

Improving Alaska's Immunization Coverage Rates

Brian Yablon, MD
Alaska Section of Epidemiology

Alaska Immunization Conference
9 October, 2013

**National, State, and Local Area Vaccination Coverage Among Children
Aged 19–35 Months — United States, 2012**

Vaccination coverage varied by state, with coverage for the combined vaccine series ranging from 59.5% in Alaska to 80.2% in Hawaii (Table 3).

What is happening with childhood vaccinations in Alaska??

Objectives

- Review NIS methodology
- Understand the chronicity and nature of Alaska's immunization coverage deficiency
- Identify key areas in need of improvement
- Discuss best practices moving forward
 - Use evidence-based interventions
 - Foster more collaboration
 - Empower everyone to improve vaccination rates

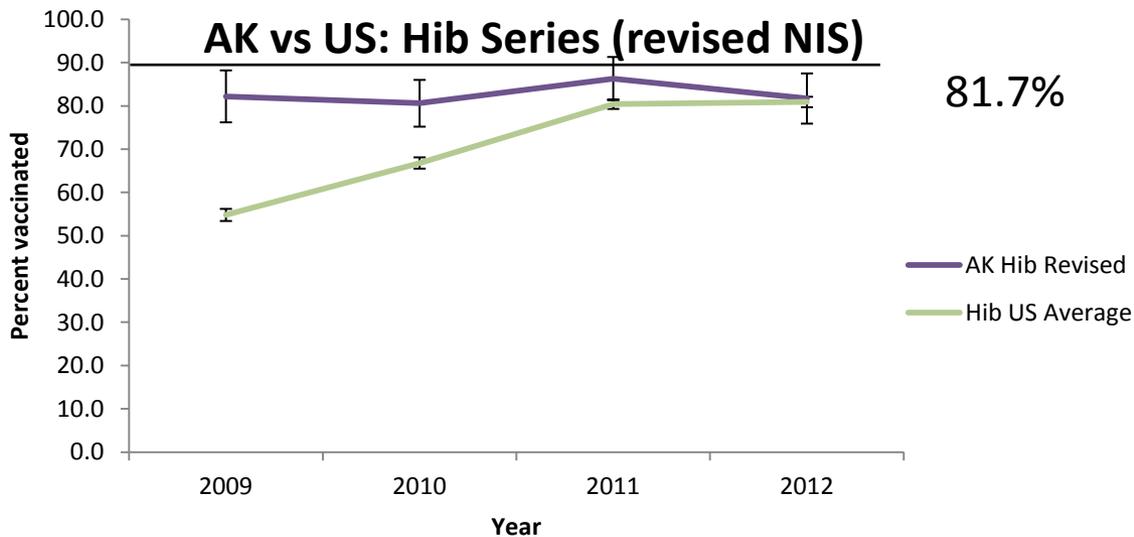
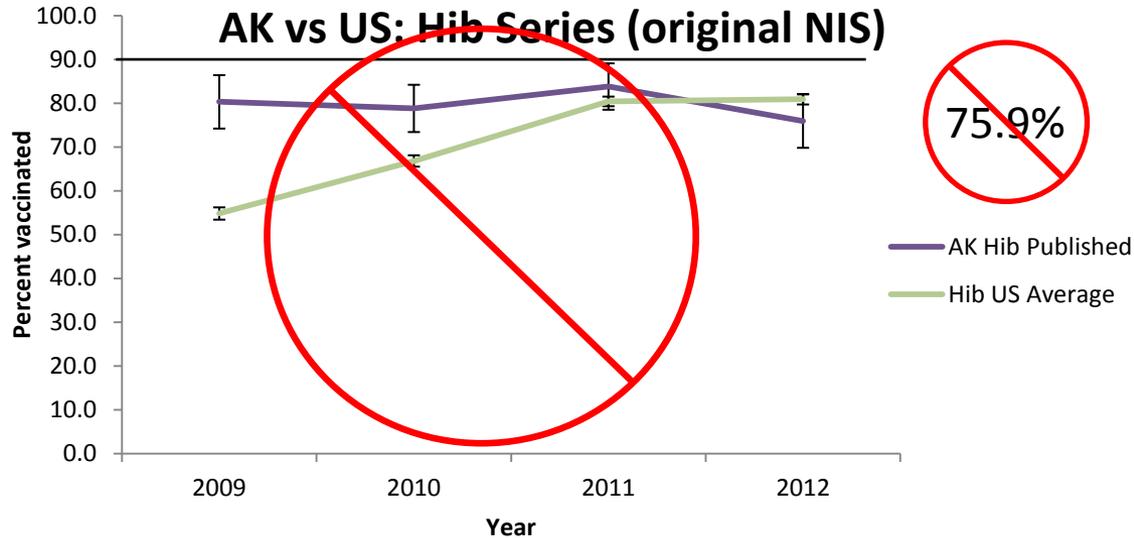
Background: NIS Methodology

- 1. Phone survey
 - Random-digit dialing of parents across the US
 - Formerly landline only; in 2012, 50% cell phones
- 2. Provider survey
 - Form mailed to identified provider after parent survey
 - Provider to fill out vaccination record and mail back
- 3. Data analysis
 - Individual series, and composite markers

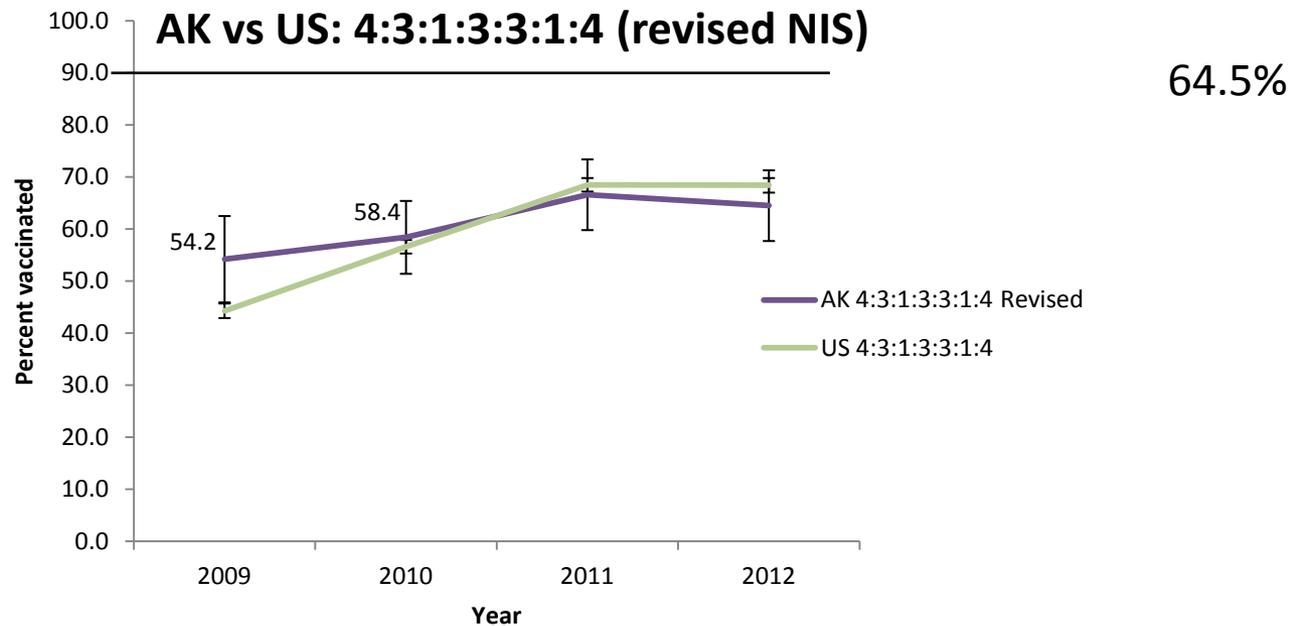
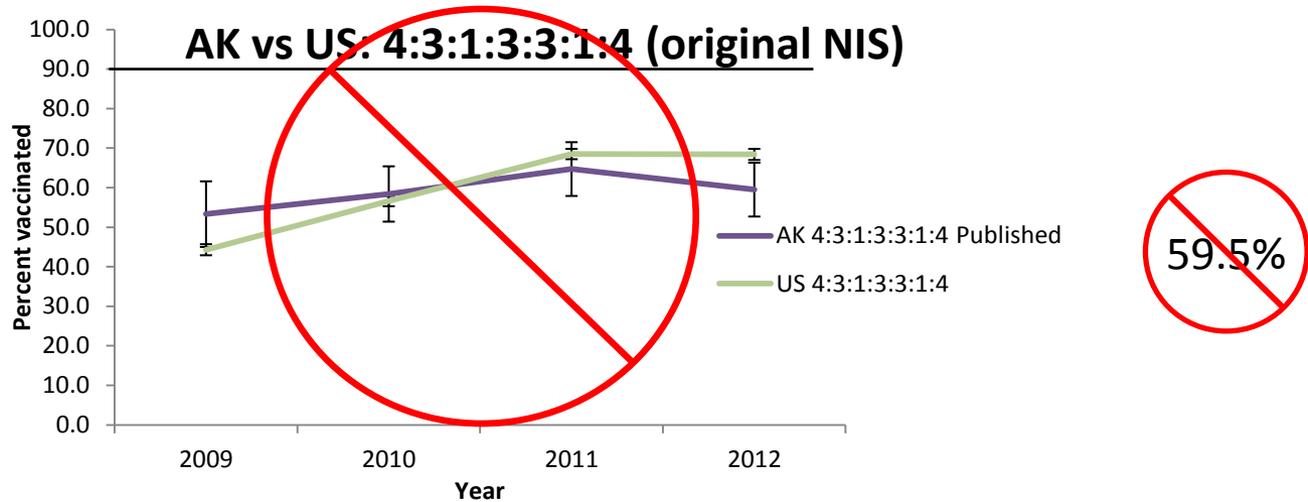
Caveats: NIS Methodology

- 1. Phone survey
 - Random-digit dialing of parents across the US
 - Formerly landline only; in 2012, 50% cell phones
 - Sample methods, small numbers ≠ cross-section of Alaska's population
- 2. Provider survey
 - Form mailed to identified provider after parent survey
 - Provider to fill out vaccination record and mail back
- 3. Data analysis
 - Individual series, and composite markers
 - Reported marker changed this year (includes Hib)
 - If Hib type unknown, assumed non-Merck product (Alaska almost exclusively uses Merck product, with 3 doses instead of 4 in full series)

Correcting for Hib Vaccine Data



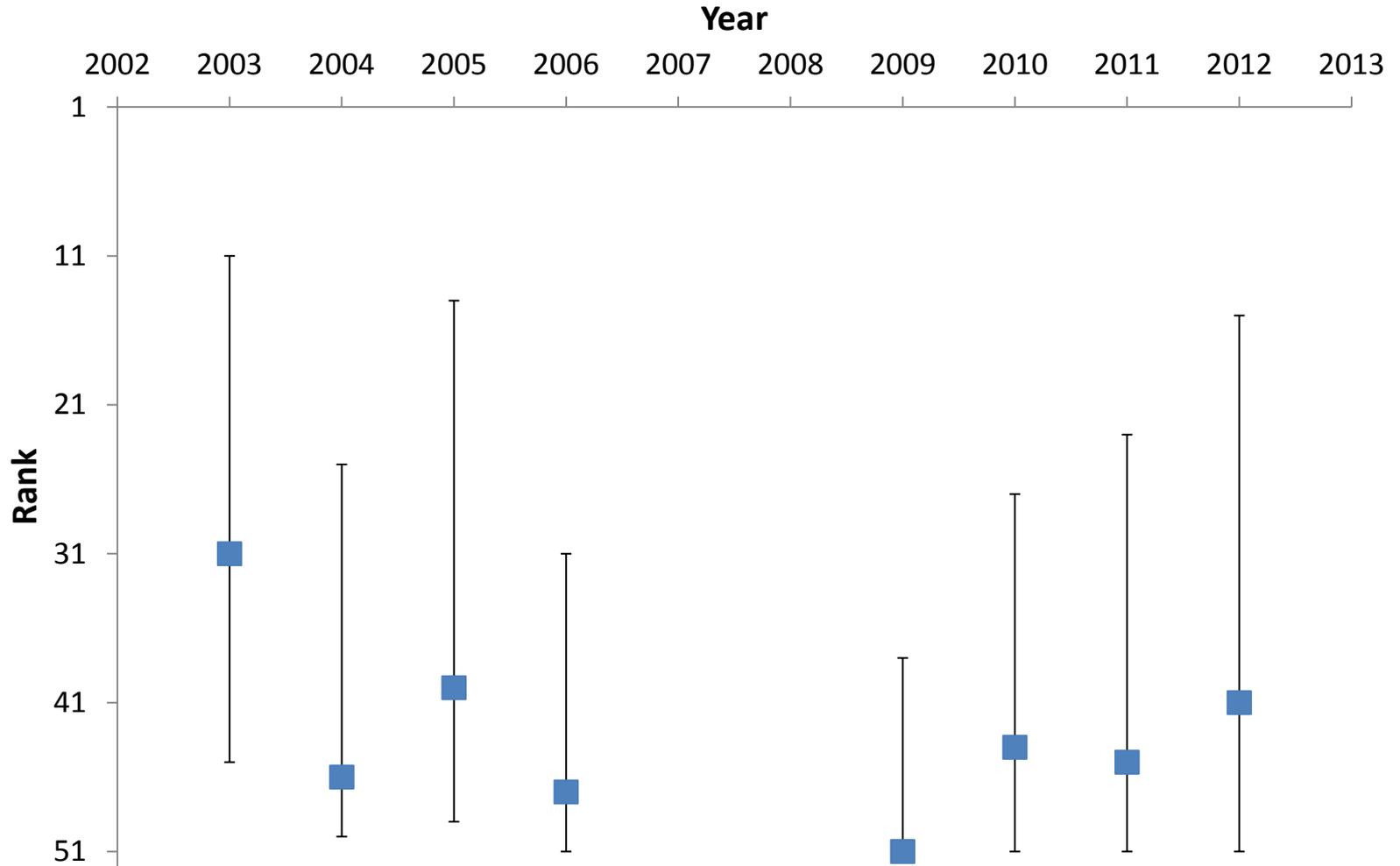
Correcting for Hib Vaccine Data



More NIS Caveats

- We cannot interpret year to year variations without paying attention to error bars!
- No statistically significant change from 2011 to 2012
- Our benchmark should not be our ranking in relation to other states
 - We have no control over other states
 - We should focus on our own absolute rates and progress
 - With large error bars and close rates, ranking estimates are inherently volatile

