



# Estimation of Immunization Coverage Rates Using Immunization Information Systems (IIS) Data

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*California Immunization Coalition Summit 2019*

*Mission Inn, Riverside, California*

*April 9, 2019*





- 19 random digit dialing (RDD) telephone surveys in San Diego County since 1995 to assess immunization coverage rates
- RDD surveys are time consuming and expensive
- Proportion of children aged 4 months through 5 years with  $\geq 2$  IZs in San Diego's IIS increased from **72.5%** in 2013 to **96.5%** in 2016

*Has increased use of the San Diego Immunization Registry (SDIR) since 2013 improved estimation of immunization coverage rates?*

# SAN DIEGO IMMUNIZATION REGISTRY (SDIR)



SDIR 10.10.3.1 - Search Page - FOR AUTHORIZED USE ONLY - Internet Explorer provided by The County of San Diego

https://www.sandiegoimmunizationregistry.org/search/app\_search.jsp

**SDIR** san diego regional immunization registry

**SEARCH** **DEMOGRAPHICS** **IMMUNIZATION** **SCREENINGS** **ACTIVITY LOG** **SAVE** **UTILITY** **LOGOUT**

Admin | Cassandra Ott | County of San Diego - CAIR Program | County of San Diego - CAIR Program

User Admin **RESET**

**ADVANCED SEARCH**

Last  First  Middle  DOB

Mother Maiden  Gender  Med Rec # starts with  **SEARCH**

- Reporting to an immunization registry is voluntary in California
  - Mandatory for pharmacies as of August 2016
- Estimate ~75% of providers in San Diego County report to SDIR
  - Continues to increase with Meaningful Use/Promoting Interoperability
- ~ 4 million total records & ~ 36 million shots as of January 2019

# METHOD OVERVIEW



LIVE WELL  
SAN DIEGO

- Target population: children 19-35 months of age
- Compare SDIR to last two RDD surveys
- SDIR data downloaded Jan. 2019
- Obstacles
  - Retrospective analysis: best “snapshot”?
  - More records in SDIR than children living in San Diego County
  - Not capturing all immunizations



- Modelled after the National Immunization Survey (NIS)
- Landline and cell phone numbers
- 19-35 months, 11-17 years,  $\geq 18$  years of age
- Verified child and adolescent records with provider
- Survey weights



## INCLUSION CRITERIA

- All records for children with at least one DOB in range
- 19-35 months of age as of the mid-point of the last two RDD surveys
  - May 25, 2013
  - Dec. 17, 2016
- Valid, invalid, booster, and historical doses



## EXCLUSION CRITERIA

- Children known to be living out of the county
- Demographic records entered after the assessment date
- “Fake” records (e.g., Mickey Mouse, TEST)
- Children with selected DOB out of range
- Duplicate doses by vaccine type and vaccination date

# IIS CALCULATION METHODS: TWO TYPES



All individuals



IIS usage trends (performance)



All records (demographic & immunizations) in SDIR as of the assessment date



Method **A**

Most likely target population



“True” coverage rates?



Subset of records in SDIR as of the assessment date and/or additional data entry



E.g. exclude likely duplicate records and/or inactive records



Methods **B & C**



# COVERAGE RATES: SELECTED METHODS



**A**

All immunizations administered and entered in SDIR before the evaluation date

**B**

All immunizations administered before the evaluation date irrespective of the date of entry

