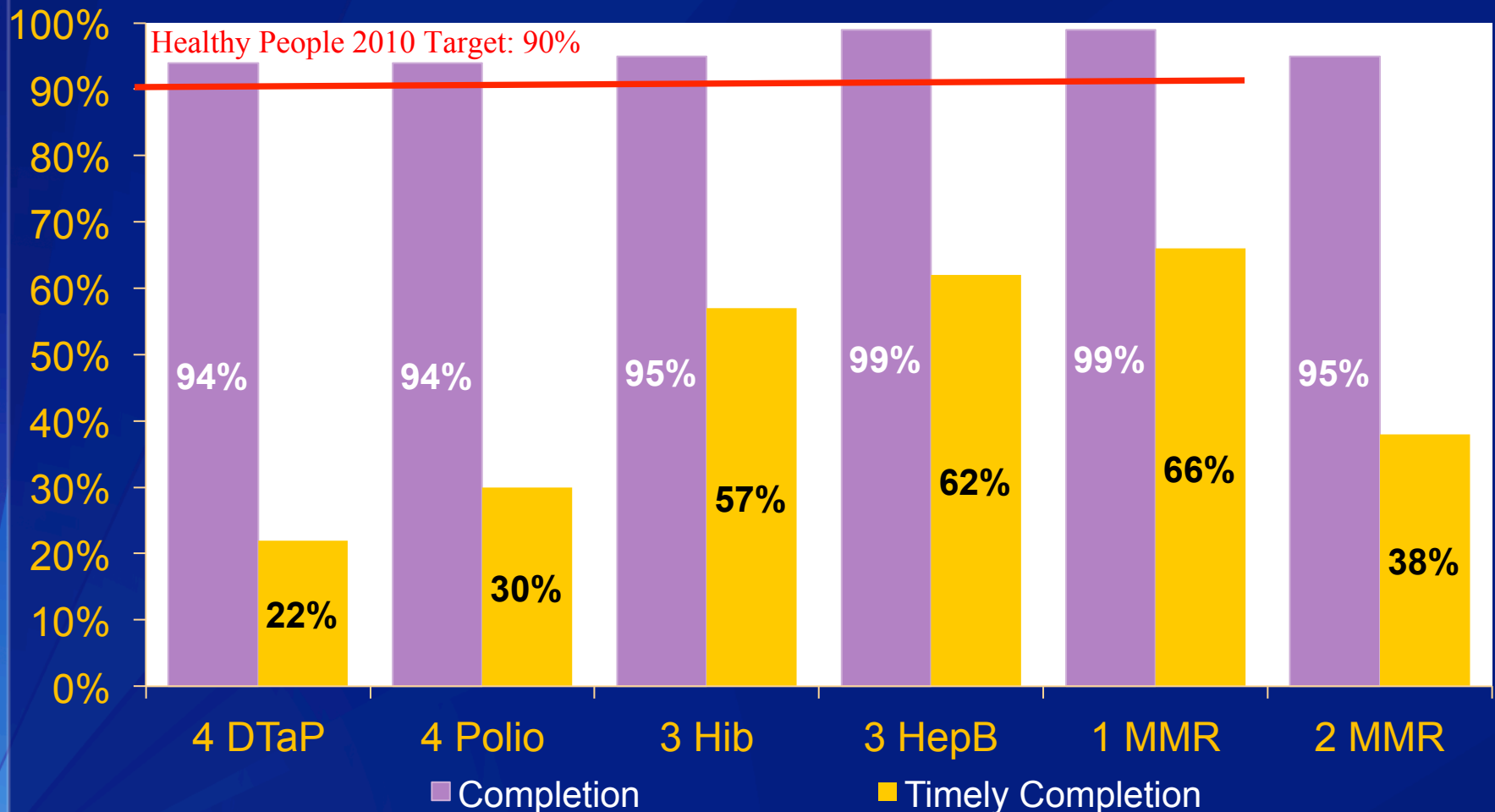
# Vaccination Coverage\* among Children 19 to 35 Months† (Weighted), Yap State, 2006/2008