Alaska's Rank among States, 4:3:1 Series, 19-35 month olds 2003-2012*



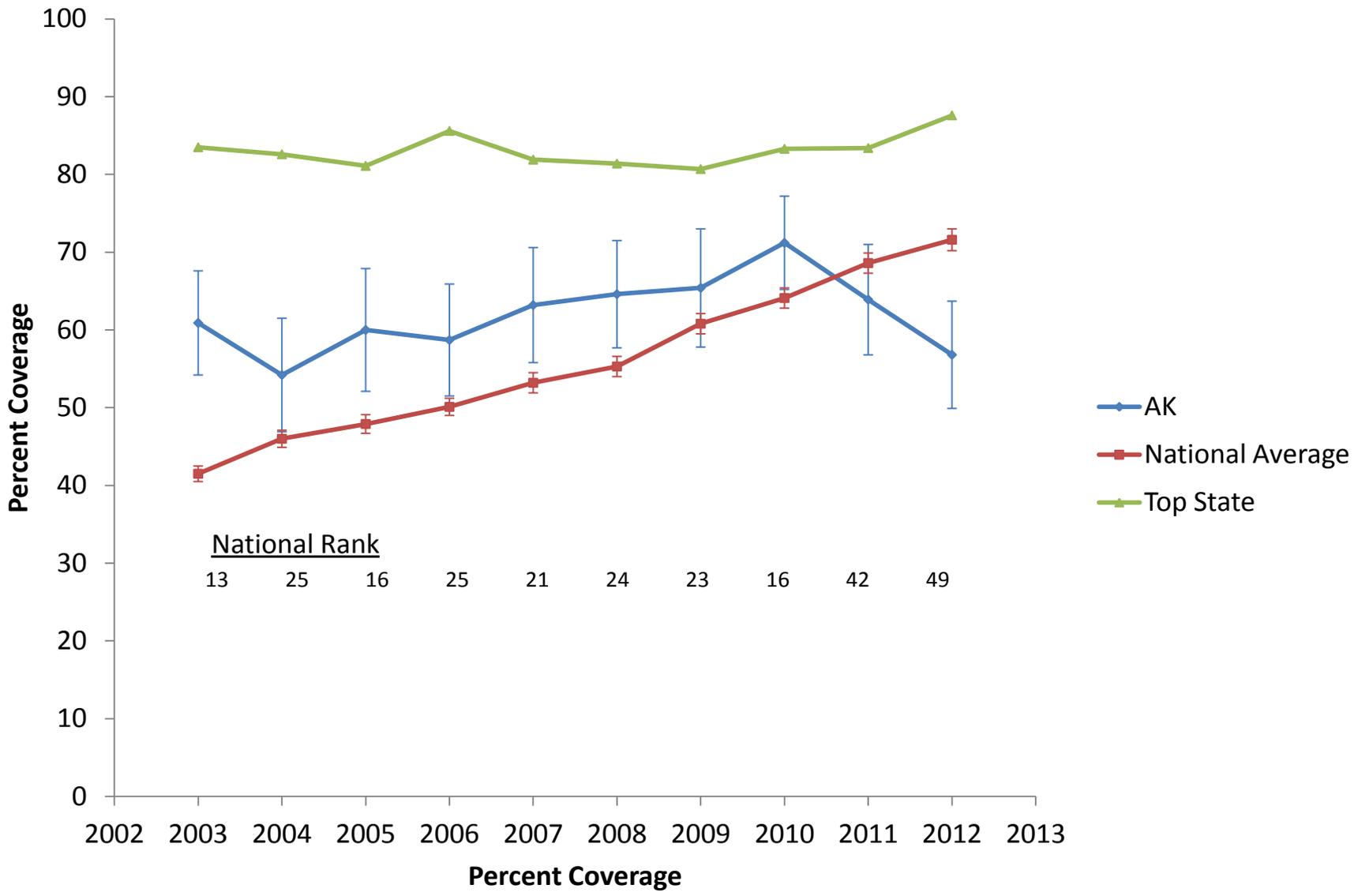
*Rank error bars represent 95% confidence interval for each rank (Monte Carlo trials based on NIS data)

Let's Look at Some Other NIS Data

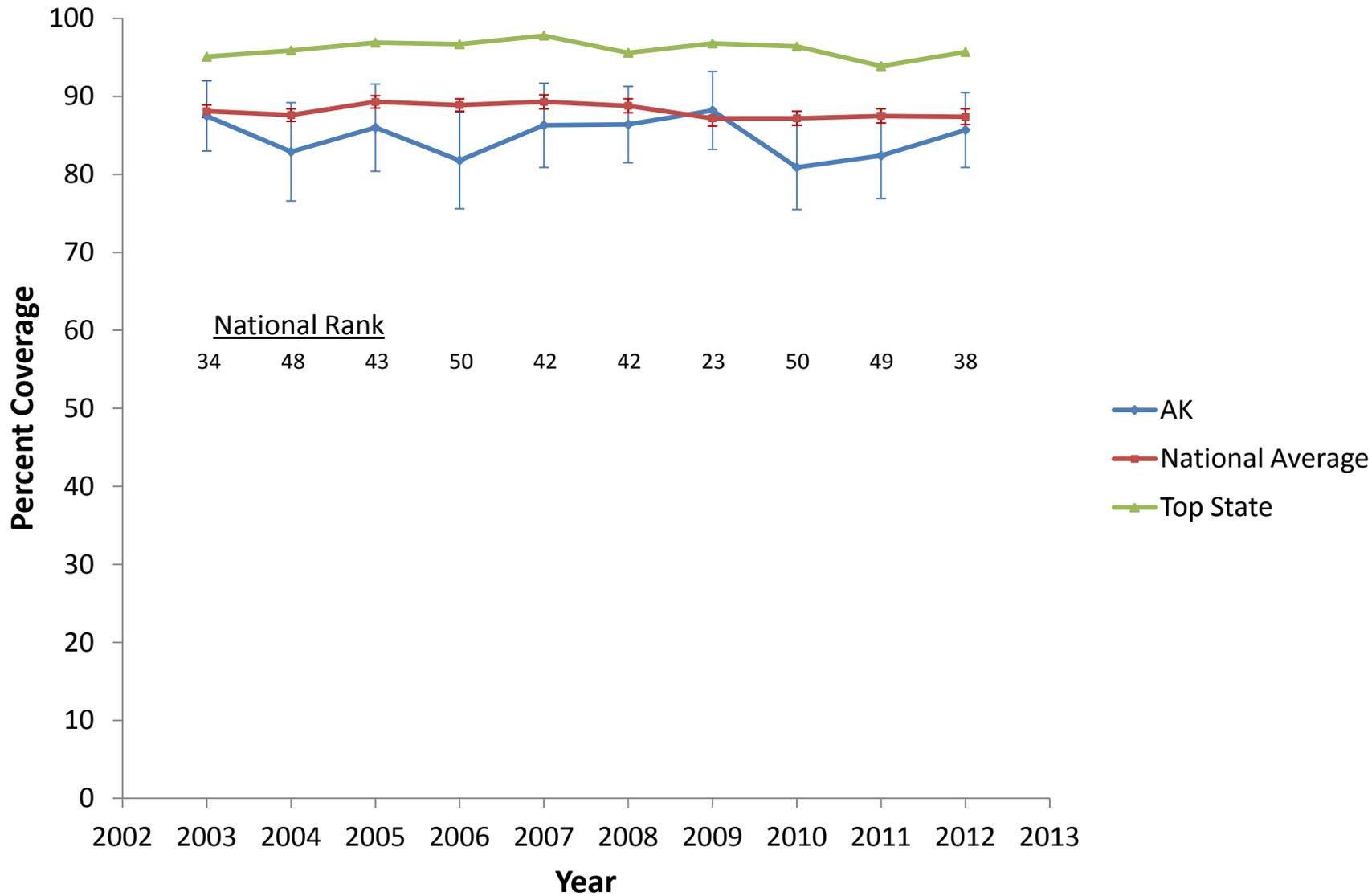
- Vaccination coverage rates are collected at many ages—not just composite 19-35 months
- Examining “on time” rates may yield valuable insights into our coverage gaps
 - Birth dose Hep B
 - DTaP series at several milestone ages
 - MMR and varicella at 13 months
 - 4:3:1* series at 19 months

