

PHSSR Research-In-Progress Series:

Quality, Cost and Value of Public Health

Wednesday, February 4, 2015 12:00-1:00pm ET

**Centralized Reminder/Recall to Increase Immunization
Rates for Populations of Young Children:
*A Comparative Effectiveness Trial***

Conference Phone: 877-394-0659

Conference Code: 775 483 8037#

Please remember to mute your phone and computer speakers during the presentation.

PHSSR NATIONAL COORDINATING CENTER AT THE UNIVERSITY OF KENTUCKY COLLEGE OF PUBLIC HEALTH

Agenda

Welcome: Rick Ingram, DrPH, National Coordinating Center

Presenter:

“Centralized Reminder/Recall to Increase Immunization Rates for Populations of Young Children: A Comparative Effectiveness Trial”

Allison Kempe, MD, MPH, Director, Children's Outcomes Research Program, Children's Hospital Colorado, and U. of Colorado School of Medicine

Allison.Kempe@childrenscolorado.org

Commentary:

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Lisa VanRaemdonck, MPH, MSW, Executive Director, Colorado Association of Local Public Health Officials
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Questions and Discussion

Future Webinar Announcements

Presenter



Allison Kempe, MD, MPH

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Professor of Pediatrics, University of Colorado
School of Medicine & Colorado School of Public
Health

Director, Children's Outcomes Research Program,
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Co-Director, Colorado Health Outcomes Program
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Director, AHRQ-funded Center for Research in
Implementation Science and Prevention (CRISP)

Increasing Vaccination Among Young Children

Allison Kempe, MD, MPH

Director, Children's Outcomes Research (COR) Program
Center for Research in Implementation Science and Prevention
(CRISP)



Immunizations

Second Only to Clean Water!

Disease	Pre-Vaccine Era Estimated Annual Morbidity*	Most Recent Estimates [†] of U.S. Cases	Percent decrease
Diphtheria	21,053	0 [†]	100%
H. influenzae (invasive, <5 years of age)	20,000	243 ^{† §}	99%
Hepatitis A	117,333	11,049 [†]	91%
Hepatitis B (acute)	66,232	11,269 [†]	83%
Measles	530,217	61 [†]	>99%
Mumps	162,344	982 [†]	99%
Pertussis	200,752	13,506 [†]	93%
Pneumococcal disease (invasive, <5 years of age)	16,069	4,167 [‡]	74%
Polio (paralytic)	16,316	0 [†]	100%
Rubella	47,745	4 [†]	>99%
Congenital Rubella Syndrome	152	1 [†]	99%
Smallpox	29,005	0 [†]	100%
Tetanus	580	14 [†]	98%
Varicella	4,085,120	449,363 [‡]	89%

*CDC. JAMA, November 14, 2007; 298(18):2155–63

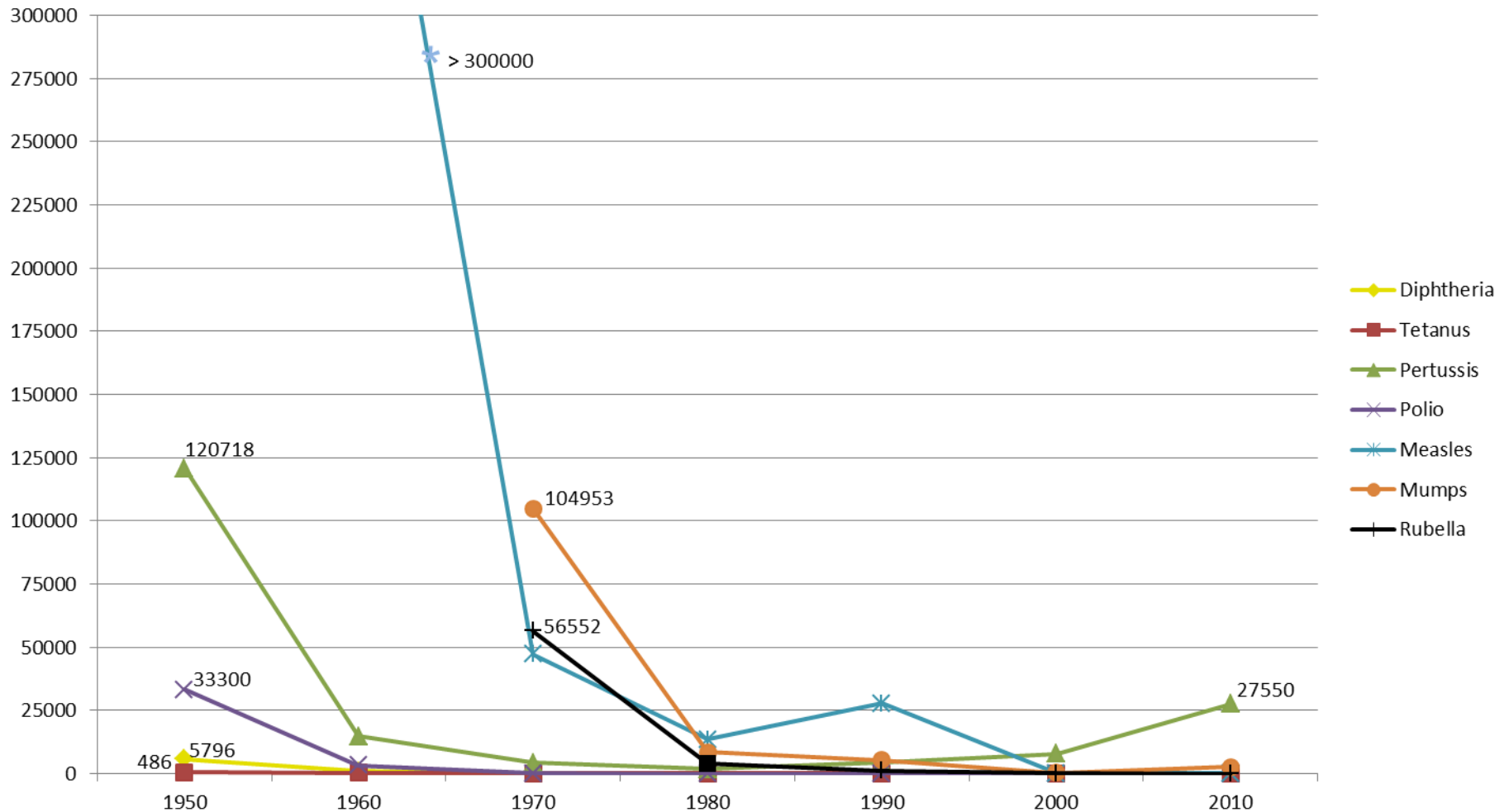
[†]CDC. MMWR, January 8, 2010; 58(51,52):1458–68

[‡]2008 estimates, *S. pneumoniae* estimates from Active Bacterial Core Surveillance