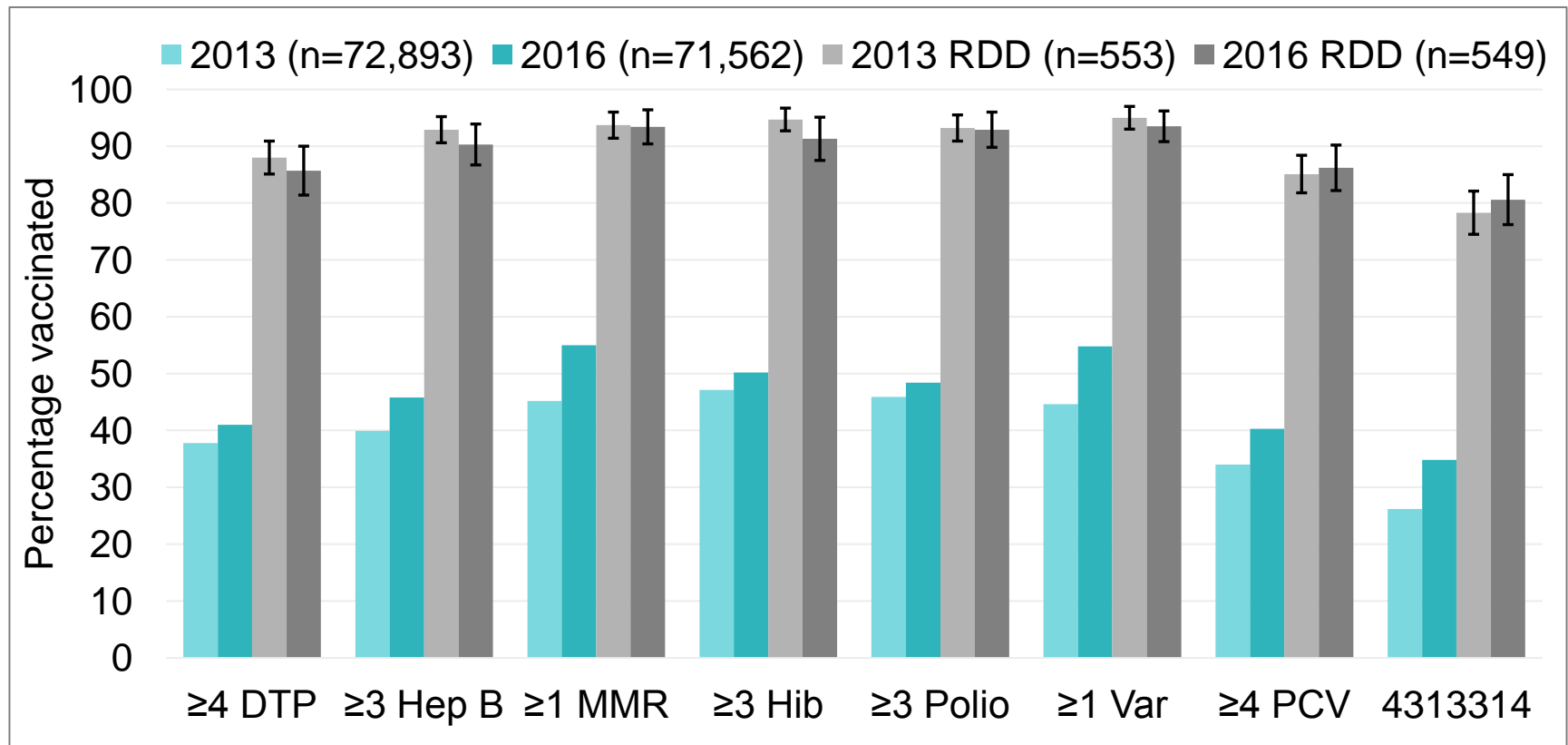
**C**

Children with  $\geq 2$  immunizations, IG, or antitoxin administered before the evaluation date irrespective of the date of entry