*4 DTaP, 3 polio, 1 MMR

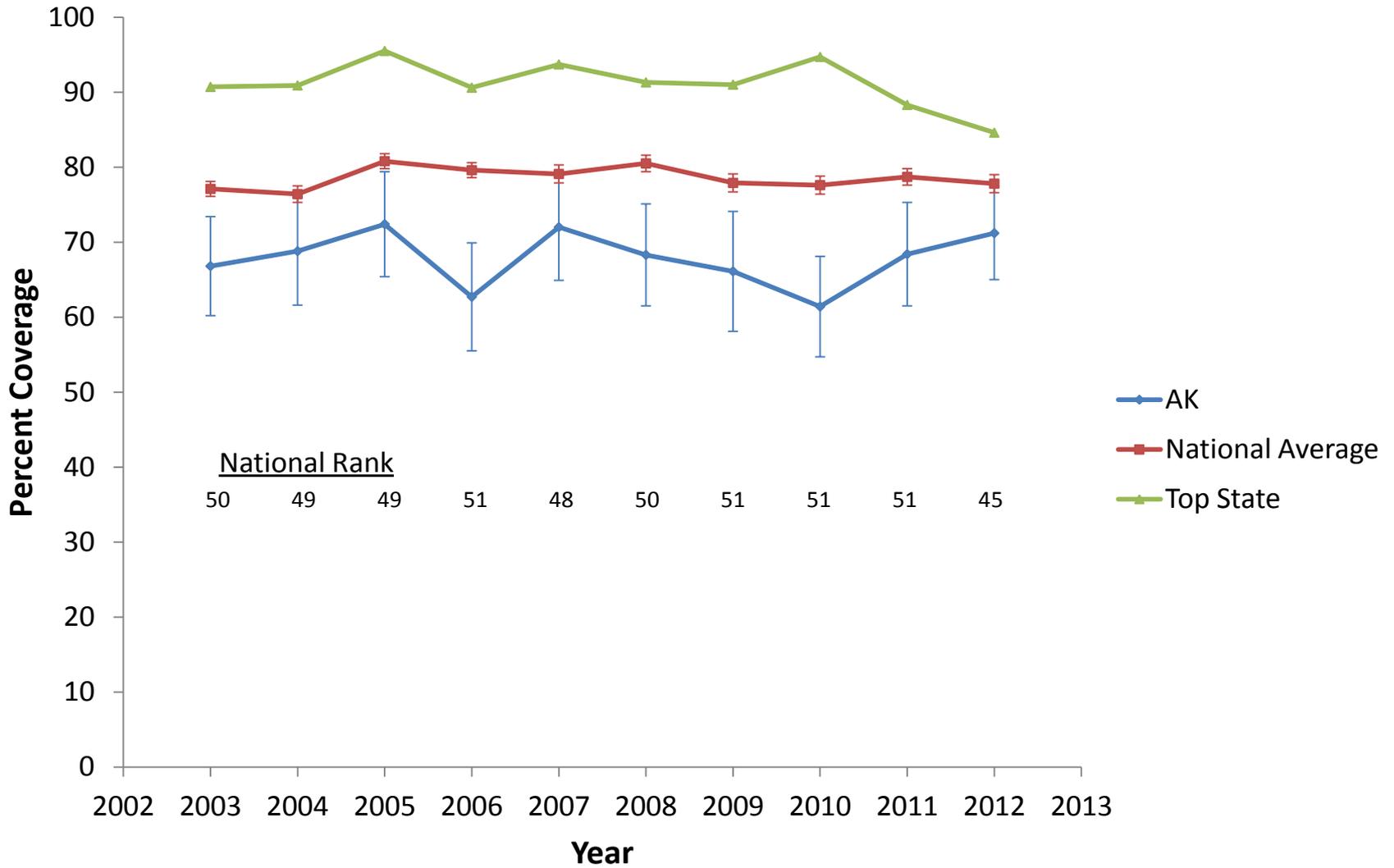
Birth Dose Hep B Vaccine



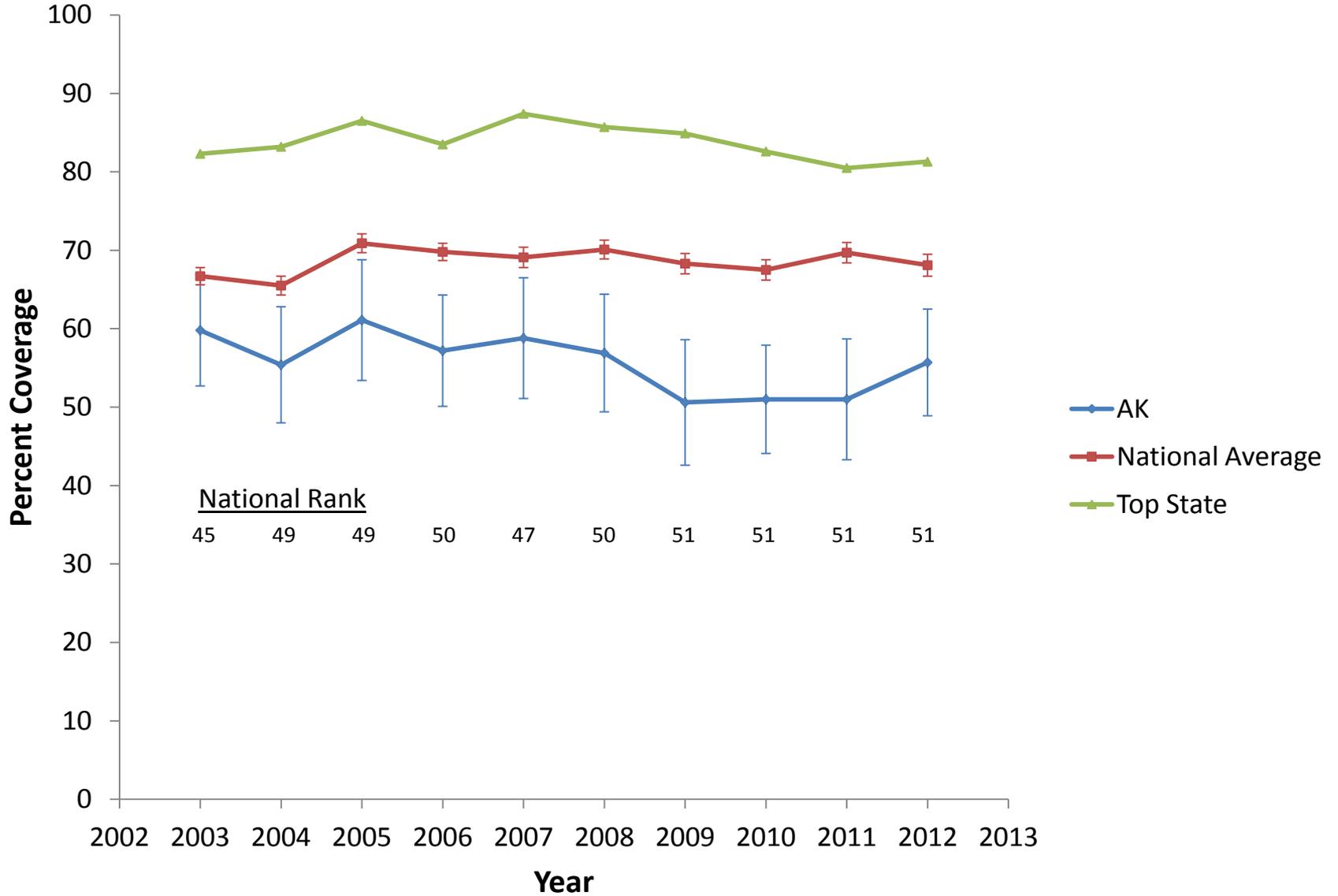
1 DTaP by 3 months



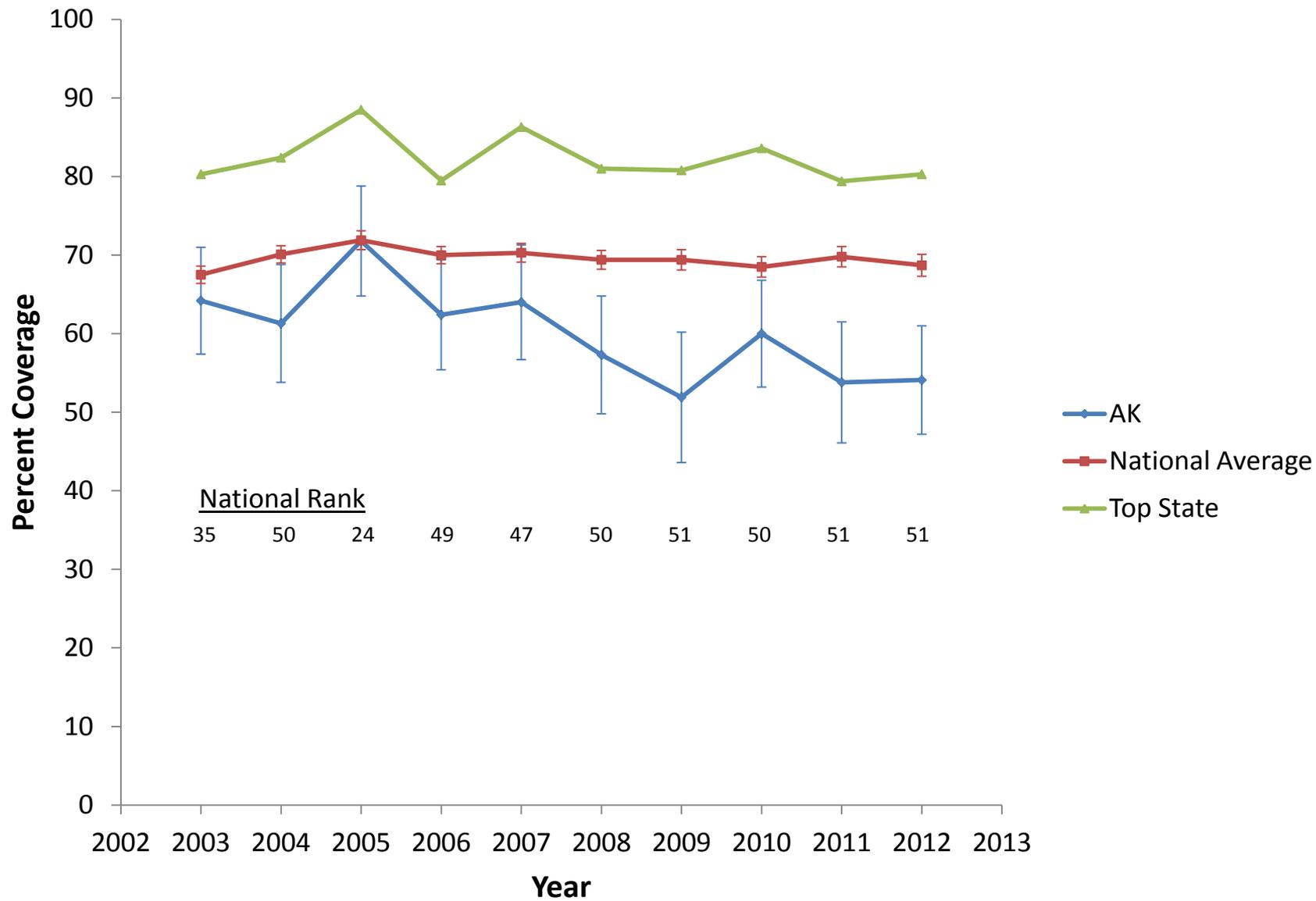
2 DTaP by 5 months



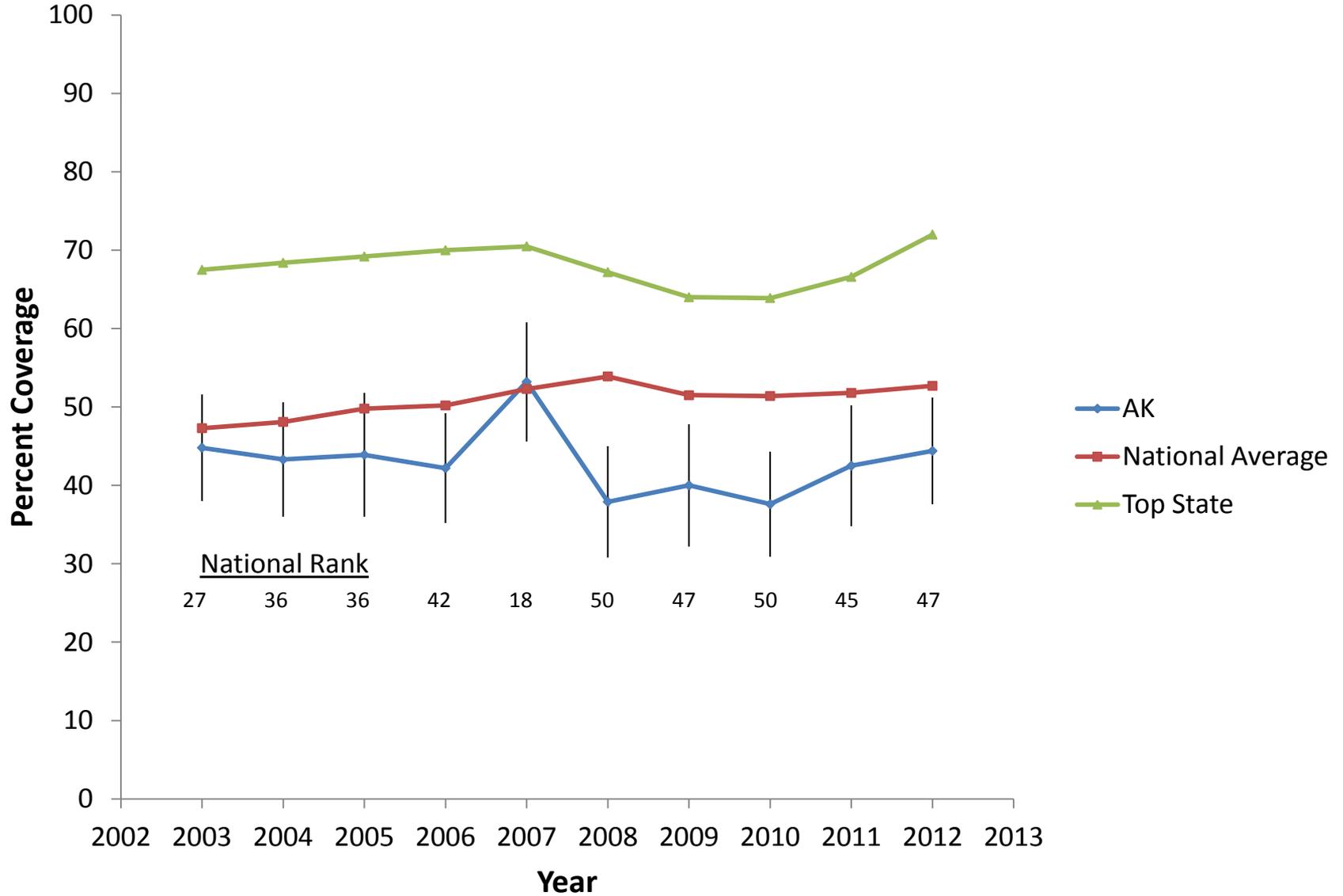
3 DTaP by 7 months



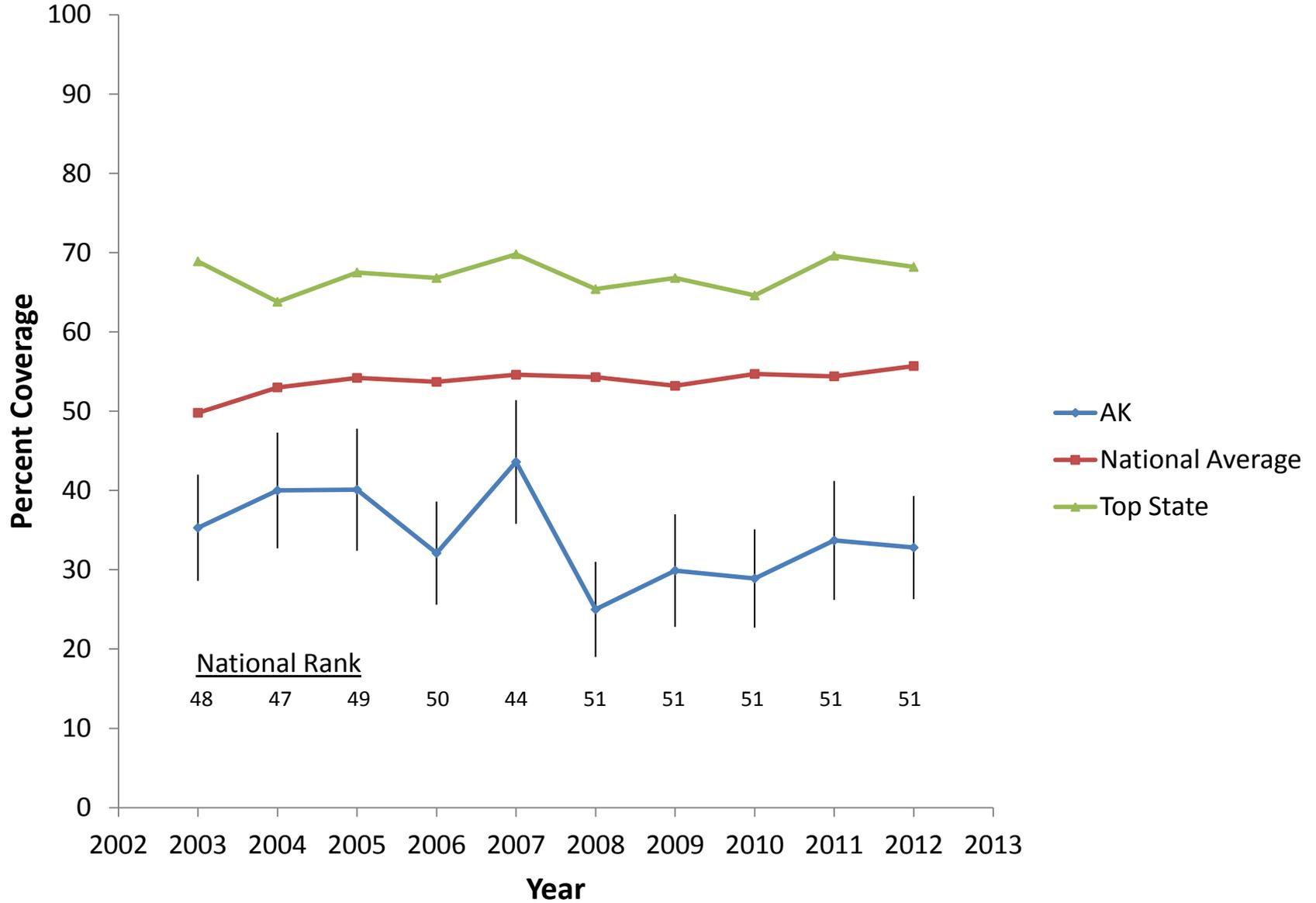
4 DTaP by 19 months



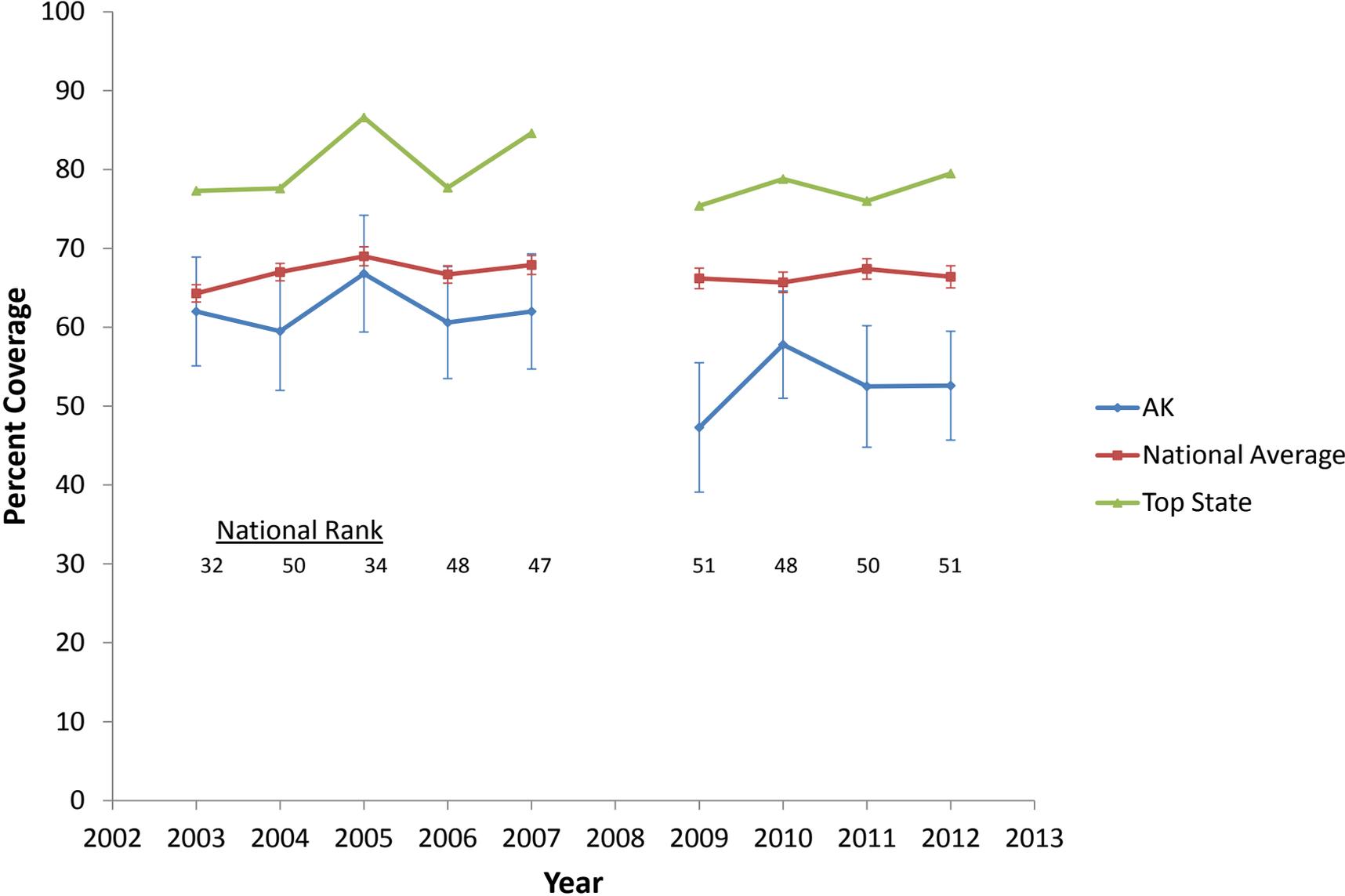