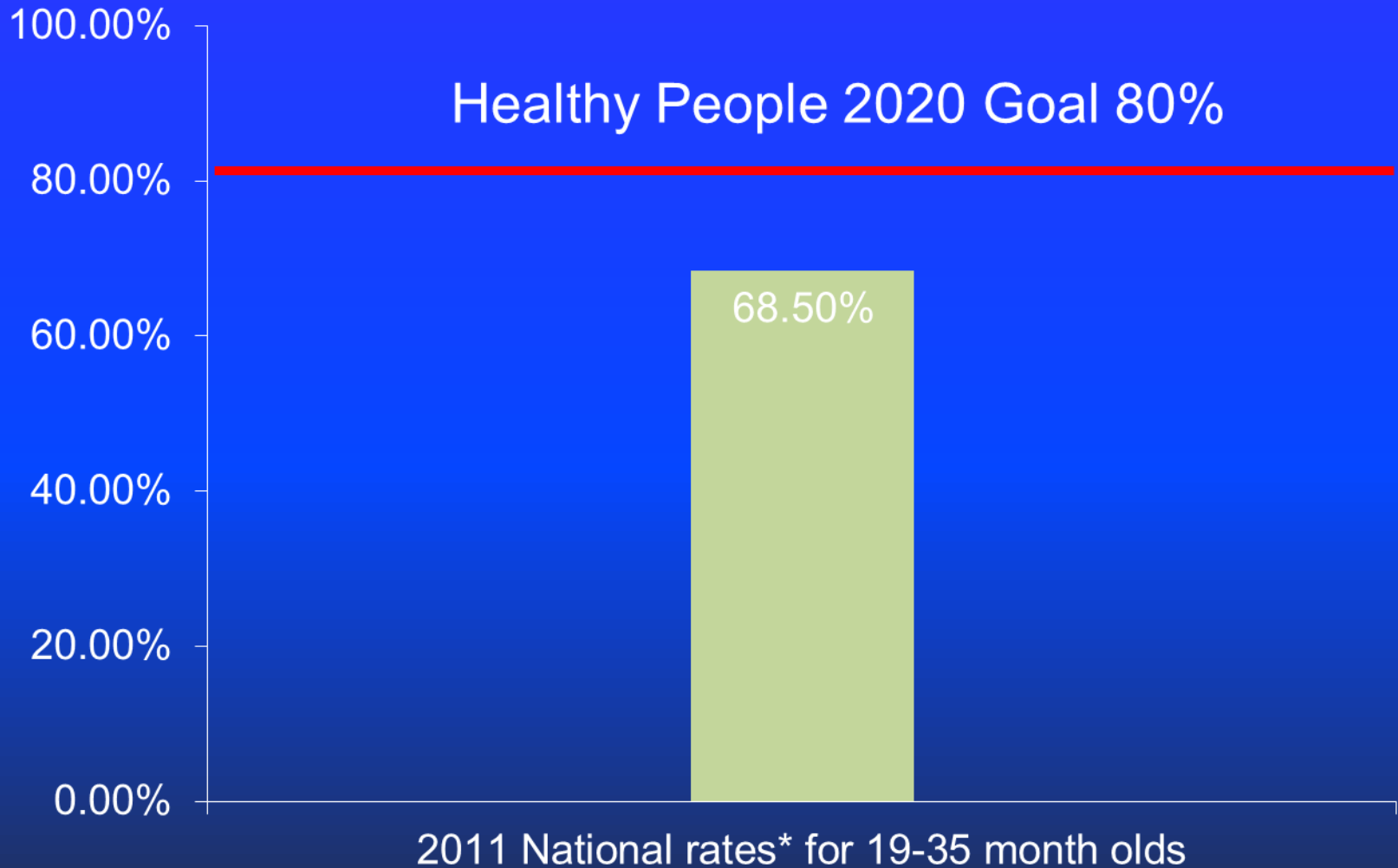
[§]25 type b and 218 unknown

Immunizations Second Only to Clean Water!

Reported Cases of Vaccines Preventable Diseases,
United States, 1950-2010



So How Are We Doing?



*Routinely recommended vaccines: ≥ 4 doses of DTaP/DT/DTP, ≥ 3 doses of poliovirus vaccine, ≥ 1 doses of measles-containing vaccine, full series of Hib (3 or 4), ≥ 3 doses of HepB, ≥ 1 dose of varicella vaccine, ≥ 4 doses of PCV

What's the Problem?!

Barriers to optimal immunization delivery

- Financial
- Access to care issues
- Lack of awareness
- Infrastructure and regulatory issues
- Complexity and expansion of vaccination schedule
 - # of vaccines more than doubled in past 25 years
 - By 18 months of age U.S. children recommended to receive vaccines against 14 different diseases, requiring up to 26 different vaccine doses
- Vaccine hesitancy
 - Misinformation
 - Safety concerns

Population-based vs Practice-based Reminder/Recall: a Pragmatic Comparative Effectiveness Trial



Children's Outcomes
Research Program



The Children's Hospital
Aurora, CO



Colorado Health
Outcomes Program
Un. of Colorado Denver
Aurora, CO

Allison Kempe, MD, MPH

Background

- Reminder/recall (R/R): postcards, letters or telephone calls to inform patients they are due or overdue for immunizations
- The Task Force on Community Preventive Services¹⁶ recommends R/R as one of the most evidence-based method of increasing Izs
- R/R can be automated using Immunization Information System (IIS)

Background

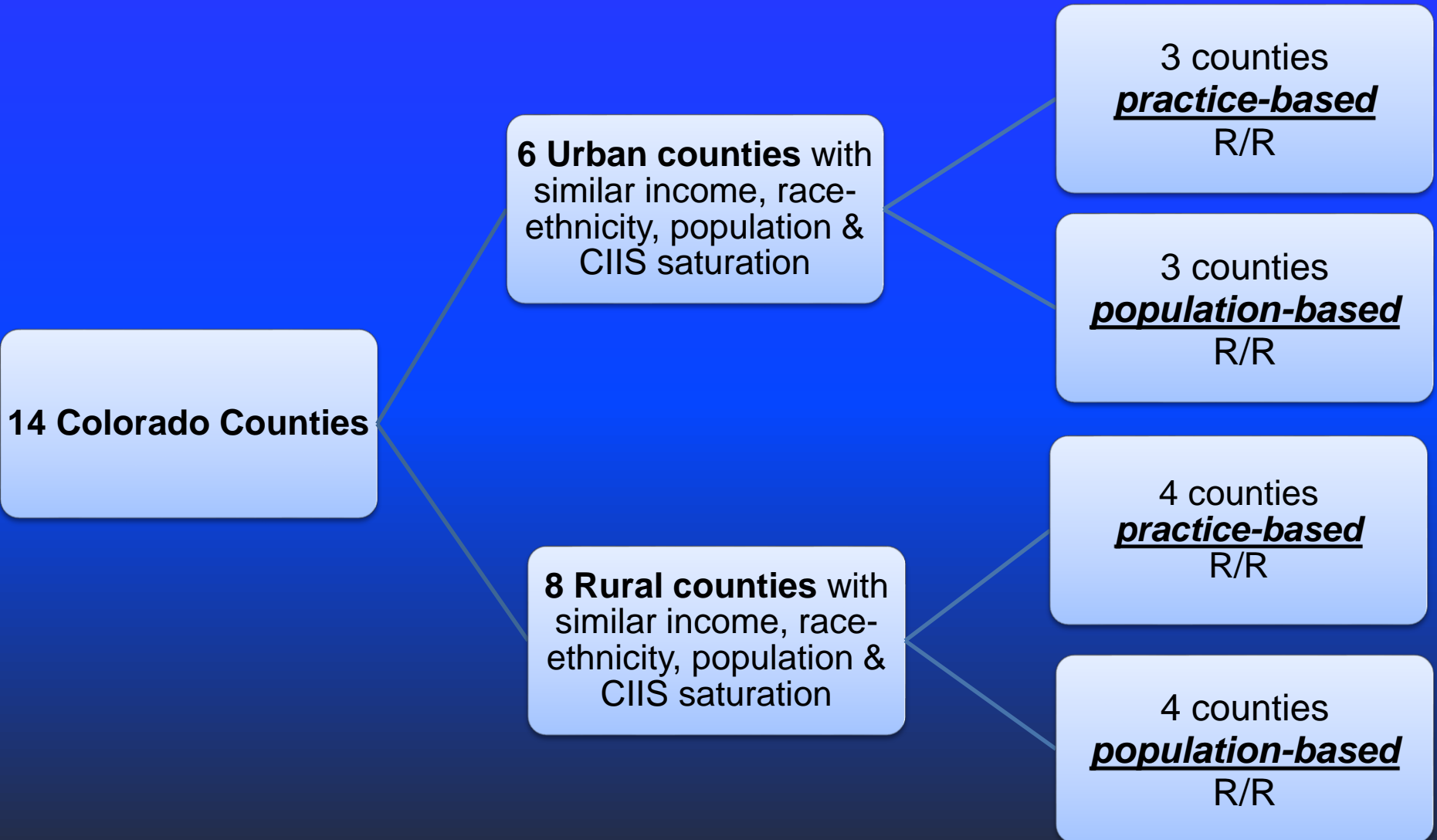
- R/R conducted in practice settings shown effective in increasing rates but only 16% of physicians nationally are conducting
- Population-based R/R if conducted centrally by public health departments could offer advantages:
 - Reducing burden of conducting R/R by practices
 - Reaching children without usual source of primary care