# PERFORMANCE



**Method A.** All immunizations administered and entered in SDIR before the evaluation date



→ **Conclusion:** increased use of SDIR since 2013



## Method A (all children)

**Pro:** increased rates over time = IIS improving

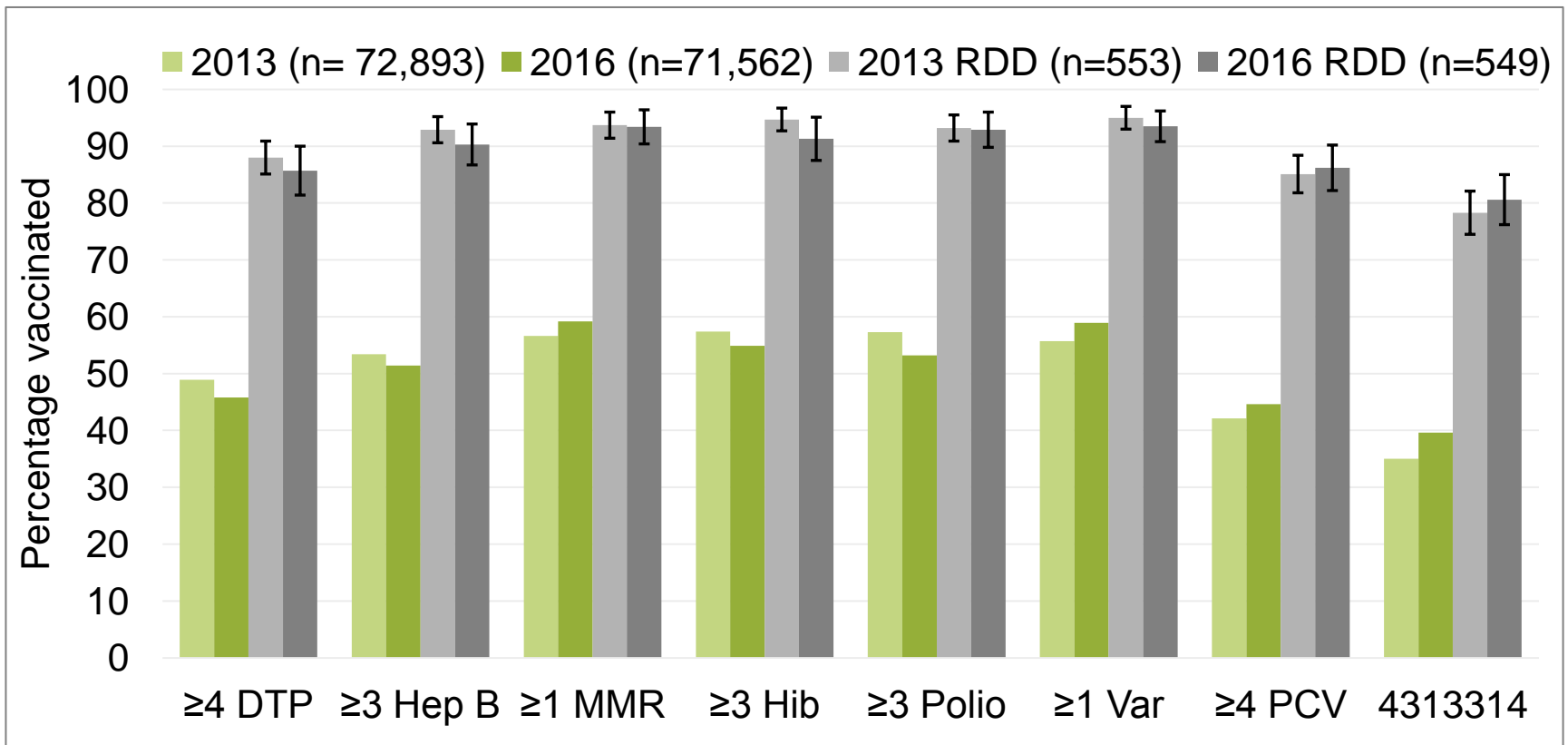
**Cons:**

- Overestimate denominator
- Severely underestimate rates

# “TRUE” COVERAGE RATES?



**Method B.** All immunizations administered before the evaluation date irrespective of the date of entry



→ **Conclusion:** increased coverage, but still underestimating true rates