1 MMR by 13 Months



1 Varicella by 13 months



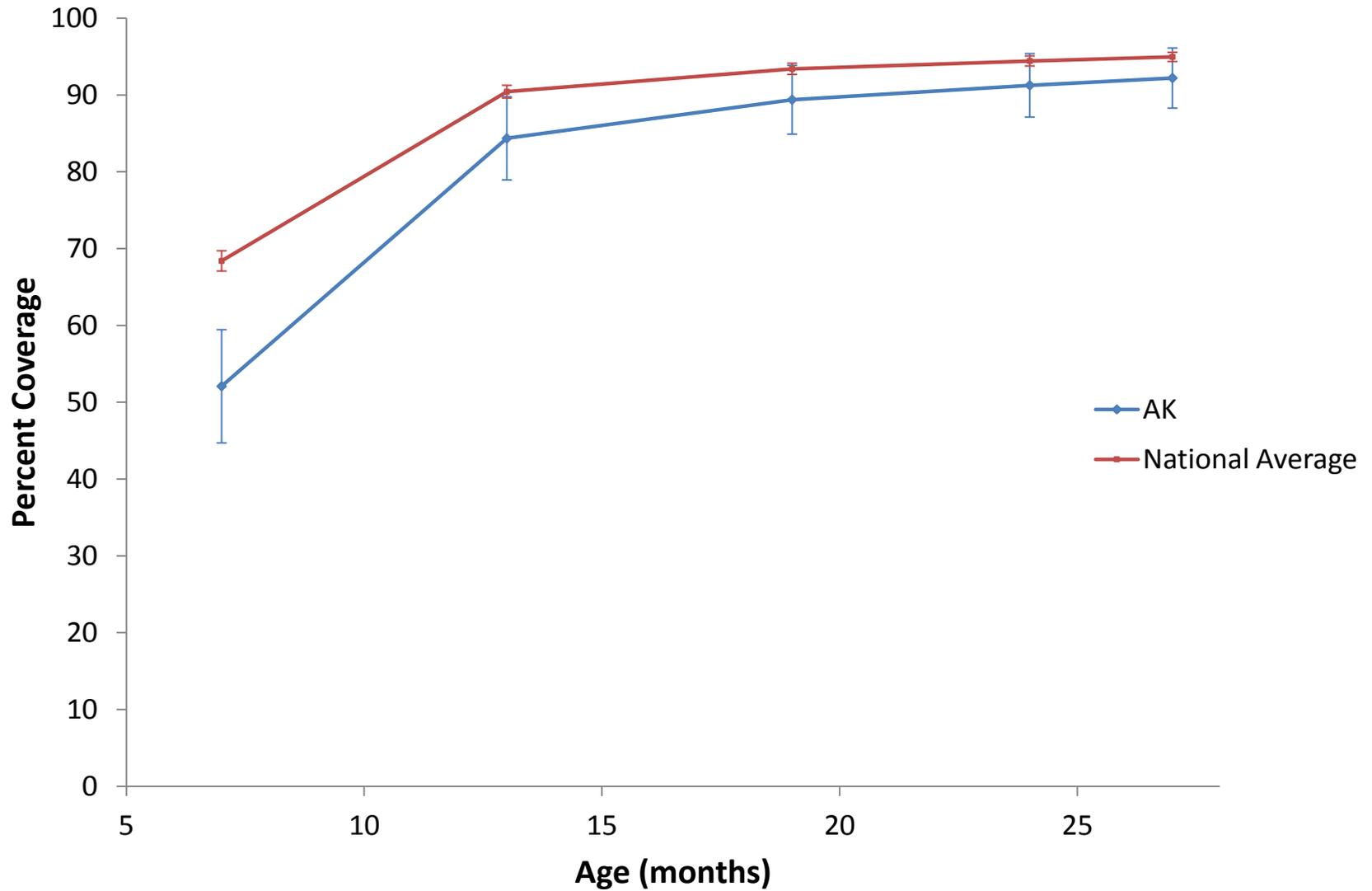
4:3:1 by 19 months



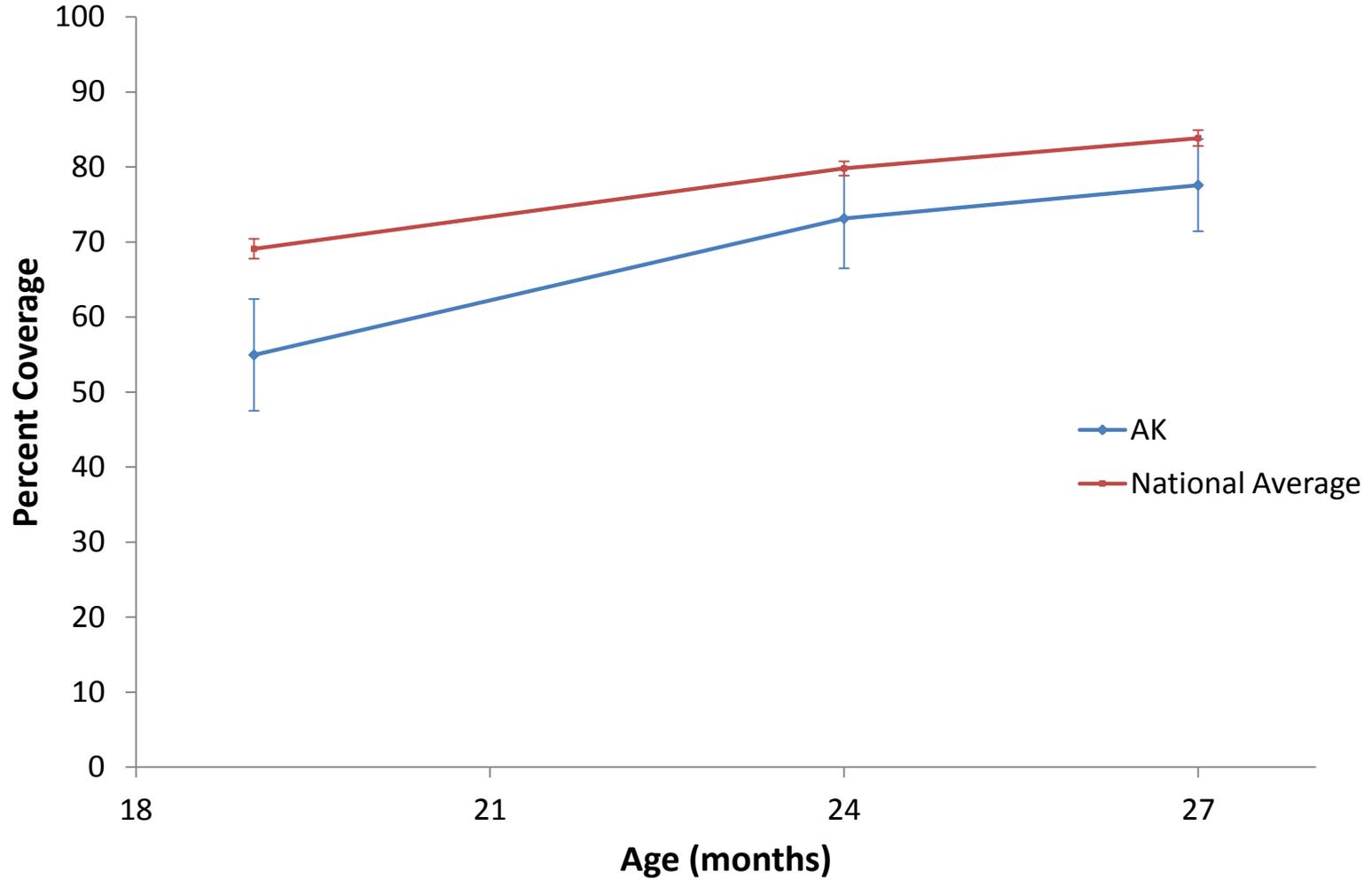
Bottom Line: we have a chronic problem with low on-time vaccinations

- Where are we losing ground?
- Let's explore the data differently, looking at average coverage rates over the last four years plotted against age