\*Coverage defined as completion of all doses regardless of timing

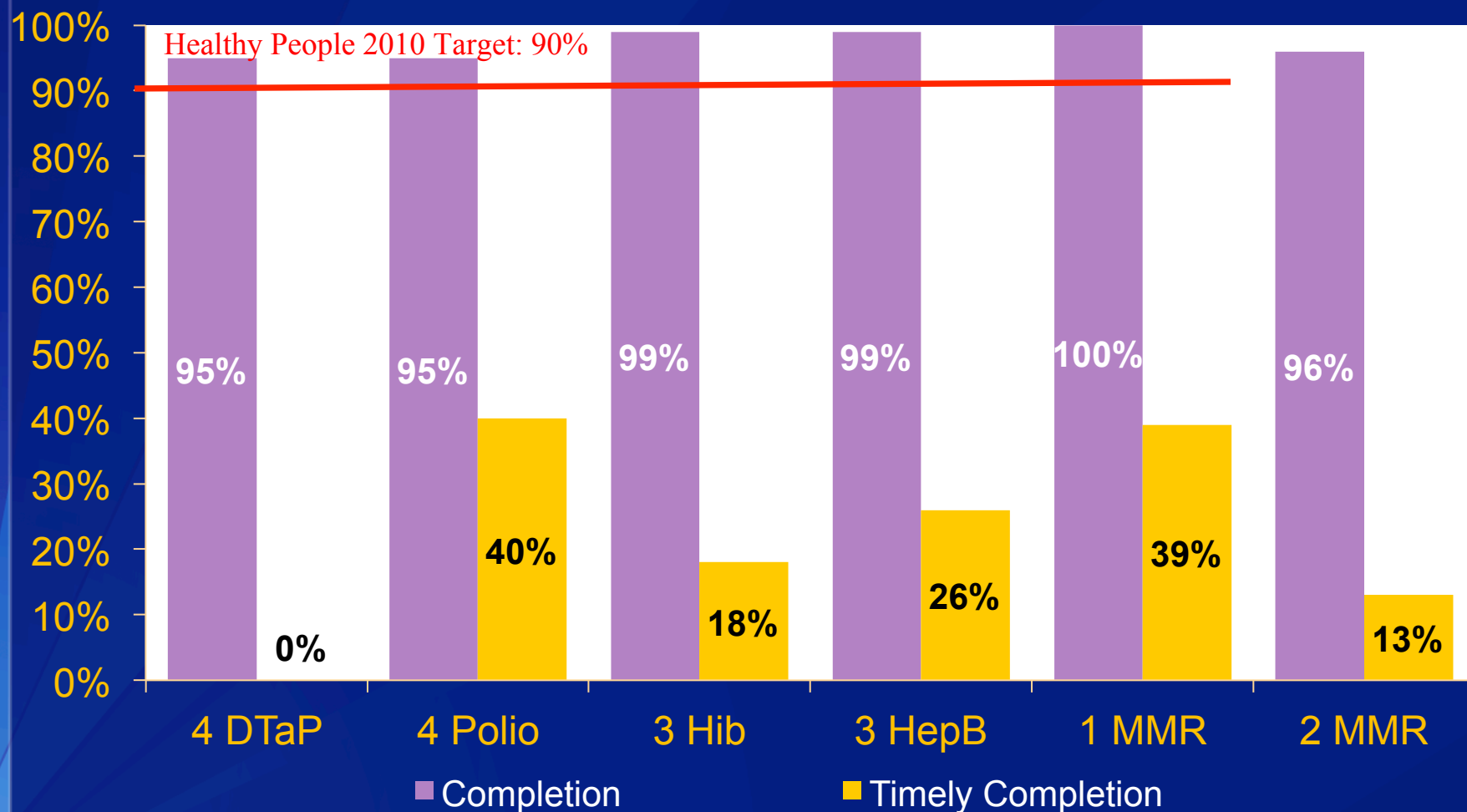
†Combined record, n=228