## Method B (A + irrespective of IZ data entry)

**Pro:** capturing more vaccines than were actually received

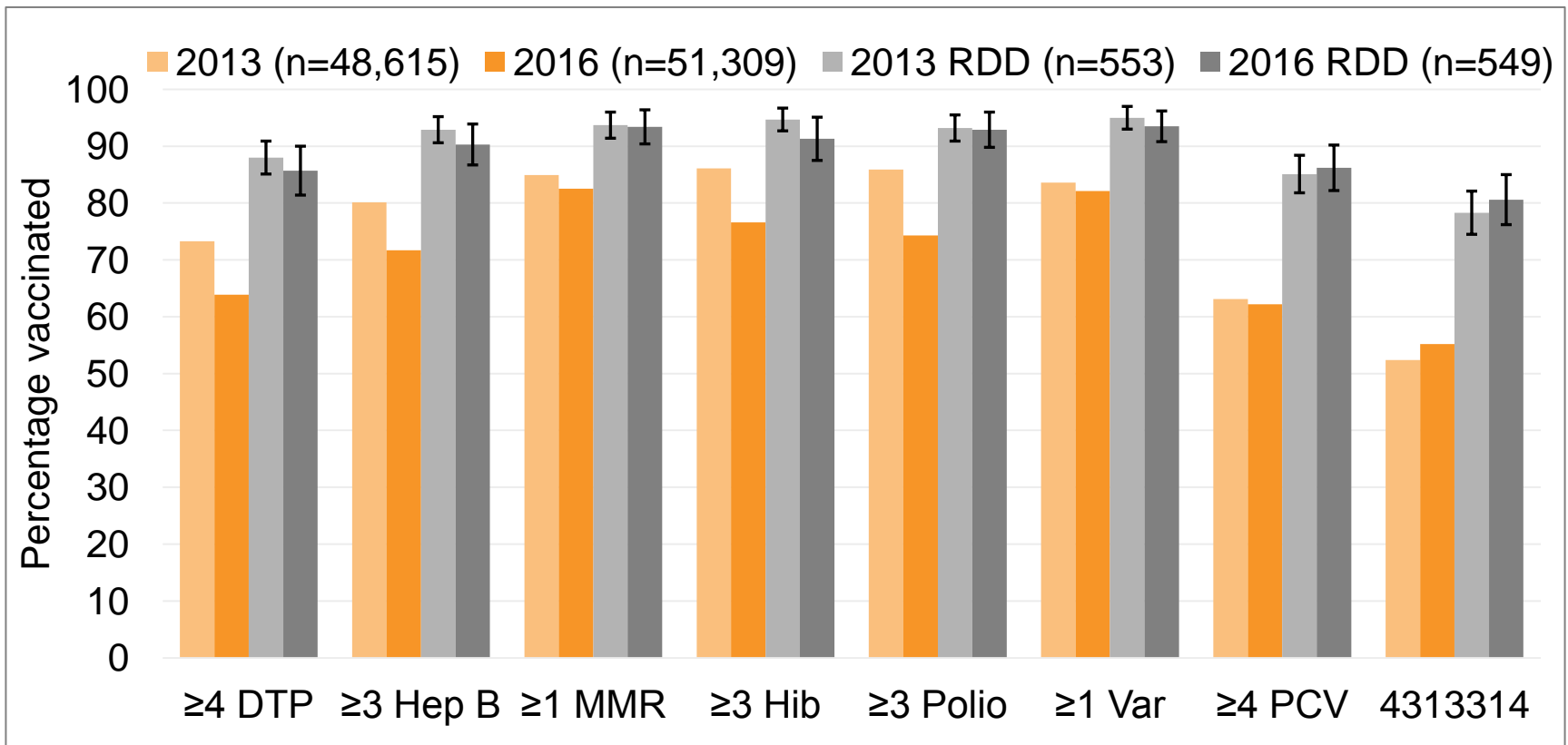
**Cons:**

- Can't compare trend over time
  - Differences could be due to unequal time for data entry
  - Can't say it's a change in vaccination practices
- Overestimate denominator
- Currently underestimating true coverage rate

# “TRUE” COVERAGE RATES?



**Method C.** Children with  $\geq 2$  immunizations, IG, or antitoxin administered before the evaluation date irrespective of the date of entry