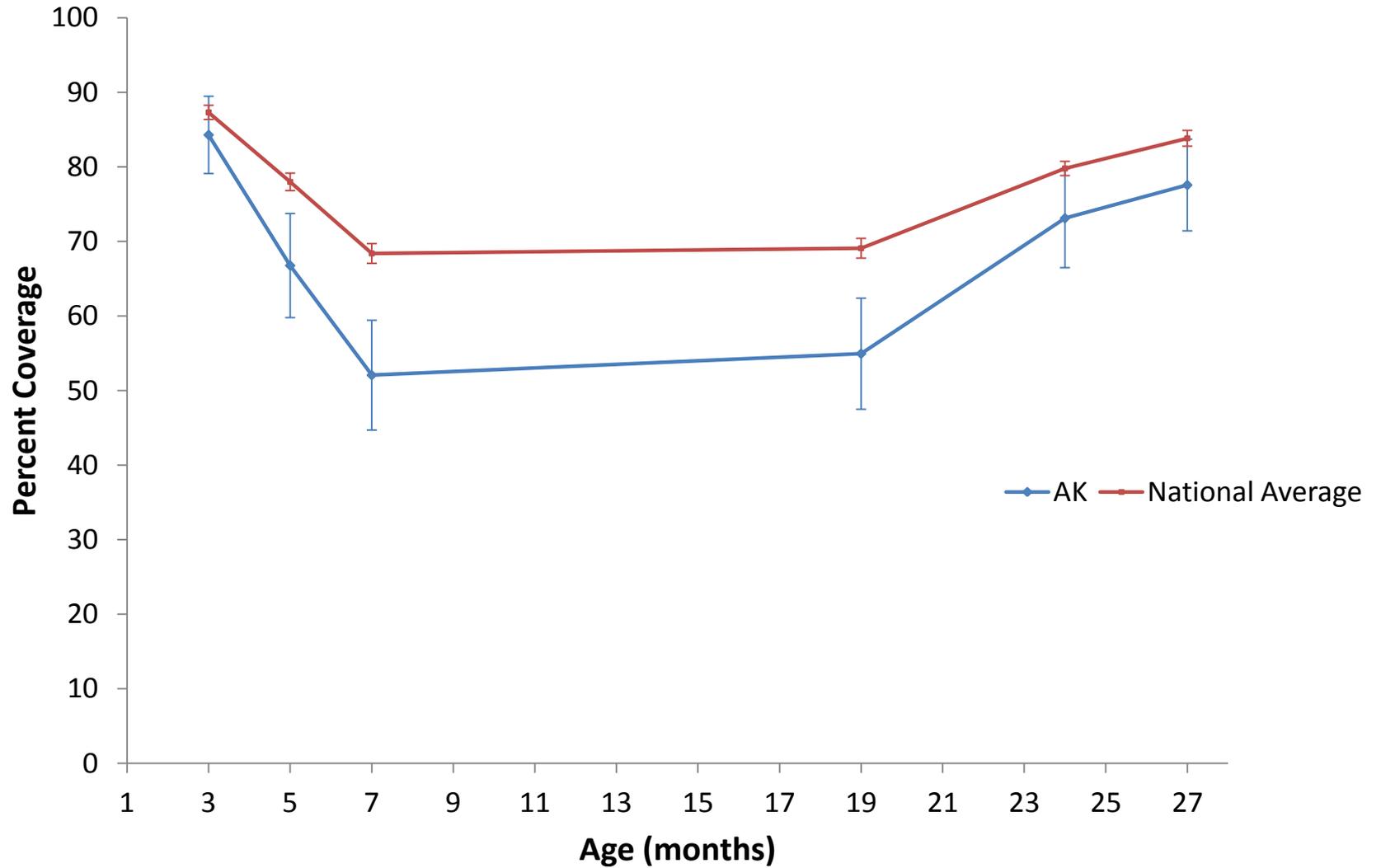
3 DTapP Vaccinations by Age, 2009-2012



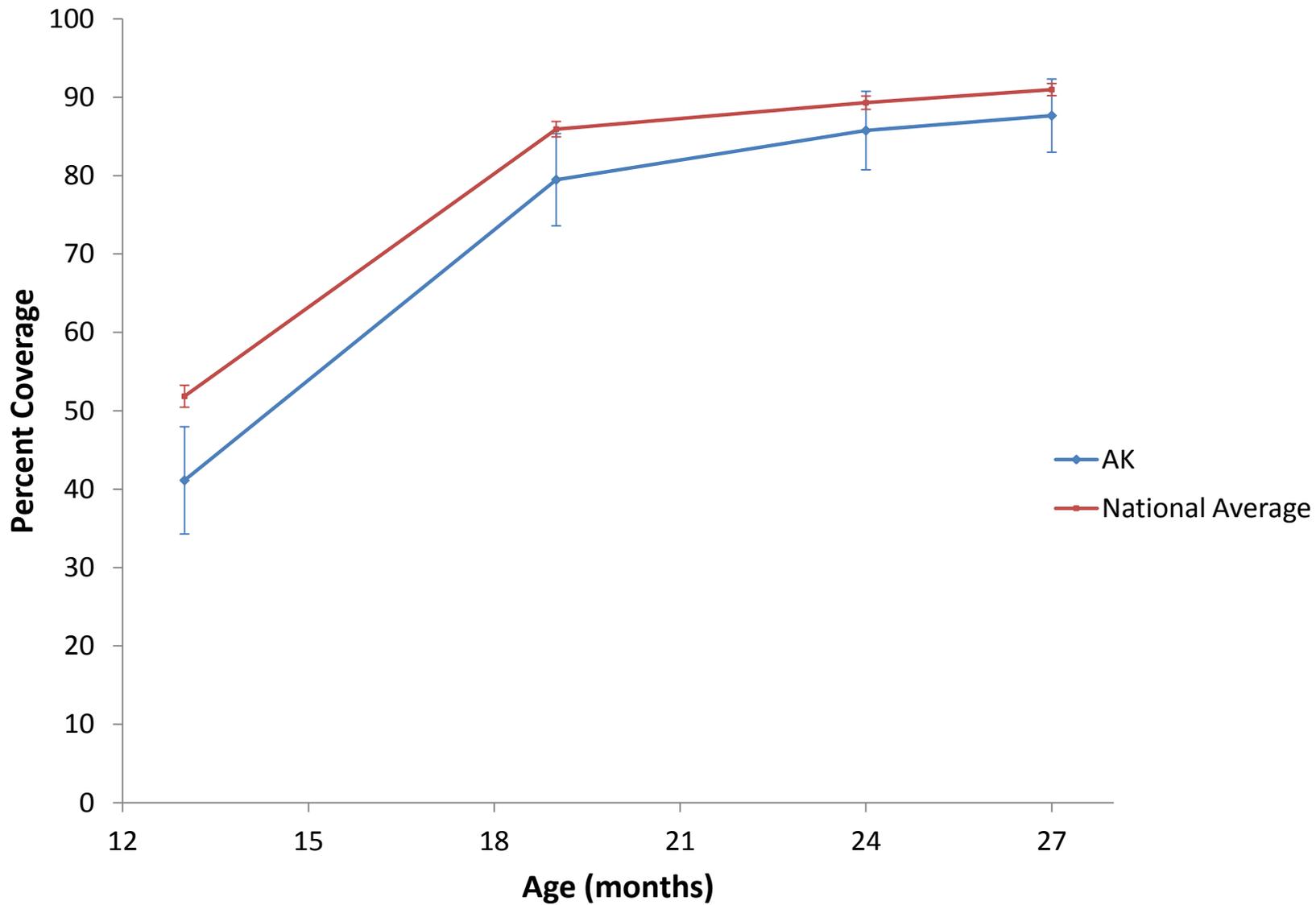
4 DTaP Vaccinations by Age, 2009-2012



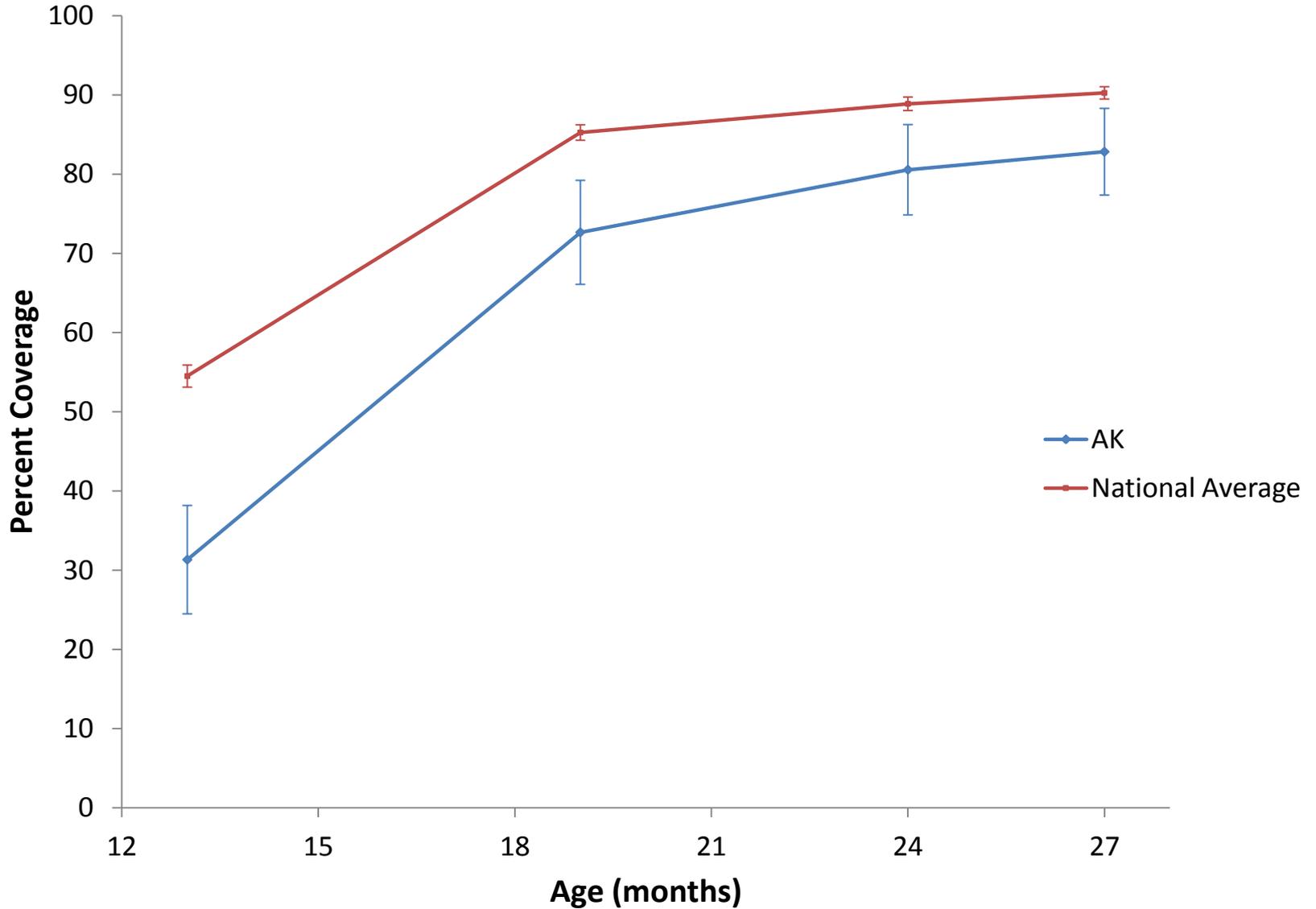
"On Time" DTaP by Age, 2009-2012



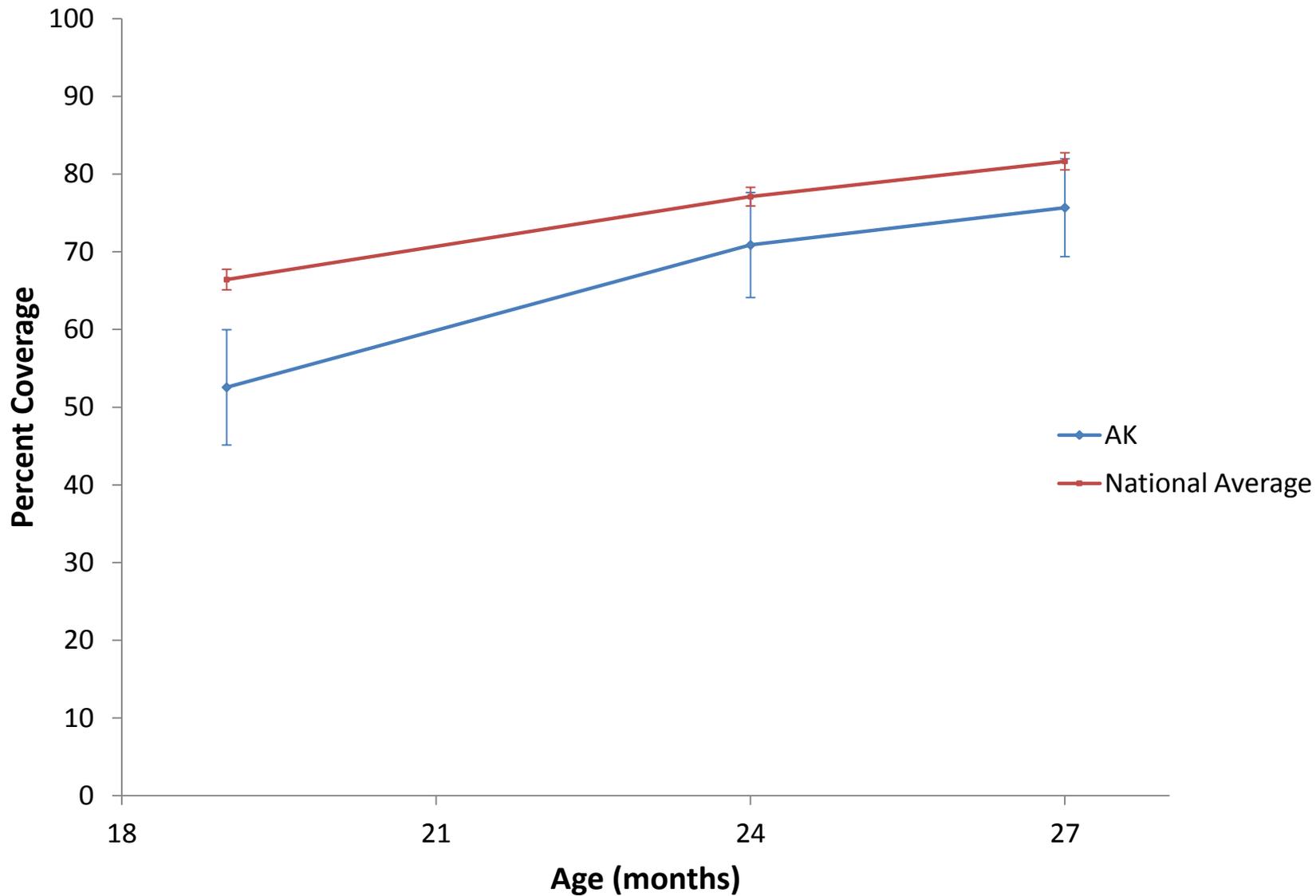
1 MMR Vaccination by Age, 2009-2012



1 Varicella Vaccination by Age, 2009-2012



4:3:1 Vaccination by Age, 2009-2012



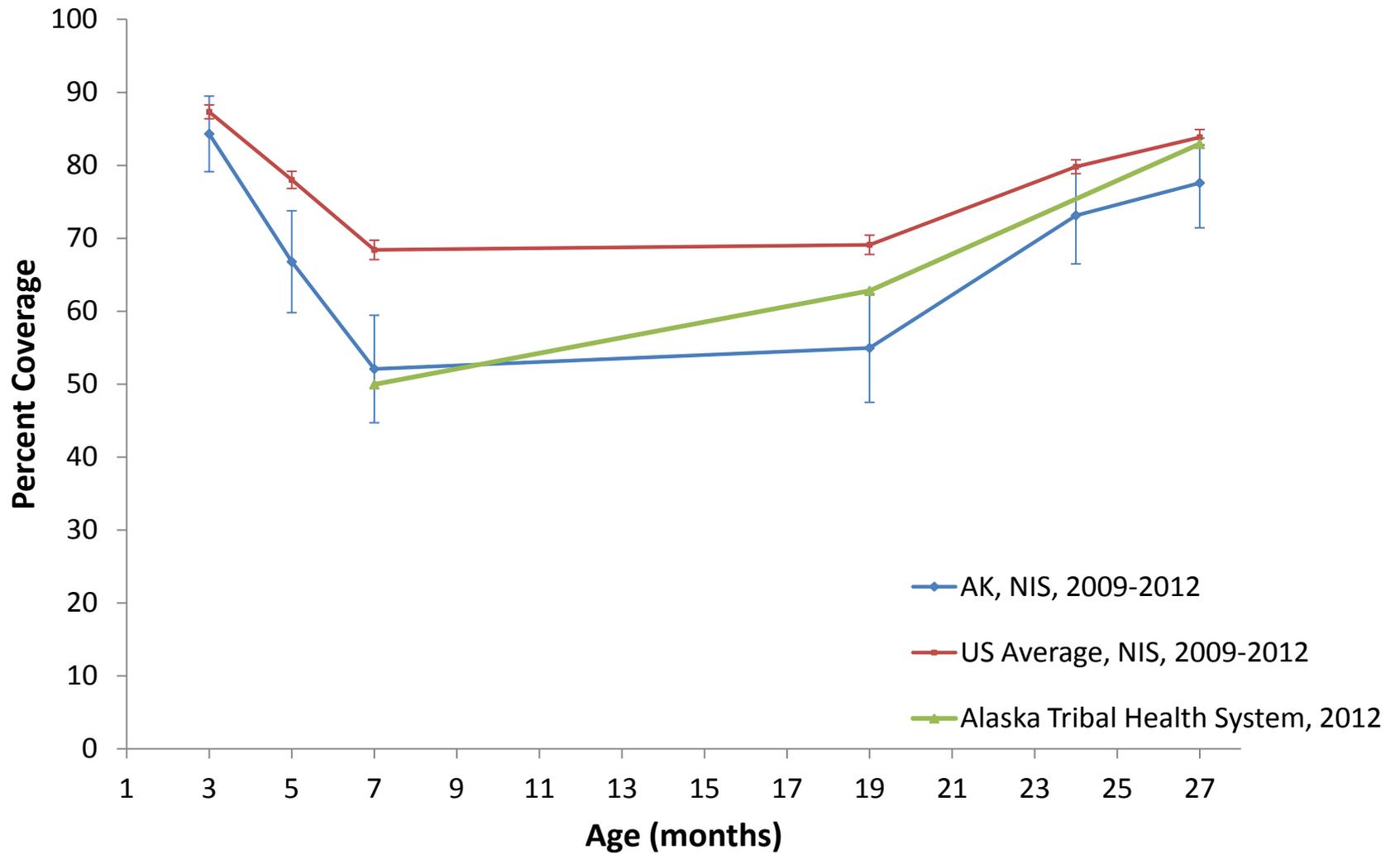
How does tribal health compare to the rest of AK in vaccination coverage?