# Vaccination Coverage among Children 19 to 35 Months\*, Yap Proper, 2006



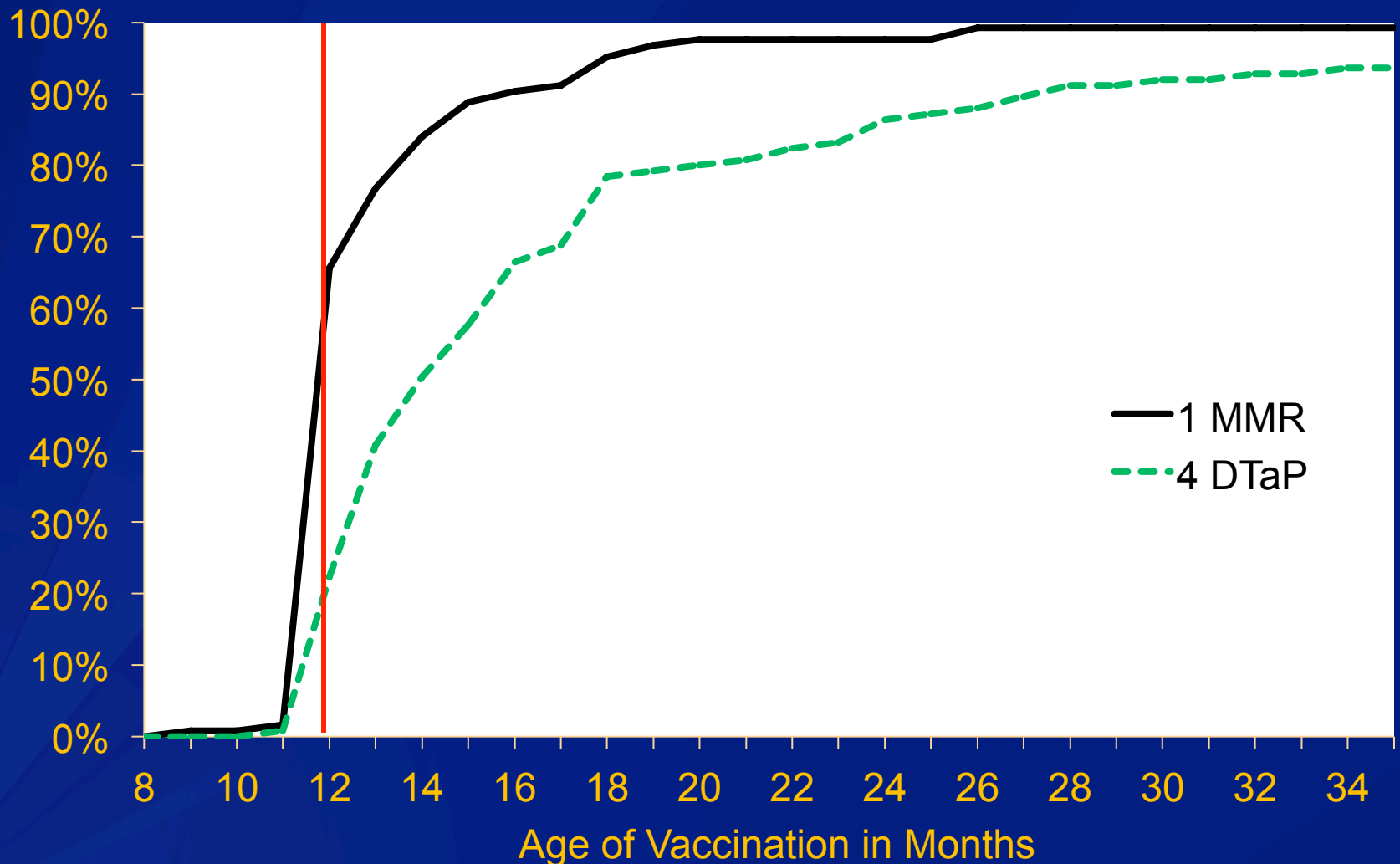
\*Combined record, n=125