Objectives

To compare the *effectiveness* and *cost-effectiveness* of conducting R/R using two methodologies:

1. ***Population-based R/R:*** conducted centrally by the State Health Department using the Colorado Immunization Information System (CIIS)
2. ***Practice-based R/R:*** conducted at the level of the primary care practice using CIIS

Methods: Randomization of Counties



Covariate Constrained Randomization

- Baseline data on relevant contextual variables used to generate all possible randomizations of units into study groups
- A balance criterion (B), defined as the sum of squared differences between study groups on relevant standardized variables, is calculated for each randomization
- Criterion for maximum allowable difference between study groups established and set of “acceptable randomizations” in which the differences between treatment groups on covariates are minimized defined
- A single randomization is then chosen from the set of “acceptable randomizations”

Study Populations for Both Intervention Arms

Patient names, addresses and immunization data automatically uploaded from Birth Vital Statistics to



Colorado Immunization Information System (CIIS)



Downloaded names and addresses of children 19-35 months old needing ≥ 1 immunization within all 14 counties

Methods: Intervention Strategies

- Population-based recall counties:
 - Centralized R/R conducted by the State Public Health Department June – September 2010
 - Up to 3 mailings to children 19-35 months needing immunizations
 - R/R notices suggested patients go to primary care provider for immunization or, if they did not have one, to public health immunization site

Methods: Intervention Strategies

- Practice-based recall counties:
 - All practices invited to attend web-based R/R training in May/June 2010
 - R/R methodology suggested
 - 3 mailings to children 19-35 months needing immunizations
 - June – September 2010
 - Financial support for mailings offered to practices who did R/R in this timeframe

Methods: Statistical Analysis

- To account for clustered nature of the data mixed effects models used
 - Two models conducted to assess association between intervention group and whether or not 1) child became UTD or 2) received any shot during the study period
 - Fixed effects for both models included county baseline UTD rate, rural/urban status of county, and whether or not site of last service did R/R
 - The random effect in both models was site of last service

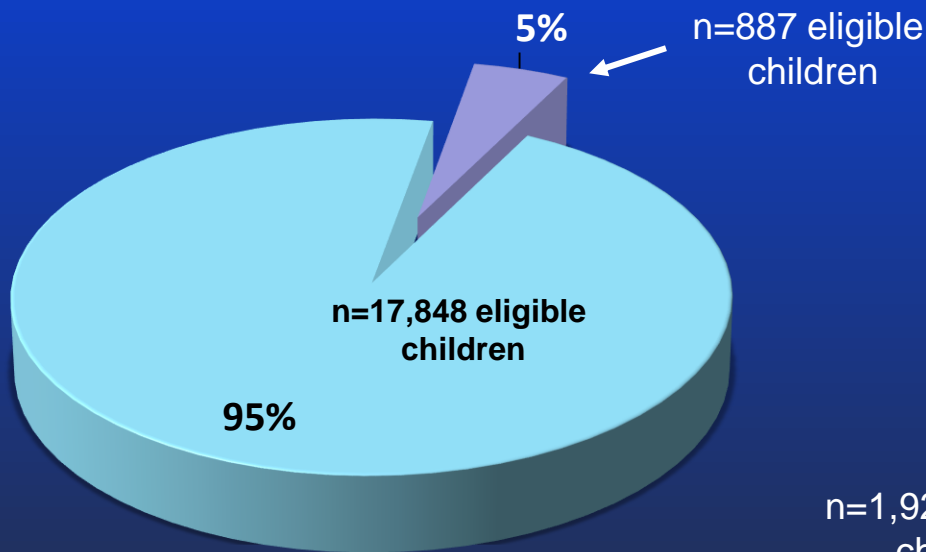
Methods: Cost Assessment

- Population-based R/R (performed centrally)
 - Staff time for training and implementation
 - Staff time for updating bad mailing addresses
 - Mailing and printing costs for up to 3 mailings
- Practice-based R/R (performed differently at each practice)
 - Average staff time among practices conducting R/R
 - Average mailing costs or costs of phone calls

Comparison of “Reach” of Intervention

Practice-based R/R Reach

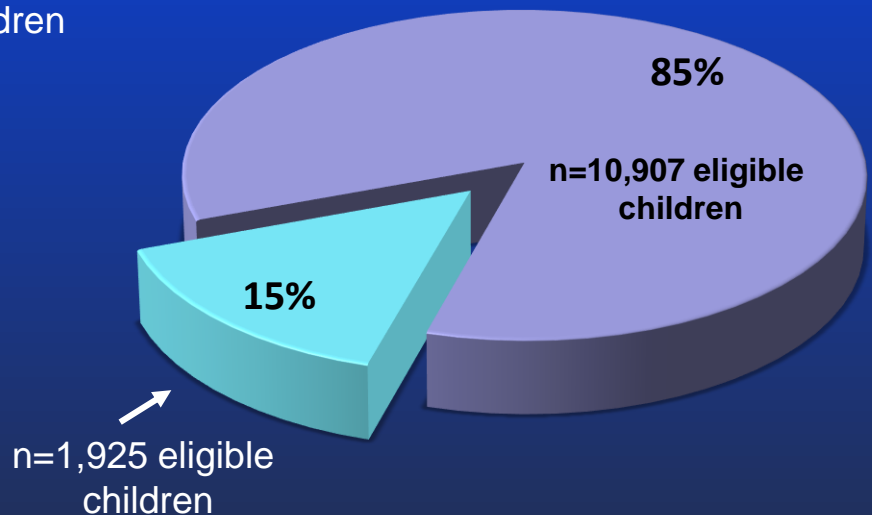
195 practice sites; 10 conducted recall



- Received ≥ 1 Reminder (assuming 100% received R/R)
- Did not receive R/R notice