Jurisdiction	3 DTaP by 7 mo	4 DTaP by 19 mo	4 DtaP 19-35 mo
2012 AK Tribal Health System Combined*	50%	63%	83%
All Alaska 2009-12 NIS	52%	55%	78%

Data courtesy of Dr. Ros Singleton and Tania Smallemberg, ANTHC

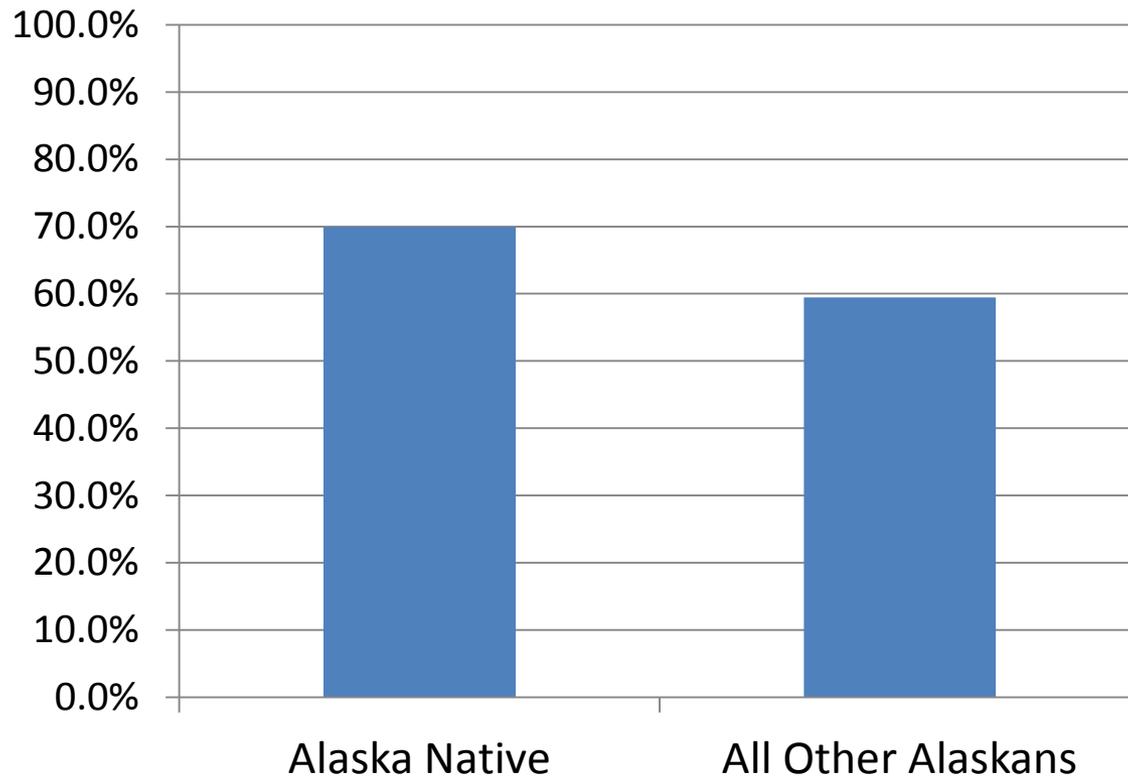
*Most data 19-35 month olds as of Dec 31, 2012, except 2 regions from June 2012.

Up To Date DTaP by Age: Comparison of AK, US, and AK Tribal Health



*Note: Blue line includes Alaska Natives, as well

Putting it all together: 4:3:1:3:3:1:4* Series Coverage, 19-35 mos (pooled NIS data from 2009-2012)



Absolute difference:
10.5%

Statistically significant:
 $p = 0.005$
(2x2 comparison, Open Epi)

*4 DTaP, 3 Polio, 1 MMR, 3 Hep B, 3 Hib, 1 Varicella, 4 PCV doses

How does tribal health compare to the rest of AK in vaccination coverage?

Similarities to rest of AK

- Regional variability
- Low on-time vaccination rates in infancy
- Overall rates lower than Healthy People 2020 Goals

Differences from rest of AK

- Much better catch-up by end of toddler period
- Better integration of all recommended doses
- Thus, significantly higher coverage for 19-35 month composite series

How does tribal health compare to the rest of AK in care delivery?

Similarities to rest of AK

- Vaccines delivered in clinic or PHC setting
- Vaccines typically delivered during well child care

Differences from rest of AK

- Guaranteed access to primary care services without co-pays
- Integrated care model with robust data-sharing
- Designated point people regionally and statewide who monitor, give feedback on vaccination rates
- ? less hesitancy about individual vaccines

What about vaccine hesitancy?

How many vaccines will your child get?

AT BIRTH	6 MONTHS	15 MONTHS
- HepB	- RV	- DTaP - each shot has 3 vaccines
ONE MONTH	- DTaP - each shot has 3 vaccines	18 MONTHS
- HepB	- Flu	- Flu - annually throughout
TWO MONTHS	- HepB	Lifetime
- RV	- Hib - each shot has 2 vaccines	- HepA
- DTaP - each shot has 3 vaccines	- PCV - each shot has 8 vaccines	4-6 YEARS
- Hib - each shot has 2 vaccines	- IPV	- DTaP - each shot has 3 vaccines
- PCV - each shot has 8 vaccines	12 MONTHS	- IPV
- IPV	- HepA	- MMR - each shot has 3 vaccines
4 MONTHS	- Hib - each shot has 2 vaccines	- Varicella
- RV	- PCV - each shot has 8 vaccines	11-12 YEARS
- DTaP - each shot has 3 vaccines	- MMR - each shot has 3 vaccines	- MCV
- Hib - each shot has 2 vaccines	- Varicella	- Tdap
- PCV - each shot has 8 vaccines		- IPV - 3 doses
- IPV		

Too many.
Your child may receive up to **81** vaccines by six years of age.

Vaccination injects bacteria, viruses, genetic material and many other biological and toxic chemicals (mercury, aluminum, formaldehyde, acids) deep into the child's body, where they have access to internal organs (including the brain). The results are a host of illnesses that were rare or non-existent before mass vaccination. These conditions include, but are not limited to, the following:

Autism, juvenile diabetes, juvenile rheumatoid arthritis, reading problems, language difficulties, asthma, allergies, attention deficit disorder (ADD), ADHD, brain tumors, cancer, osteosarcoma, lupus erythematosus, diabetes, abnormal behavior, deafness, hearing impairment, autoimmune diseases, hyperactivity, death, inflammatory bowel disease, irritable bowel disease, juvenile arthritis, brain inflammation, infantile spasms, seizures, epilepsy, convulsions, increased intracranial pressure, demyelinating disease, AIDS (crib death), Asperger's syndrome, pervasive developmental disorder, vision problems, otitis media (ear infection), upper respiratory tract infection, vomiting, fever, loss of IQ, pinpoints, gastroenteritis, rash, croup, hives, eczema, colitis, choking, holding breath, throat, wheezing, pneumonia, bronchitis, influenza, vomiting, conjunctivitis, local swelling, irritable child, permanent brain damage, encephalopathy (brain inflammation), sepsis, arthralgia (painful joints), nausea, headache, cardiac arrhythmias, syncope (fainting), cranial nerve paralysis, anaphylaxis, Guillain-Barre syndrome, Kawasaki disease (inflammation of heart and blood vessels), skin diseases, skin rashes, kidney disorders (including kidney failure), shingles, tuberculosis, carpal tunnel syndrome, paralytic disease, septic meningitis, Hodgkin's Disease and non-Hodgkin's lymphoma, atopic dermatitis, skin conditions

Vaccines

DTaP/Tdap	Diphtheria, tetanus & pertussis
Dta	diphtheria
HepA	Hepatitis A
HepB	Hepatitis B
Hib	Haemophilus influenzae type b
IPV	Human papillomavirus
MMR	Inactivated poliovirus
MMRV	Meningococcal
PCV	Mumps, measles & rubella
RV	Pneumococcal conjugate
Varicella	Rotavirus gastroenteritis
	Chickenpox

Make an informed choice.

Louder than Words
A Mother's Journey in Healing Autism
Jenny McCarthy
New York Times Bestselling author of *Baby Laughs*

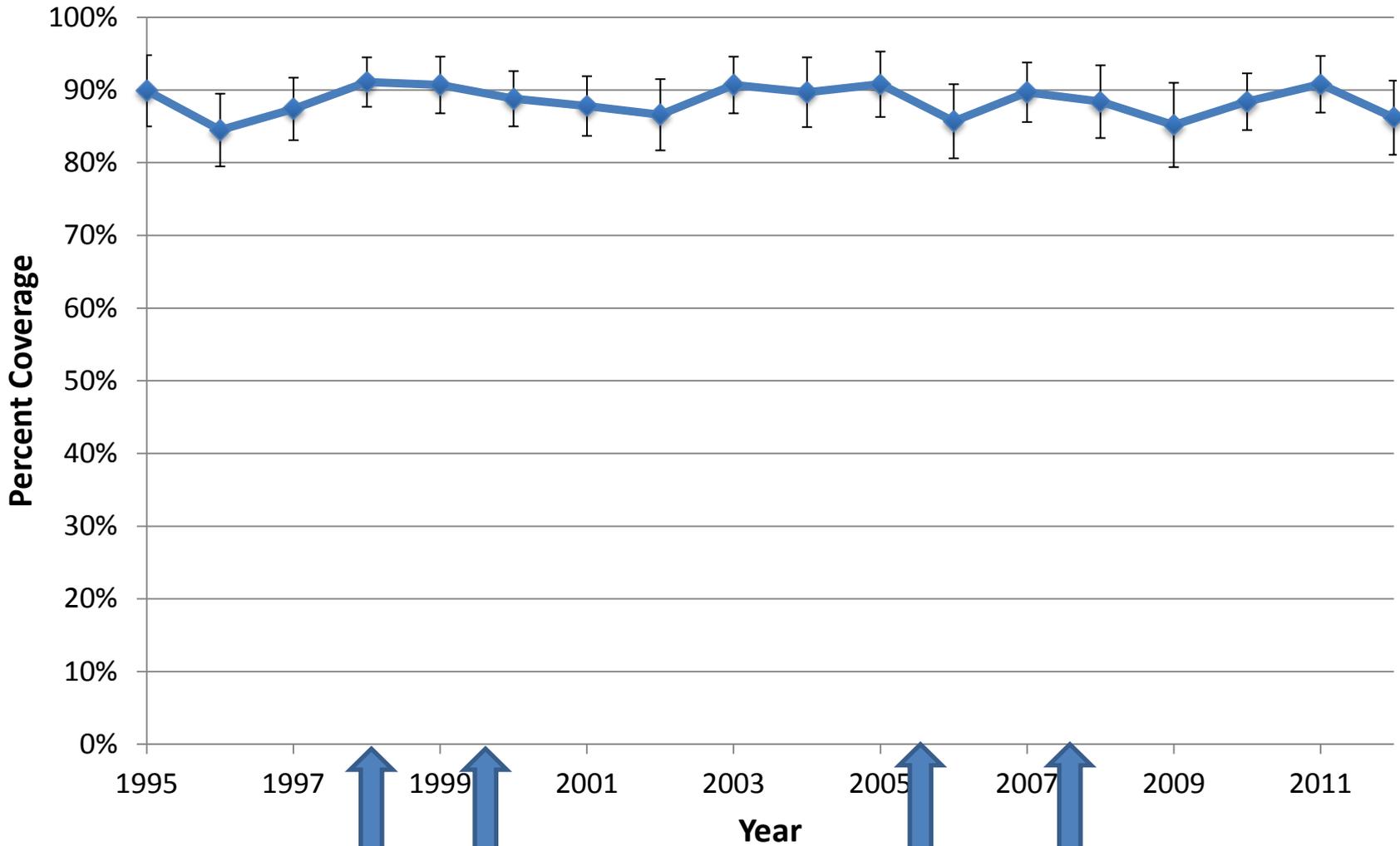
SEARS PARENTING LIBRARY
COMPLETELY REVISED AND UPDATED
The Vaccine Book
Making the Right Decision for Your Child
Robert W. Sears, MD, FAAP

- It is real, but this is not unique to Alaska
- Defining hesitancy is slippery, but most data show it is more common among higher-educated, white families
- We have no evidence of a substantial effect of hesitancy on Alaska's 19-35 month coverage rates

Did he just say that hesitancy is not our major coverage problem?

- Between 90-94% of our 19-35 month olds are up to date on polio and Hep B series
- Over 97% of our kindergarteners were up to date on polio and Hep B series in 2011-12
- Thus, outright refusal represents a very small portion (~10%) of our coverage deficit. It is also the portion where we have the least evidence we can effect change at the state level.
 - What about parent-initiated delays? Where's the data...
 - What about MMR delay/refusal?

MMR Coverage, 19-35 month olds in Alaska (NIS Data), 1995-2012



Anti-vaccine milestones:

Wakefield article

Thimerosal controversy begins

David Kirby publishes *Evidence of Harm*

Jenny McCarthy on Oprah

Why the focus on hesitancy?