# Vaccination Coverage among Children 19 to 35 Months\*, Yap NI, 2008

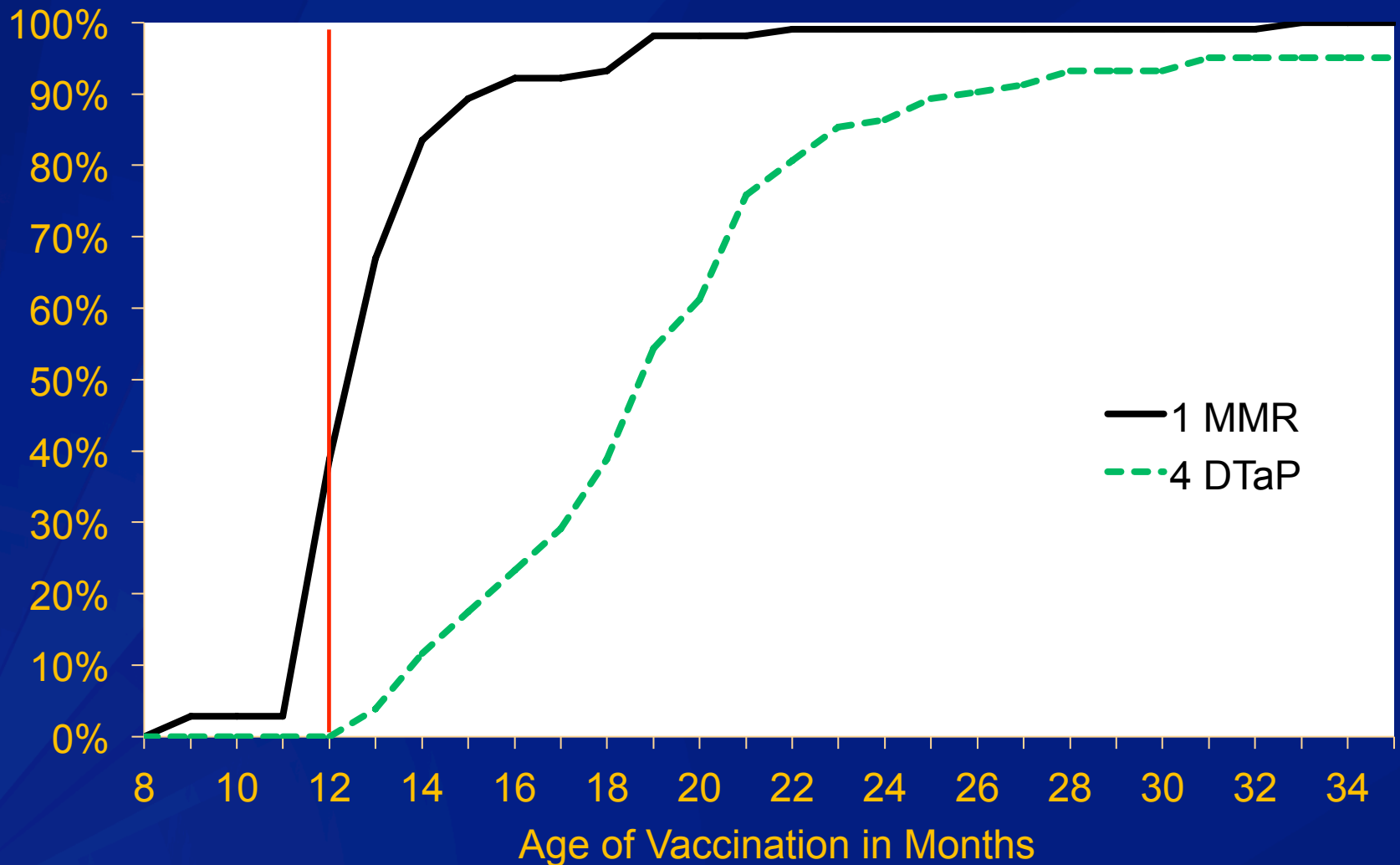