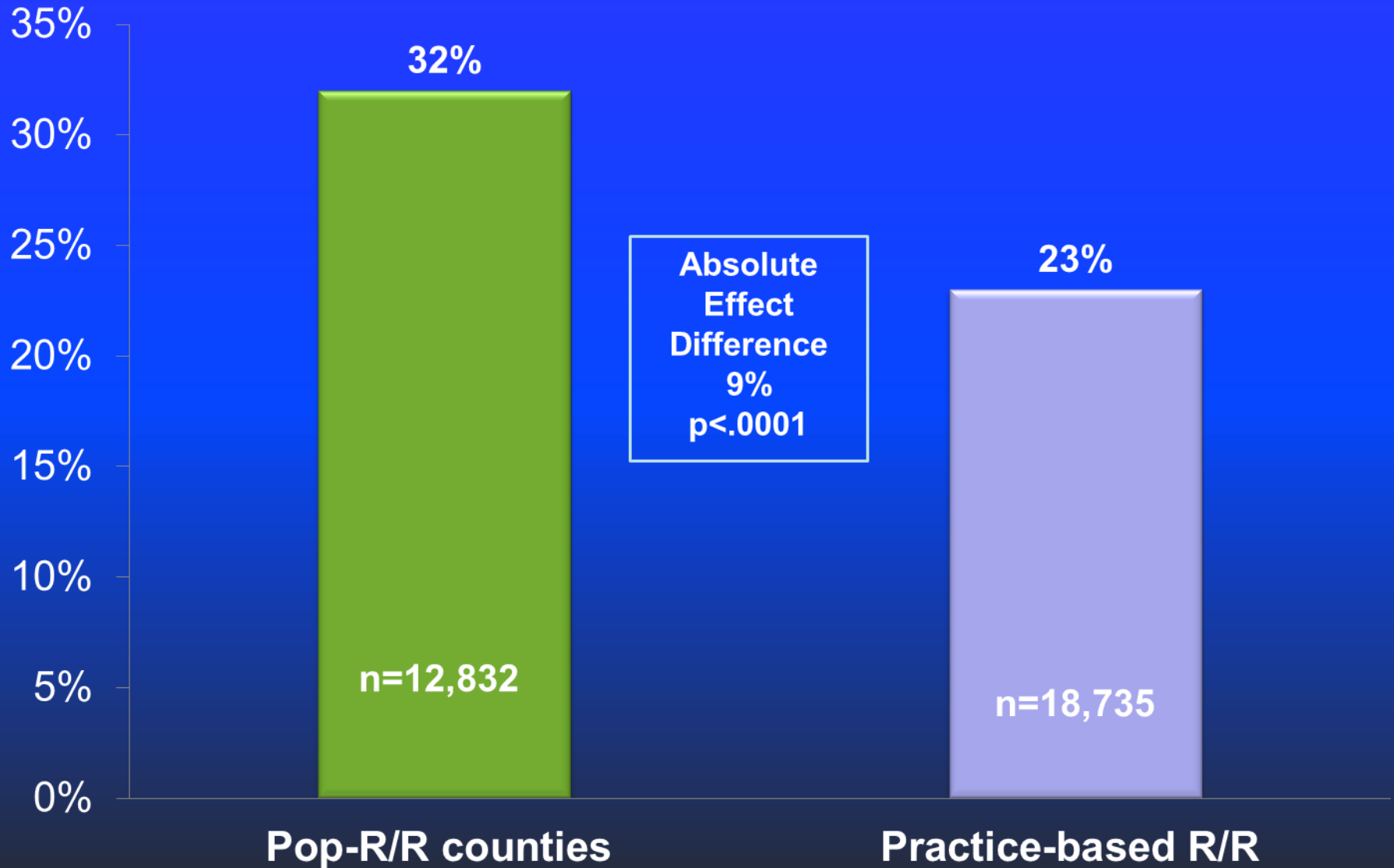
Population-based R/R Reach

188 practice sites



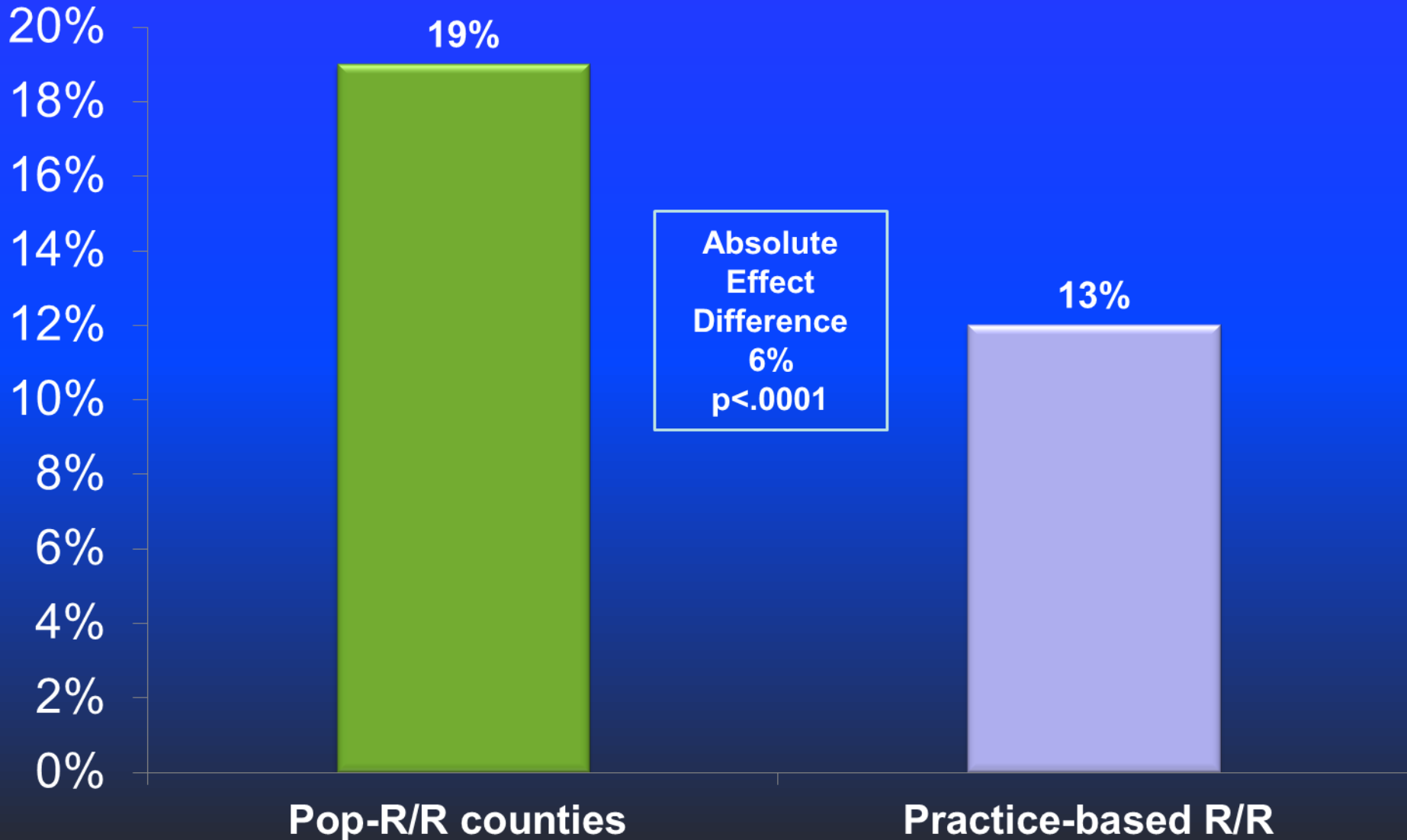
- Received ≥ 1 Reminder Notice (assuming 85% received R/R)
- Did not receive a R/R notice

Percent Receiving Any Vaccine within 6 months (of those needing vaccines at baseline)