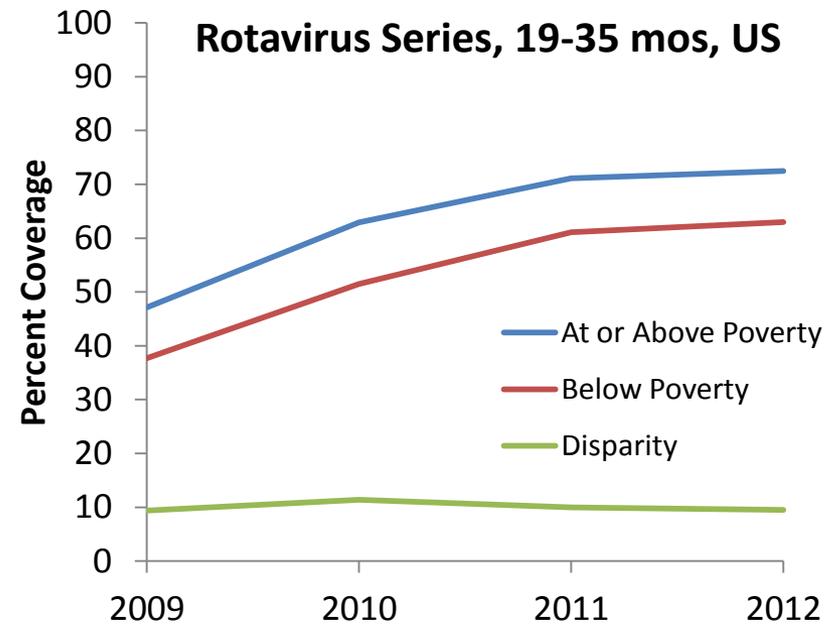
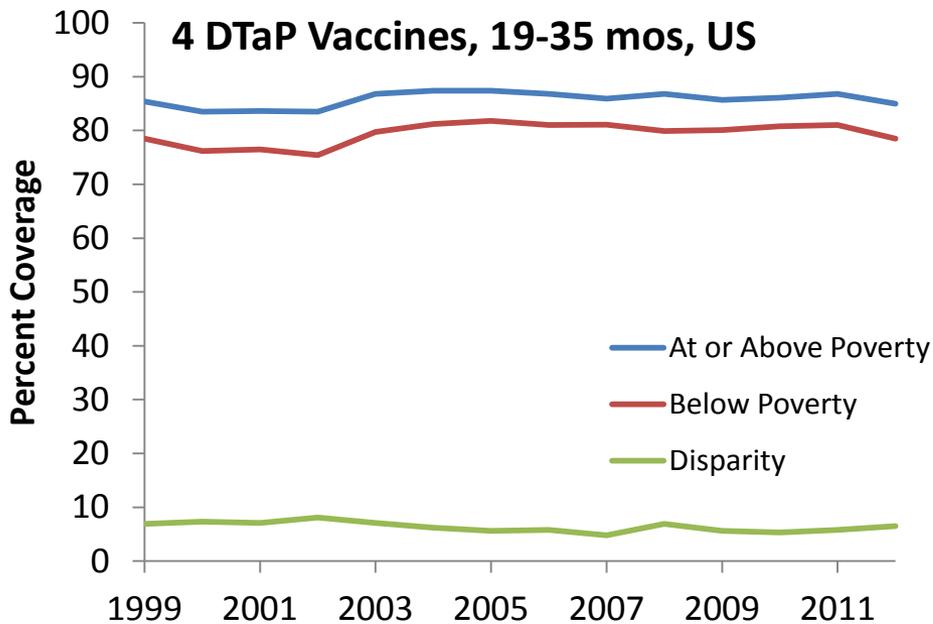
- The squeaky wheel gets the grease
 - The anti-vaccine lobby is loud and has media appeal
 - Patient-care anecdotes that provoke strong personal reactions have sticking power
 - We have more awareness of families who come to clinic and voice concerns than those who would gladly get vaccinated but don't make it in
- Having a villain (the anti-vaccine crowd) offloads some responsibility from ourselves in dealing with our low coverage rates

Summary of problem

- We have long struggled with low vaccination rates in 19-35 month olds. There is no evidence of acute worsening of this problem.
- The key challenge is timely follow-up for vaccines (and well child care) starting in early infancy.
- Vaccine hesitancy is a challenging issue, but should not be overly emphasized as a barrier to achieving goal 19-35 month coverage in Alaska.

What are known barriers to timely vaccination?

- Childhood poverty and housing stress
 - Documented in NIS nationally and at the county level
 - Most pronounced for multi-dose series



What are specific factors associated with lower on-time rates?*

- Low SES
- Paying for immunizations
- Lack of health insurance
- Low parental education
- Younger maternal age
- Large family size
- Not remembering vaccination schedules and appointments
- Delayed well child visits
- Sick child delays

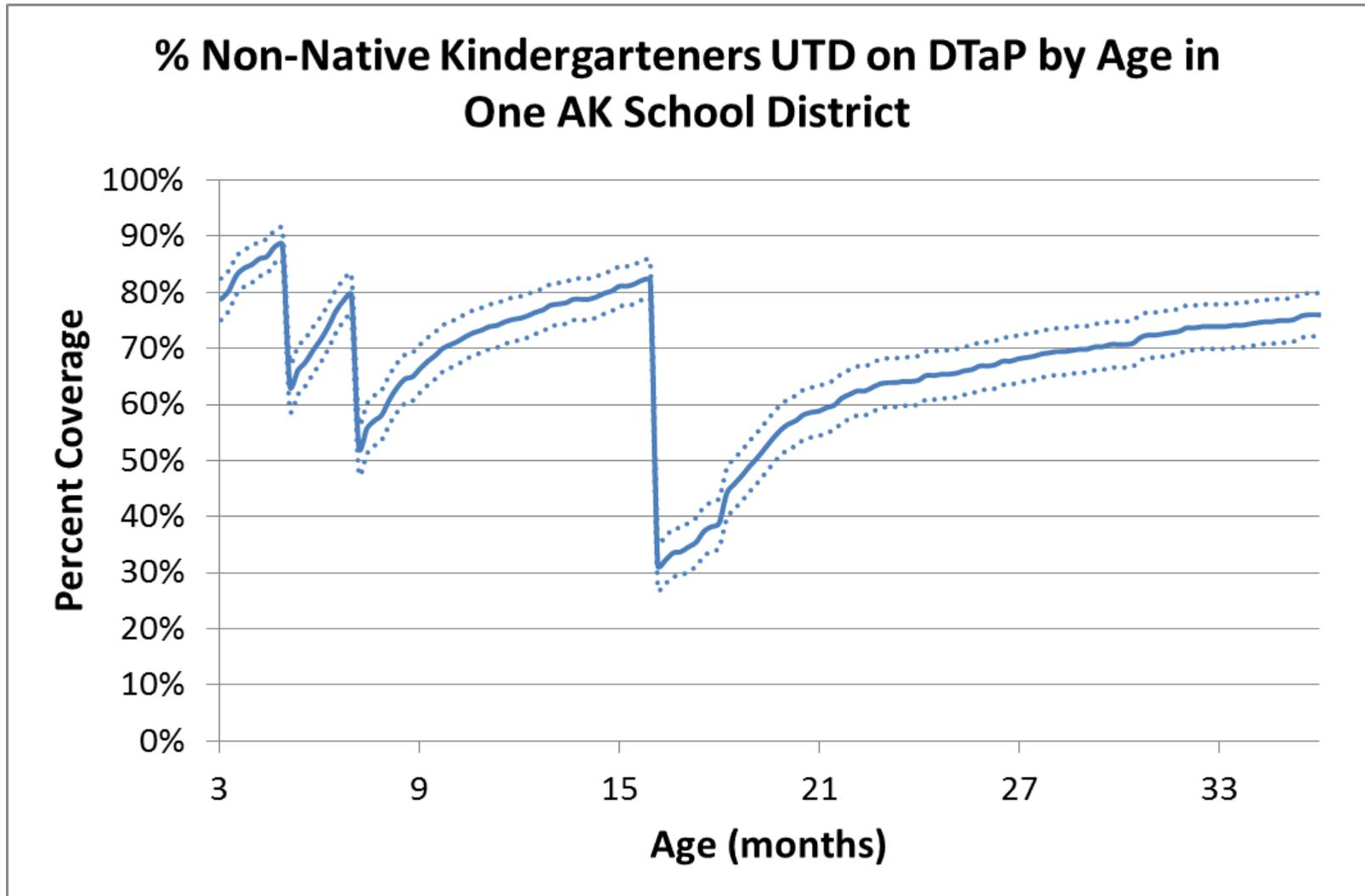
- Inadequate provider support
- Lack of available health structures
- Transportation and accessibility issues for immunization clinics
- Lack of knowledge about vaccines and diseases
- Negative beliefs/attitudes
- Fear/safety concerns
- Skepticism/doubts about medical information provided

*Falagas ME and Zarkadoulia E, "Factors associated with suboptimal compliance to vaccinations in children in developed countries: a systematic review." Current Medical Research and Opinion, Vol 24(6):2008

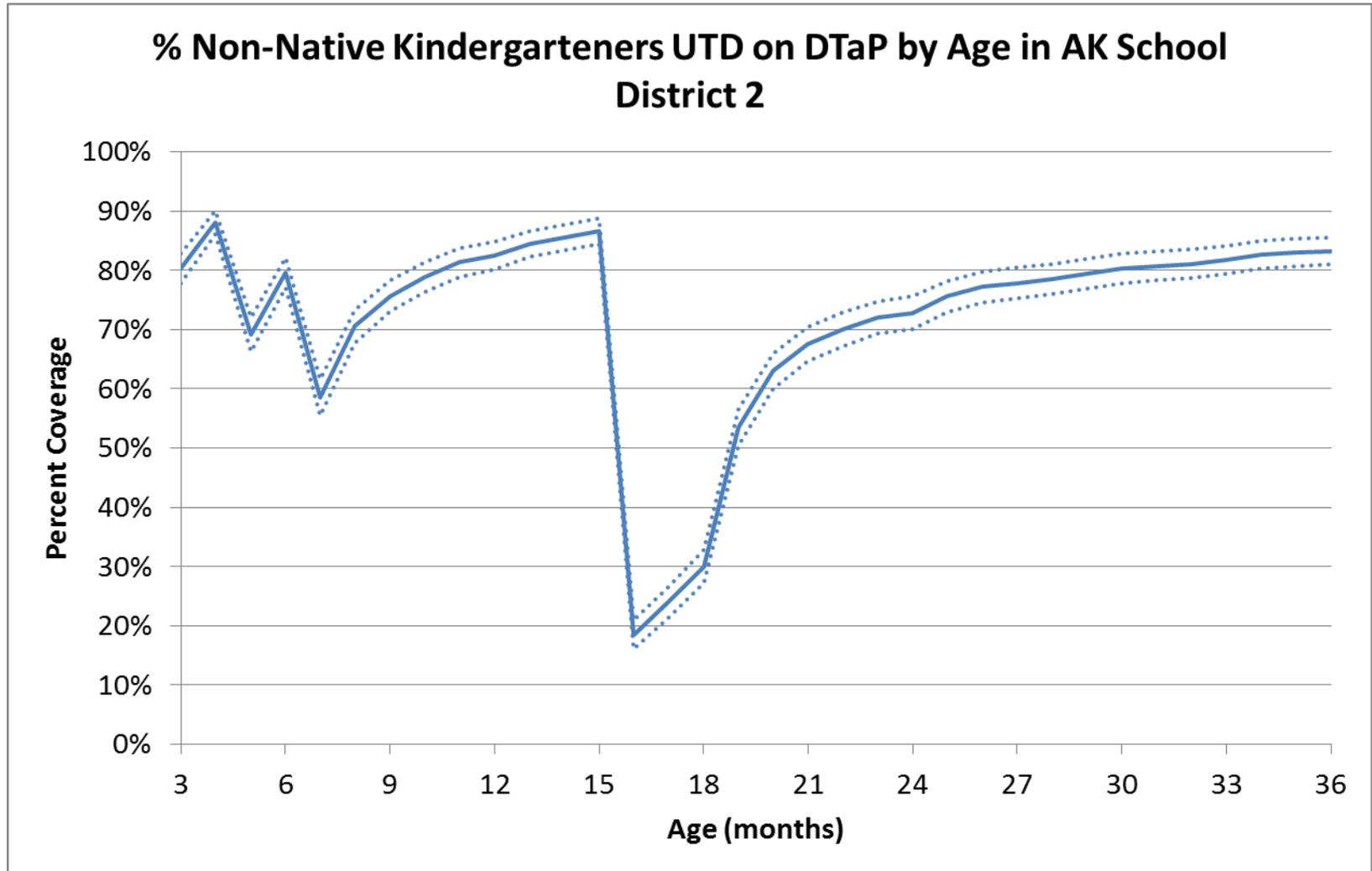
Are there socioeconomic disparities in Alaska's vaccine coverage?

- Let's look at current kindergarteners in two large Alaska school districts
- We can see how old they were when they received each of their milestone vaccines
- We can stratify the data by race and socioeconomic status (children who qualify for free and reduced school lunch vs those who do not)

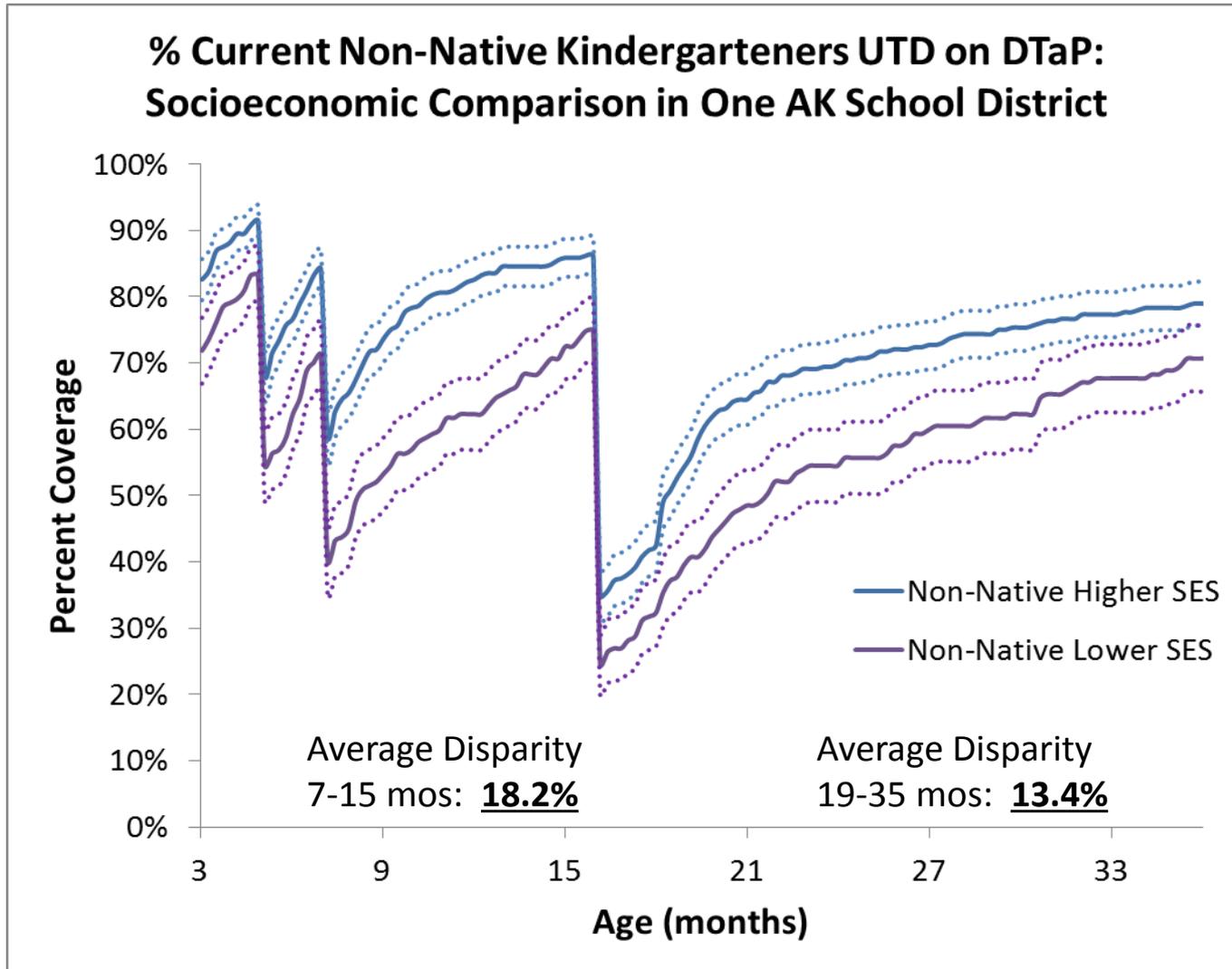
District 1 Aggregate Data: Non-Native Students