\*Combined record, n=103

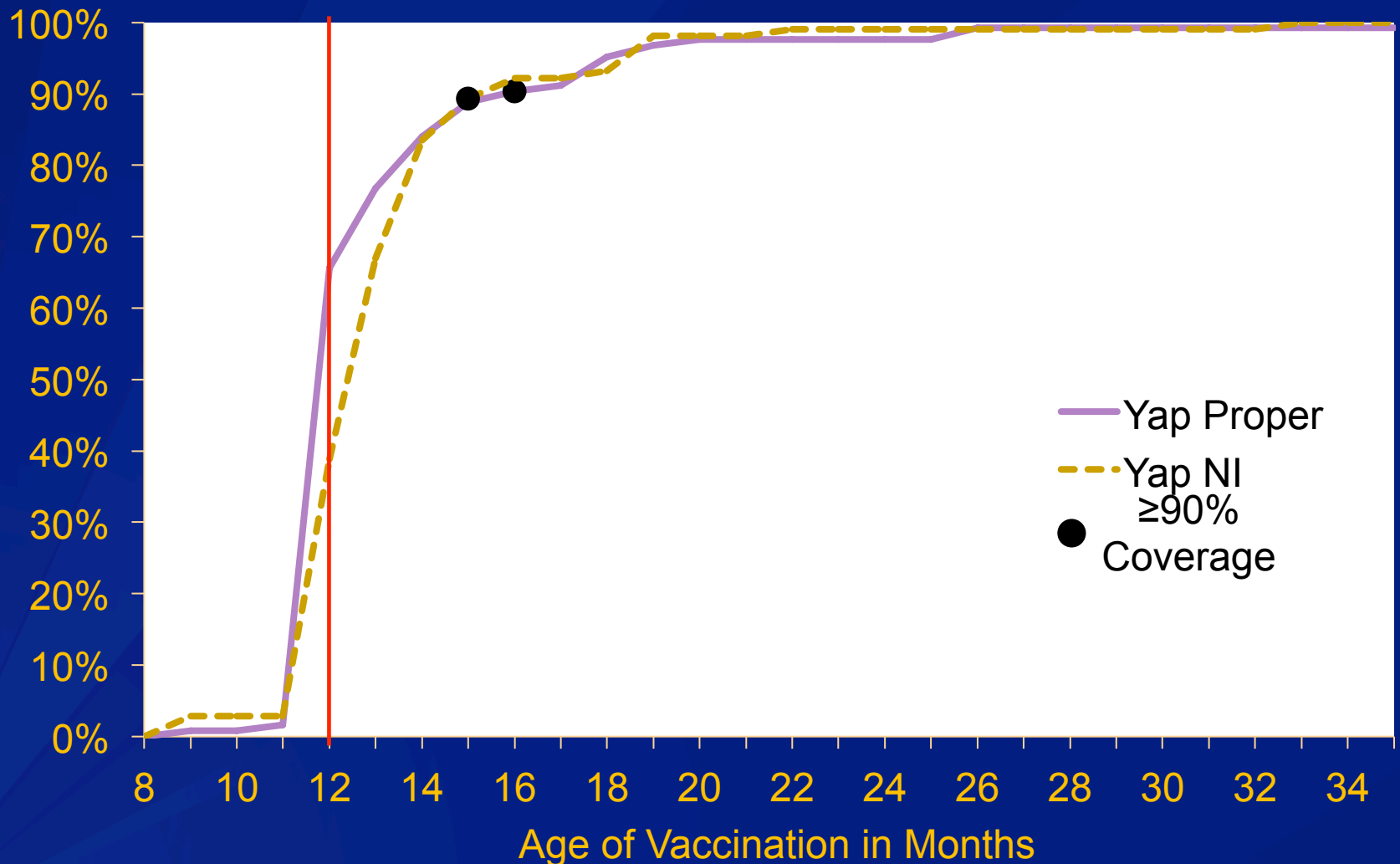
## Coverage with 4 DTaP and 1 MMR by Age of Vaccination, Yap Proper, 2006