Percent Brought Up-to-Date within 6 months

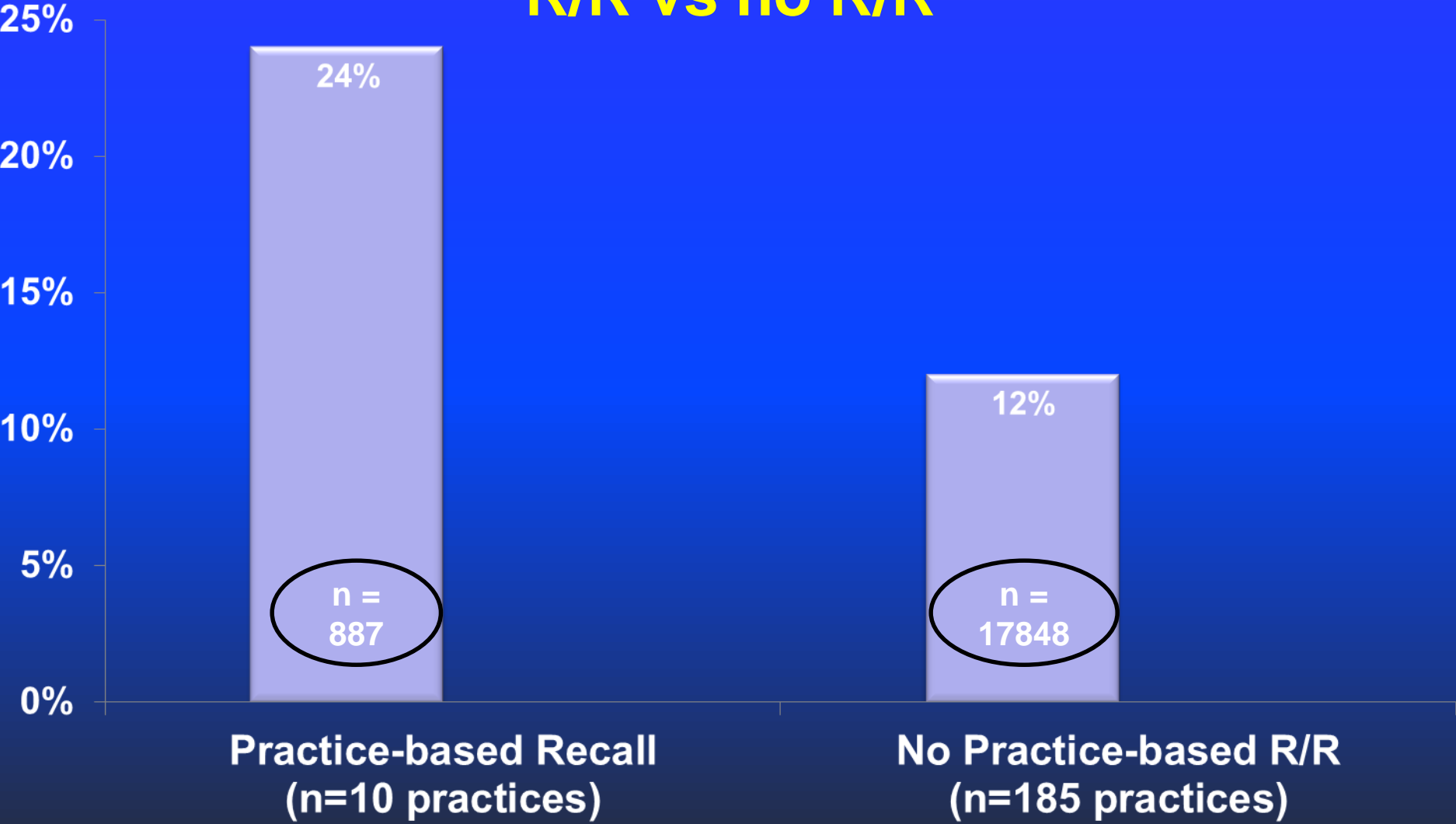
(of those needing vaccines at baseline)