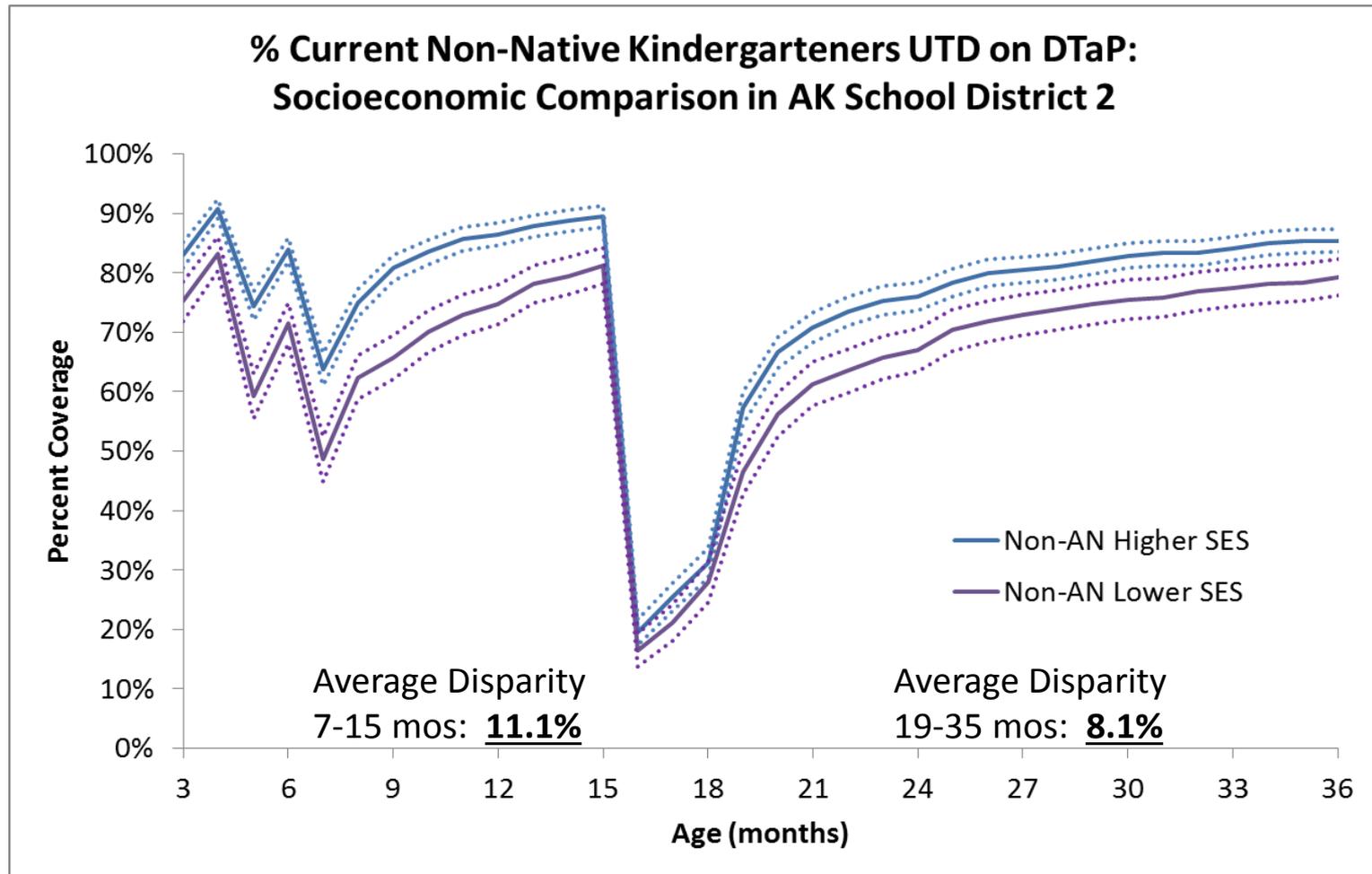
District 2 Aggregate Data: Non-Native Students



Socioeconomic Disparities in District 1



Socioeconomic Disparities in District 2



Are there socioeconomic disparities in
Alaska's vaccine coverage?

YES

What are known facilitators of on-time vaccination

- Reducing or eliminating barriers to primary care and vaccine access
- Clinic and PHC systems that effectively track and recall patients who need primary care
- Use of a robust immunization information system for this purpose
- Having more pediatricians per population served in an area

What are best practices to promote immunization?

American Academy
of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN™



FROM THE AMERICAN ACADEMY OF PEDIATRICS

Organizational Principles to Guide and Define the Child Health Care System and/or Improve the Health of all Children

Policy Statement—Increasing Immunization Coverage

COMMITTEE ON PRACTICE AND AMBULATORY MEDICINE AND
COUNCIL ON COMMUNITY PEDIATRICS

KEY WORDS

immunization, vaccines, immunization coverage, increasing immunization coverage, vaccine financing, vaccine supply, vaccine safety, immunization information system, reminder-recall, missed opportunities, risk communication, refusal to vaccinate

abstract

FREE

In 1977, the American Academy of Pediatrics issued a statement calling for universal immunization of all children for whom vaccines are not contraindicated. In 1995, the policy statement "Implementation of the Immunization Policy" was published by the American Academy of Pediatrics, followed in 2003 with publication of the first version of this statement, "Increasing Immunization Coverage." Since 2003, there have continued to be improvements in immunization coverage, with progress toward meeting the goals set forth in *Healthy People 2010*. Data from the 2007 National Immunization Survey showed that 90% of children 19 to 35 months of age have received recommended doses of each of the following vaccines: inactivated poliovirus (IPV), measles-mumps-rubella (MMR), varicella-zoster virus (VZV), hepatitis B virus (HBV), and *Haemophilus influenzae* type b (Hib). For diphtheria and tetanus and acellular pertussis (DTaP) vaccine, 84.5% have received the recommended 4 doses by 35 months of age. Nevertheless, the *Healthy People 2010* goal of at least 80% coverage for the full series (at least 4 doses of DTaP, 3 doses of IPV, 1 dose of MMR, 3 doses of Hib, 3 doses of HBV, and 1 dose of varicella-zoster virus vaccine) has not yet been met, and immunization coverage of adolescents continues to lag behind the goals set forth in *Healthy People 2010*. Despite these encouraging data, a vast number of new challenges that threaten continued success toward the goal of universal immunization coverage have emerged. These challenges include an increase in new vaccines and new vaccine combinations as well as a significant number of vaccines currently under development; a dramatic increase in the acquisition cost of vaccines, coupled with a lack of adequate payment to practitioners to buy and administer vaccines; unanticipated manufacturing and delivery problems that have caused significant shortages of various

Recommendations Regarding Interventions to Improve Vaccination Coverage in Children, Adolescents, and Adults

Task Force on Community Preventive Services

Medical Subject Headings (MeSH): vaccine-preventable diseases, vaccination coverage, community health services, decision-making, evidence-based medicine, systematic reviews, population-based interventions, practice guidelines, preventive health services, public health practice, task force (Am J Prev Med 2000;18(1S):92-96) © 2000 American Journal of Preventive Medicine

Introduction

This report makes recommendations on the use of interventions to increase vaccine coverage levels. The reviews of evidence on which these recommendations are based are provided in the accompanying article (see Briss et al., page 97). The recom-

ing the information found in these reviews and recommendations (i.e., strategies that work in general) with local contextual information (i.e., ensuring a good match between interventions and local needs and capabilities).

A starting point for addressing vaccine-preventable disease problems in communities is to assess activities

Increasing Community Demand

- **Strongly Recommended**
 - Client reminder/recall
 - Multicomponent interventions that include education plus at least one additional activity
- *Recommended*
 - Vaccination requirements for daycare, school
- **Insufficient Evidence**
 - Community-wide education-only interventions
 - Clinic-based education-only interventions
 - Client/family incentives
 - Client-held medical records

Enhancing Access to Vaccination Services

- **Strongly recommended**
 - Reduce out-of-pocket costs
 - Expand access in health care settings during intervention
 - Reduce distance from setting to population
 - Increase or change hours of vaccination services
 - Deliver in settings where not previously available
 - Reduce clinic admin barriers (e.g. drop-in, express lane)
- *Recommended*
 - Vaccination programs in WIC settings (assess up-to-date status, offer vaccine on site, or refer elsewhere with either voucher or free vaccine)
 - Home visits (can also include telephone, mail reminders)
- Insufficient evidence
 - School or childcare center based vaccination programs

Provider-Based Interventions

- **Strongly recommended**
 - Provider reminder/recall
 - Assessment and feedback
- *Recommended*
 - Standing orders (strongly recommended in adults, insufficient evidence of efficacy in children)
- Insufficient evidence
 - Provider education only

Do these interventions work?

Improving the Quality of Immunization Delivery to an At-Risk Population: A Comprehensive Approach

abstract

OBJECTIVE: Immunization quality improvement (QI) interventions are rarely tested as multicomponent interventions within the context of a theoretical framework proven to improve outcomes. Our goal was to study a comprehensive QI program to increase immunization rates for underserved children that relied on recommendations from the Centers for Disease Control and Prevention's Task Force on Community Preventive Services and the framework of the Chronic Care Model.

METHODS: QI activities occurred from September 2007 to May 2008 at 6 health centers serving a low-income, minority population in Washington, DC. Interventions included family reminders, education, expanding immunization access, reminders and feedback for providers, and coordination of activities with community stakeholders. We determined

AUTHORS: Linda Y. Fu, MD, MS,^a Mark Weissman, MD,^{a,b} Rosie McLaren, MS,^{c,d} Cherie Thomas, BSN, RN,^d Jacquelyn Campbell, MSN,^d Jacob Mbafor, MS,^d Urvi Doshi, BS,^d and Denice Cora-Bramble, MD, MBA^a

^aGoldberg Center for Community Pediatric Health, Children's National Medical Center, Washington, DC; ^bDC Partnership to Improve Children's Healthcare Quality, Washington, DC; ^cNational Center for Immunization and Respiratory Diseases, Centers for Disease Control and Prevention, Atlanta, Georgia; and ^dDistrict of Columbia Department of Health, Washington, DC

KEY WORDS

immunizations, quality improvement, vaccines, pediatric, pediatric outpatient clinics

ABBREVIATIONS

ACIP—Advisory Committee on Immunization Practices
CCM—Chronic Care Model
CDC—Centers for Disease Control and Prevention
CoCASA—Comprehensive Clinic Assessment Software Application

RESULTS: We found a 16% increase in immunization rates overall and a 14% increase in on-time immunization by 24 months of age. Improvement was achieved at all 6 health centers and maintained beyond 18 months.

CONCLUSION: We were able to implement a comprehensive immunization QI program that was sustainable over time. *Pediatrics* 2012;129:e496–e503

Medical Center, 111 Michigan Ave, NW, Washington, DC 20010.

E-mail: lfu@cnmc.org

PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

Copyright © 2012 by the American Academy of Pediatrics

What is needed in Alaska?

- Regional-level immunization coordination
- Support for implementation of best practices at the local level in clinics and public health centers
 - Immunization Program is currently implementing AFIX plan with baseline assessments of all clinics in the state and plans quarterly tracking
 - Pair this with provider need for QI projects for their maintenance of certification
 - Promote the full ACIP immunization schedule

What is needed?

- Good markers within our state to track progress so that NIS is not relied upon
 - VacTrak reliability should increase with time; providers must clean data and input legacy vaccines
 - For 7 month olds, anticipate full uptake of records since birth statewide by end of 2013. For 19 month olds, by end of 2014.
- Timely, guided, and confidential feedback to providers is key (AFIX)

What is needed?

- Effective and ongoing partnerships among
 - Immunization program
 - Public health nursing
 - Individual providers
 - Professional organizations (AAP, AAFP, ANA, APNO)
 - Community advocates

What is needed?

- Addressing access barriers is key to improving immunization coverage and reducing health disparities for Alaska's children

Key Next Steps

- Immunization Program/Epidemiology
 - Provide outreach and feedback to providers
 - Analyze Alaska-specific data to identify focus areas
- Professional Societies
 - Endorse vaccination QI proposals for MOC
 - Recommend and incentivize best practices
- Providers and public health nursing
 - Assess and improve reminder/recall processes
 - Promote timely vaccination and birth dose Hep B
 - Expand clinic hours and outreach efforts
- Everyone
 - Rebuild Vaccinate Alaska Coalition
 - Identify and remove barriers to accessing care

Questions?

- Please write down additional feedback, questions, observations, recommendations.
- Please join the Vaccinate Alaska Coalition. Meeting is tomorrow (Thursday) at 11:45.

Supplemental Slides Follow

What is unknown?

- Role of specific barriers that parents in Alaska face to timely vaccination and well child care
 - How socioeconomic status limits access at local and regional level
- Variations in provider practice patterns
 - Current reminder/recall efforts?
 - Alternative vaccine schedules?
- Good data regarding regional variations in coverage rates
 - No evidence that VacTrAK yields reliable coverage estimates in the large population centers of AK

VacTrAK Limitations in Surveillance

- Movement in and out of state
- Movement in and out of military system
- Inconsistent provider usage before new statewide requirements started
- Increasing provider usage of VacTrAK increases denominator of kids, but lack of legacy data will under-represent numerator of coverage
- Biased estimates skew gap between groups by rural vs urban and beneficiary vs non-beneficiary

VacTrAK Data Bias Illustrated