## Coverage with 4 DTaP and 1 MMR by Age of Vaccination, Yap NI, 2008

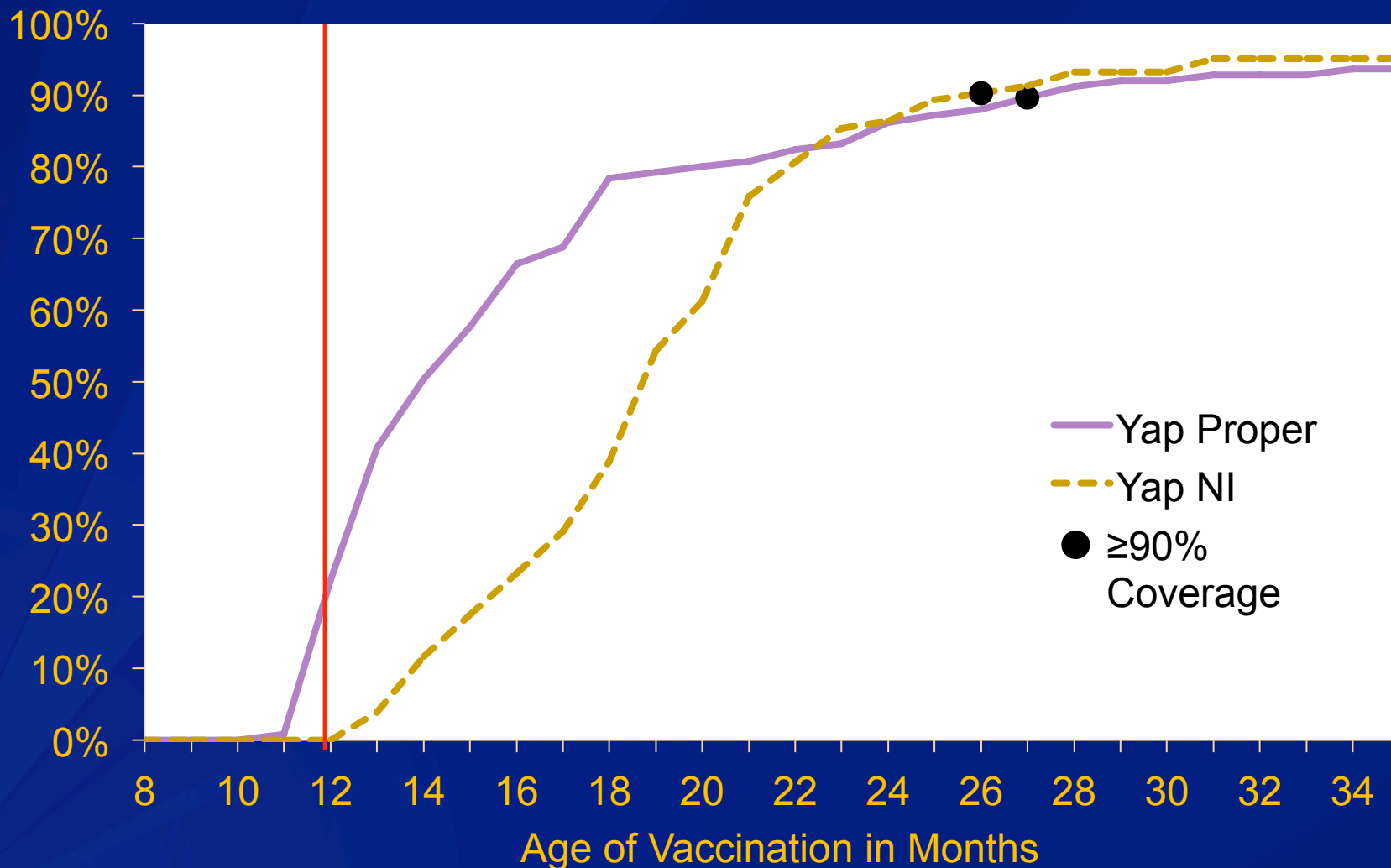


## Coverage with 1 MMR by Age of Vaccination, Yap Proper 2006 and Yap NI 2008





# Coverage with 4 DTaP by Age of Vaccination, Yap Proper 2006 and Yap NI 2008



# **Factors Associated with Not Completing Any Vaccines on Time for Children 19 to 35 Month Olds, Yap Proper, 2006**

- ❑ **Challenges for analysis and interpretation of associated factors**
  - Full census; therefore statistics not applicable
  - Small cell sizes
    - Differences in coverage may be due to other factors affecting cohort
    - Confidentiality of the data
- ❑ **Solution: “24% Rule” – if cell sizes represent 24% of total number of children (n=30) for the levels of a demographic factor, differences in coverage are “significant”**

# Factors Associated with Not Completing Any Vaccines on Time for Children 19 to 35 Month Olds, Yap Proper, 2006

	n	% Didn't Receive Any Vaccine on Time
<b>Sex</b>		
Male	69	11.6
Female	56	28.6
<i>Missing</i>	0	
<b>Mother's Age</b>		
<30	60	13.3
30 years or older	61	26.2
<i>Missing</i>	4	

# **DISCUSSION AND RECOMMENDATIONS**

## Discussion

- ❑ Most children receive all required vaccines, but vaccines are delayed
- ❑ Timely completion higher in Yap Proper; completion at interview date higher in Yap NI
- ❑ 90% 1 MMR coverage and 90% 4 DTaP coverage reached by same age in both Yap Proper and Yap NI
- ❑ Child's sex and age of mother may be associated with delayed vaccination – target vulnerable groups for outreach

## Discussion

- ❑ **Delays may leave children vulnerable to VPDs**
- ❑ **All vaccines reach 90% U.S. Healthy People 2010 goal but do not meet timely completion recommendations**
  - ❑ **Measles – high population coverage with MMR required for preventing transmission**
- ❑ **Coverage targets should be reached sooner in Yap Proper, where children have regular access to vaccinations**

# Recommendations

## ❑ Yap Proper

- Increase outreach visits to children due or overdue for vaccinations
- Continue providing incentives to public health workers to increase outreach visits
- Give vaccines on outreach visits
- Ensure catch-up schedule is followed when children receive vaccinations late
- Provide clinic and community-wide education on importance of vaccines and the vaccine schedule

## ❑ Yap Neighboring Islands

- More frequent vaccination trips would likely improve timeliness of vaccination

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# Thank You

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