Subgroup Analysis w/in Practice-based Counties

Percent Brought Up-to-Date

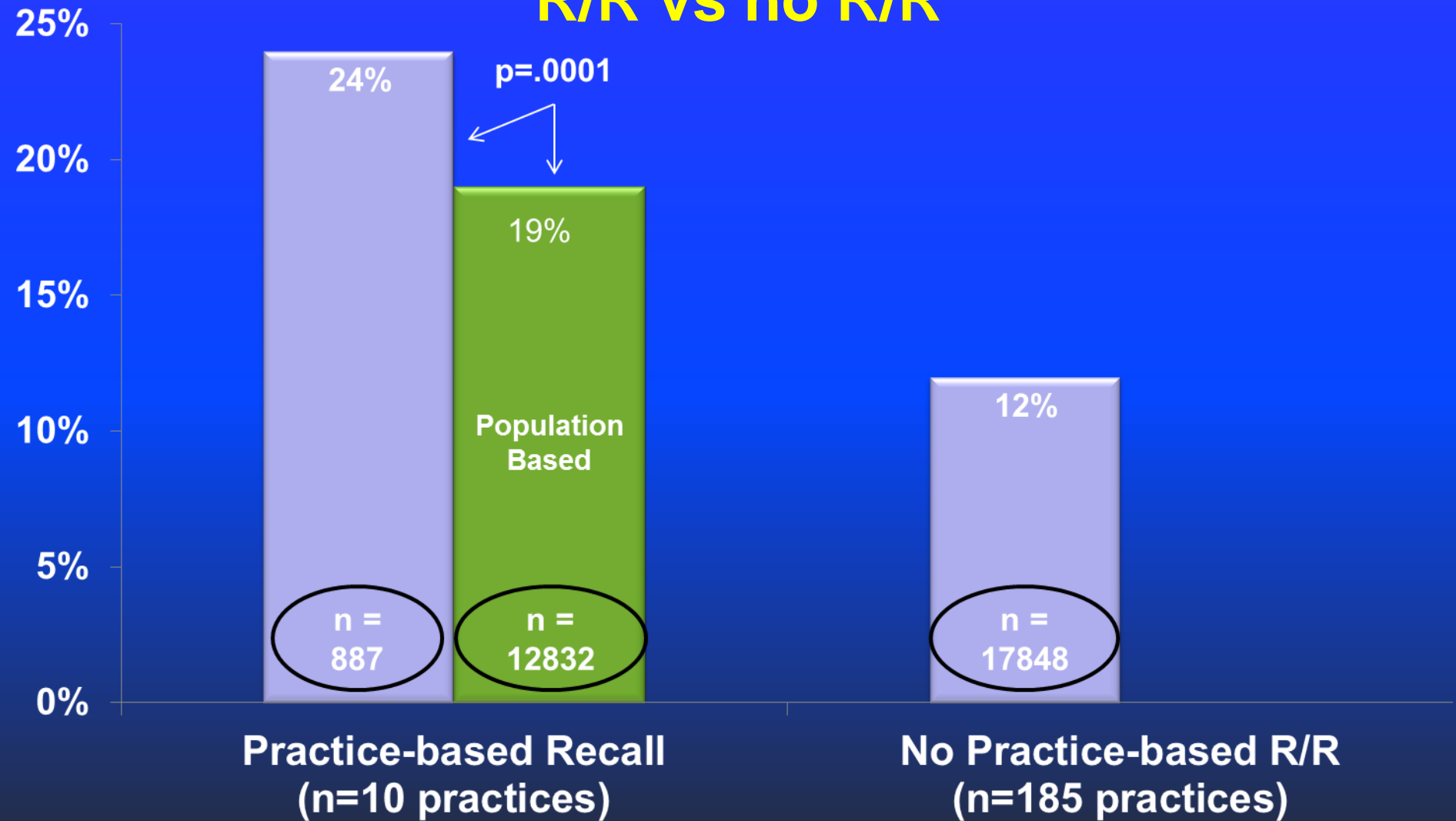
R/R vs no R/R



Subgroup Analysis w/in Practice-based Counties

Percent Brought Up-to-Date

R/R vs no R/R



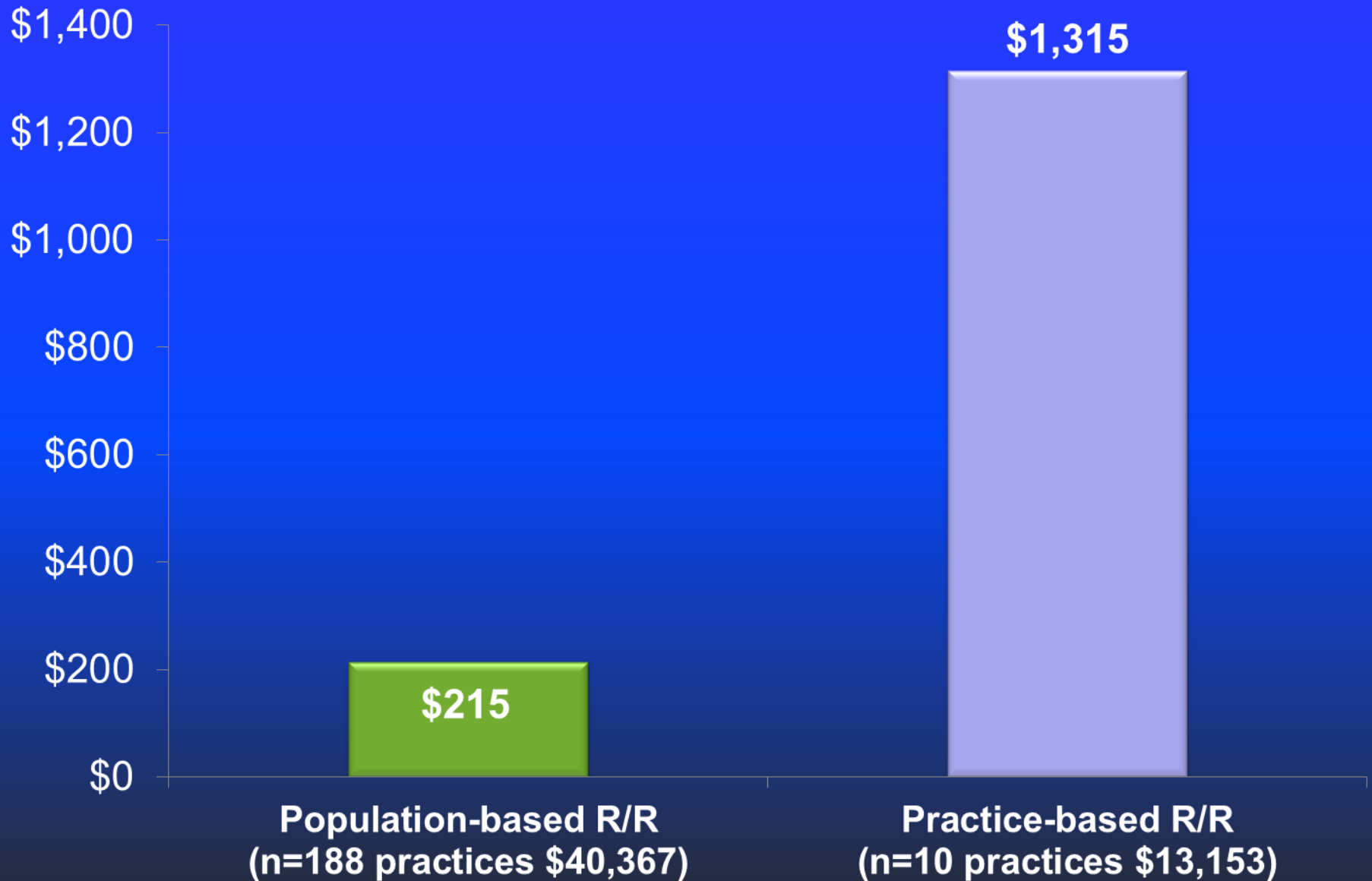
Results: Multivariable Models

Association of Intervention Group with Two Outcomes

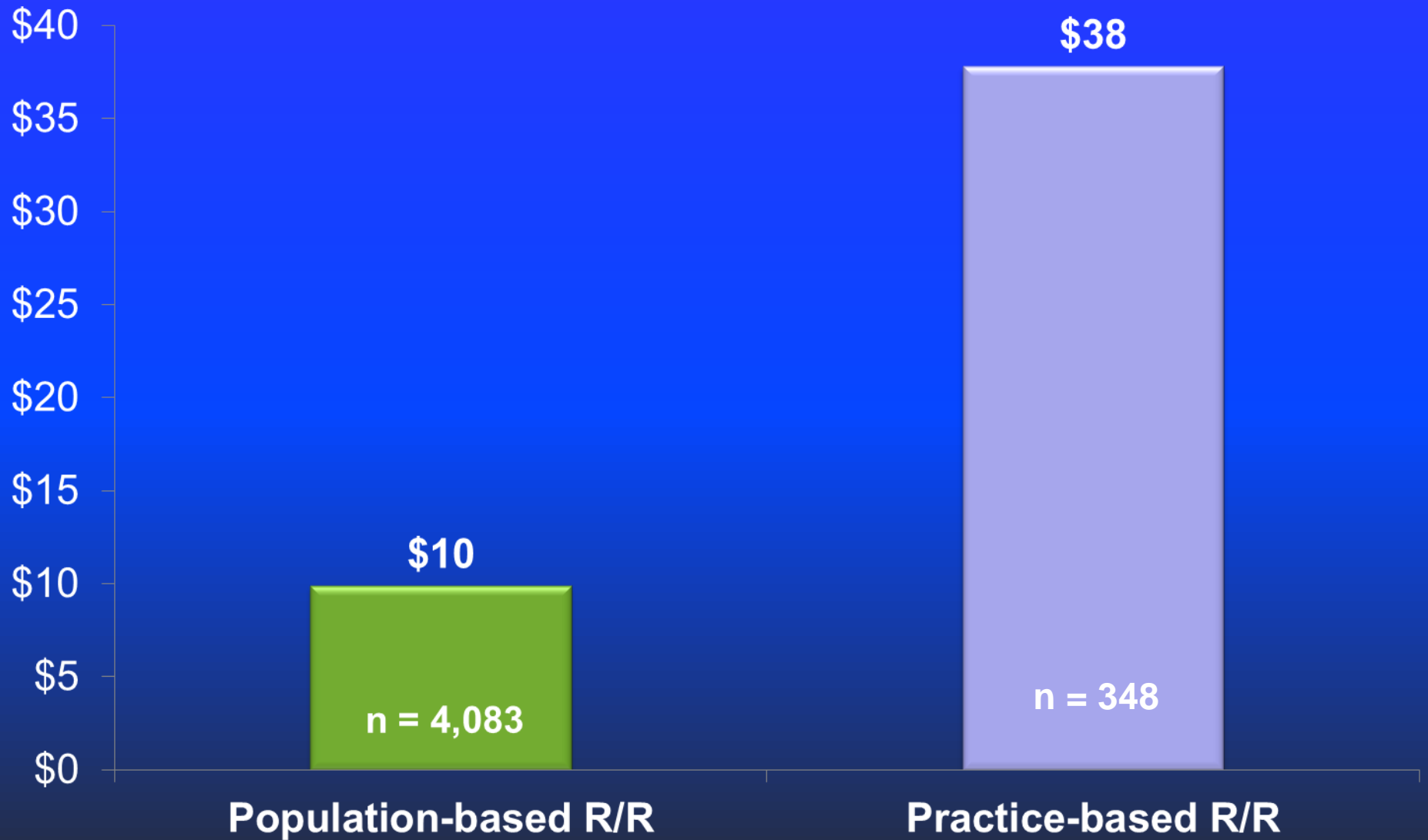
Outcomes Modeled	Adjusted OR (95% CI)	P-value
Becoming <u>up-to-date</u> in population-based versus practice-based county	1.24 (1.11-1.38)	.0002
Receiving <u>any vaccine</u> in population-based versus practice-based county	1.27 (1.15-1.39)	<.0001

Other variables included in the model were baseline county UTD rate, rural/urban status of county, site of last service and whether or not site of last service did R/R, all of which were not statistically significant

Cost of Conducting R/R per Practice



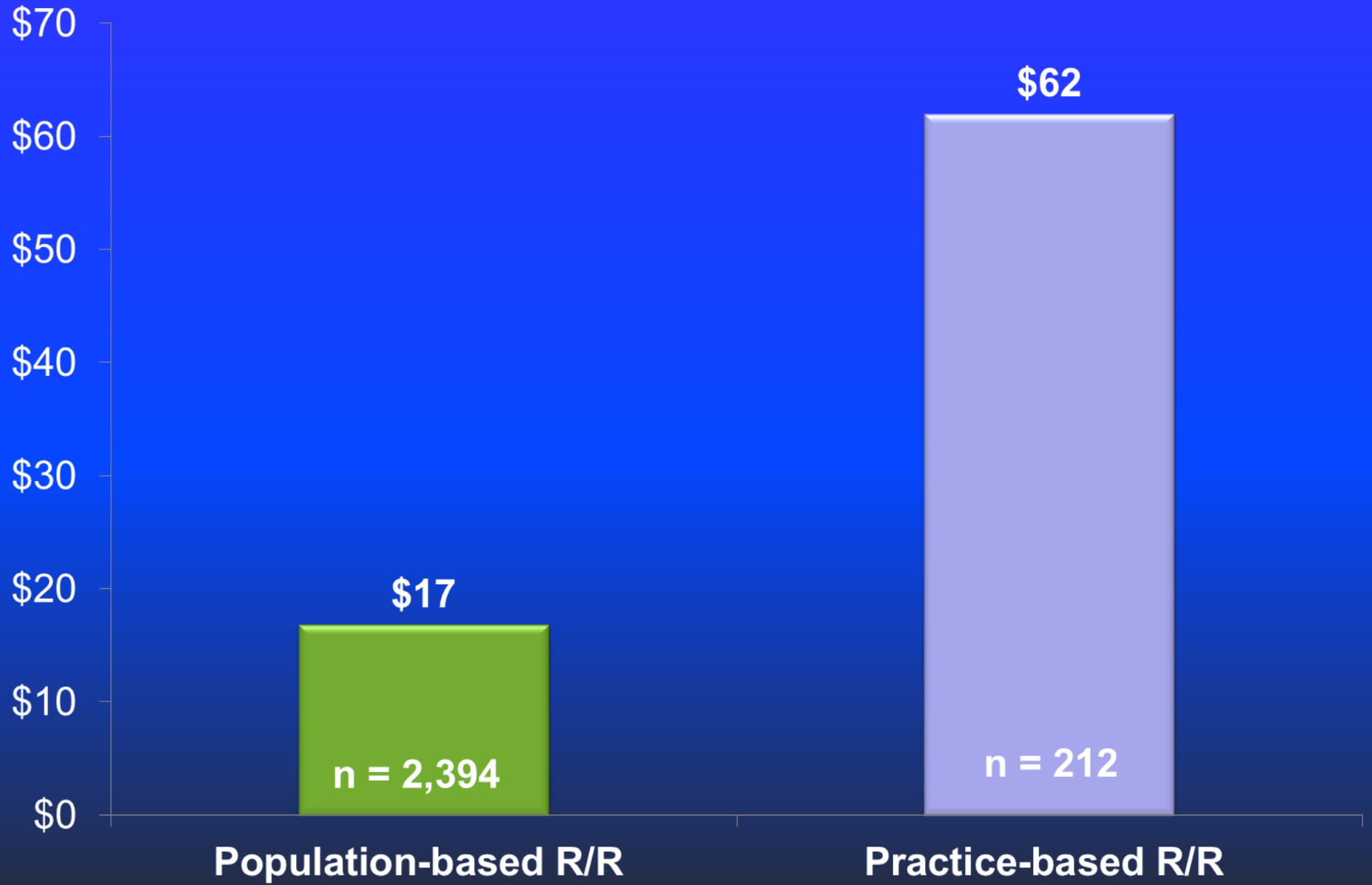
Cost of R/R Per Child who Received ≥ 1 Vaccine



n=4085

n=346

Cost of R/R Per Child Brought Up-to-Date



Limitations

- Population impossible to accurately denominate in all counties—but same method of approximation used in both intervention arms
- Population-based R/R hampered by many inaccurate addresses from vital statistics
- Practices may have conducted R/R after the 6 month period of F/U despite incentives
- Costs were based on personnel report, rather than direct observation

Conclusions

- Both practice-based and population-based R/R effective—practice-based slightly more effective when practices participated
- Overall, at a county level population-based R/R was more effective than practice-based R/R because of lack of participation of practices even when incentives provided
- Costs per practice or per child vaccinated were much lower for population-based R/R

Implications

- Centralized population-based R/R conducted by Public Health Departments more effective and less costly alternative to practice-based R/R
- Optimal approach might involve collaboration between practices and public health
 - R/R notices could appear to come from practice and public health department
 - Could be less costly if practices helped in updating of addresses
- More information needed regarding acceptability from practices' and patients' perspectives

Study Team

University of Colorado Denver

Principal Investigator – Allison Kempe, MD, MPH

- Alison Saville, MSPH, MSW
- L. Miriam Dickinson, PhD
- Brenda Beaty, MSPH
- Sheri Eisert, PhD
- Karen Albright, PhD
- Eva Dibert, MHA
- Vicky Koehler, MPH

CDPHE & CIIS Collaborators

- Ned Calonge, MD
- Diana Herrero, MS
- Joni Reynolds, RN, MSN

Funding

Study supported by a Challenge Grant from
the National Institutes of Health

(Award Number RC1LM01513 from the
National Library of Medicine)

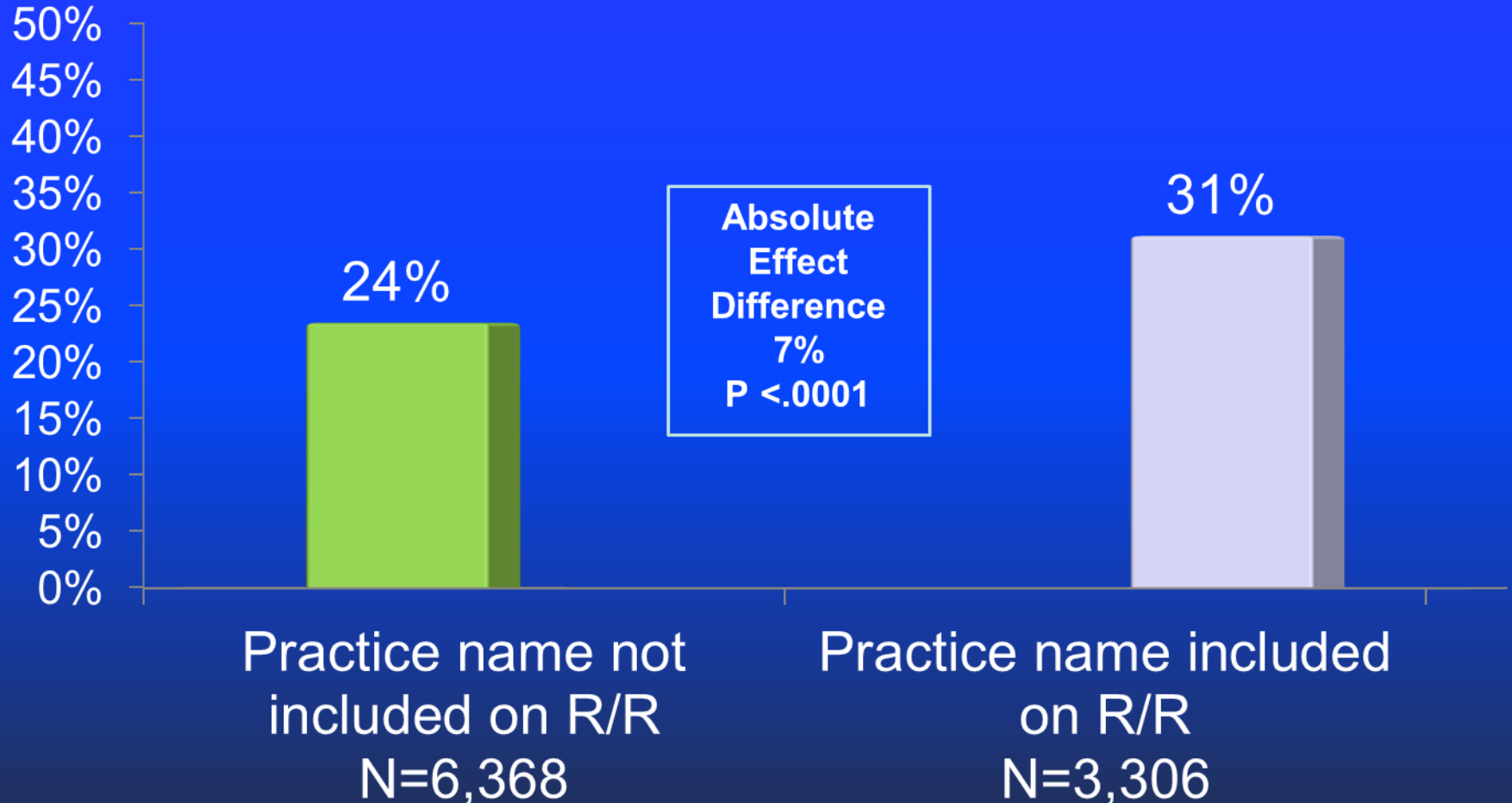
The content is solely the responsibility of the
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**DOES PRACTICE
“ENDORSEMENT” OF
POPULATION-BASED R/R
INCREASE EFFECTIVENESS?**

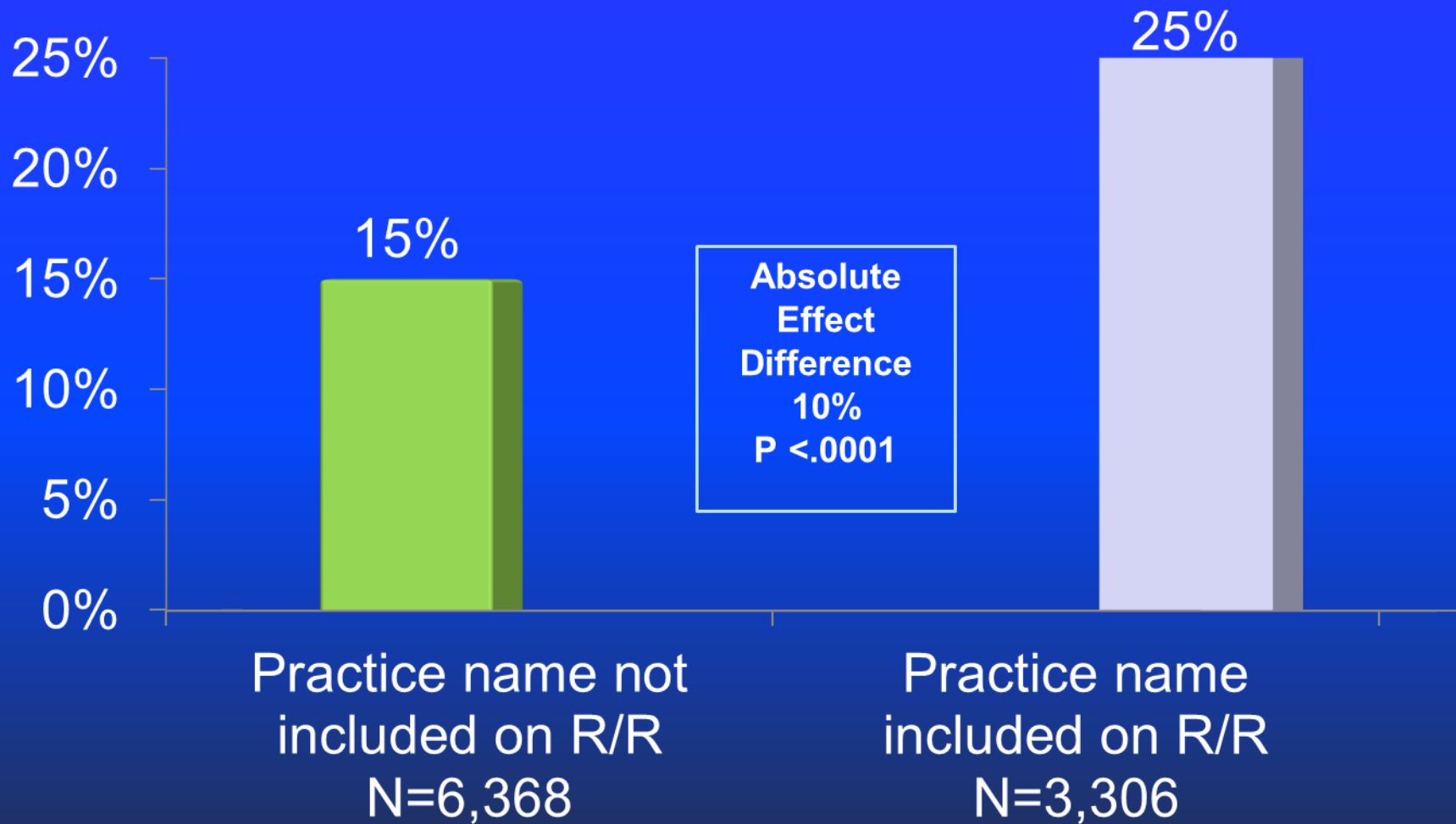
Methods: Intervention Strategies

- Population-based recall counties:
 - Centralized recall effort conducted by State/County Public Health Departments September-November, 2012
 - R/R notices printed with county health department logos and private physician information if practice opts-in
 - R/R methodology same as recommended in practice-based counties

Subanalysis of Population-based R/R (2012) Percent Receiving Any Vaccine



Subanalysis of Population-based R/R (2012) Percent Brought UTD



Let's talk
amongst
ourselves.....

Discuss.....



Commentary



Research:

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Public Health Practice:

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Questions and Discussion

Archives of all Webinars available at:

<http://www.publichealthsystems.org/phssr-research-progress-webinars>

Upcoming PHSSR Research in Progress Webinars February 2015

Wednesday, February 11 (12-1pm ET)

***Cross-Jurisdictional Shared Service Arrangements in Local Public Health:
Research in Progress***

Susan Zahner, MPH, DrPH, University of Wisconsin-Madison

Kusuma Madamala, PhD, MPH, Public Health Systems Consultant and Faculty Associate

Thursday, February 19 (1-2pm ET)

***Identifying & Learning from Positive Deviant Local Public Health
Departments in Maternal and Child Health***

Tamar A. Klaiman, PhD, MPH, University of the Sciences, Philadelphia

Upcoming PHSSR Research in Progress Webinars

March 2015

Wednesday, March 4 (12-1pm ET)

Leveraging Electronic Health Records for Public Health:

From Automated Disease Reporting to Developing Population Health Indicators

Brian Dixon, PhD, Indiana University

Wednesday, March 11 (12-1pm ET)

Evaluating the Quality, Usability, and Fitness of Open Data for Public Health Research

Erika G. Martin, PhD, MPH, State University of New York- Albany

Thursday, March 19 (1-2pm ET)

Cross-sector Collaboration Between Local Public Health and Health Care for Obesity Prevention

Eduardo J. Simoes, MD, University of Missouri and

Katherine A. Stamatakis, PhD, MPH, Washington University in St. Louis

Upcoming PHSSR Research in Progress Webinars

April 2015

Wednesday, April 1 (12-1pm ET)

*Restructuring a State Nutrition Education and Obesity Prevention Program:
Implications of a Local Health Department Model*

Helen W. Wu, PhD, U. California Davis

Wednesday, April 8 (12-1pm ET)

*Public Health Services Cost Studies: Tobacco Prevention, Mandated Public Health
Services*

Pauline Thomas, MD, New Jersey Medical School and
Nancy Winterbauer, PhD, East Carolina University

Tuesday and Wednesday, April 21-22

2015 PHSSR KEENELAND CONFERENCE, Lexington, KY

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