→ **Conclusion:** best coverage, but still underestimating true rates



## Method C (B + only children with $\geq 2$ IZ, IG, or antitoxin)

### Pros:

- Excludes likely inactive records
- Closest to “true” cross-sectional estimates

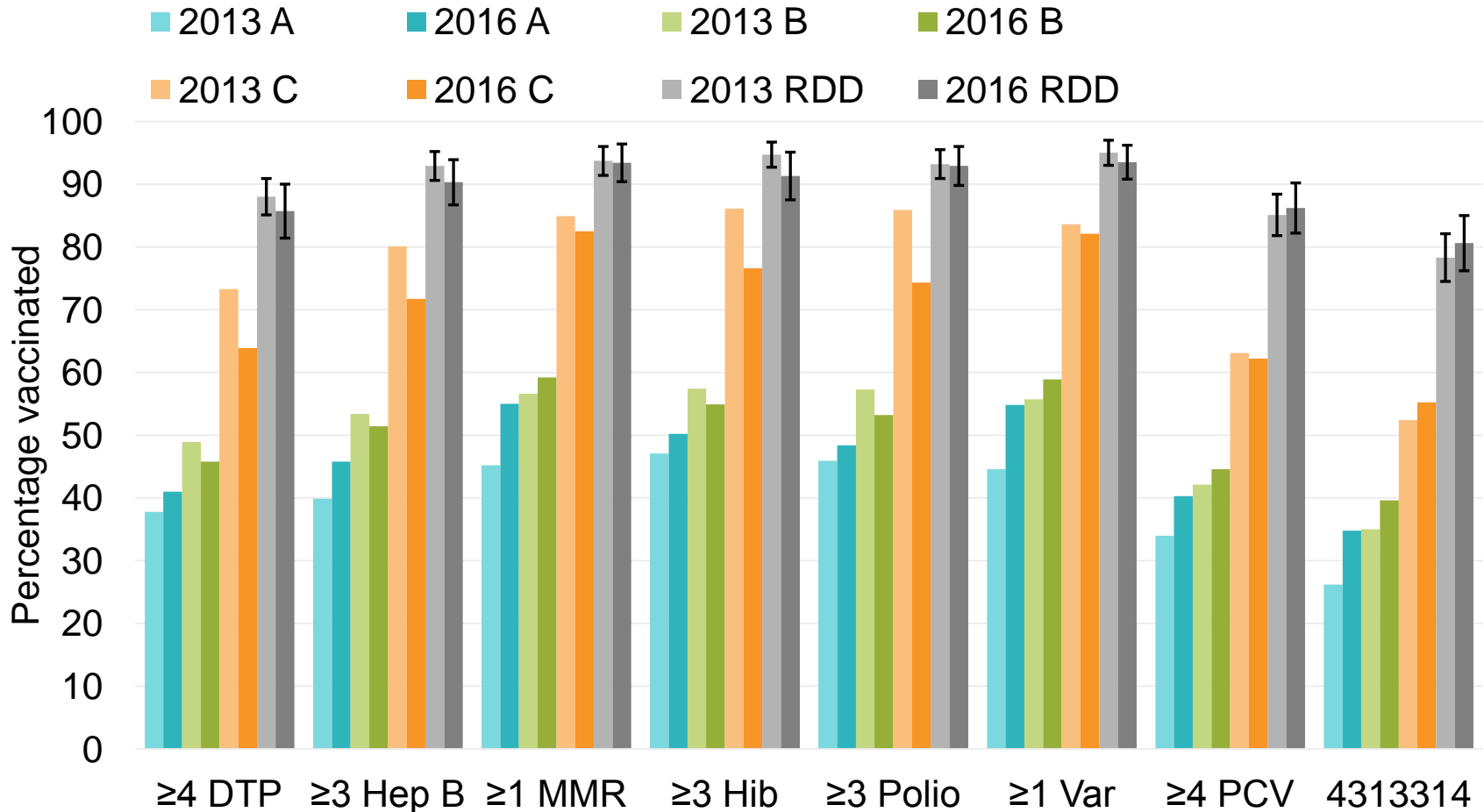
### Cons:

- Can't compare trend over time
- Doesn't include residents without immunizations
- Assumes % without shots (incorrectly excluded) = % unidentified non-residents and duplicate records (incorrectly included)
- Potential to overestimate rate as IIS matures?

# COVERAGE RATES: ALL METHODS



## Immunization coverage rates in SDIR for children 19-35 months of age in San Diego County, CA, 2013-2016

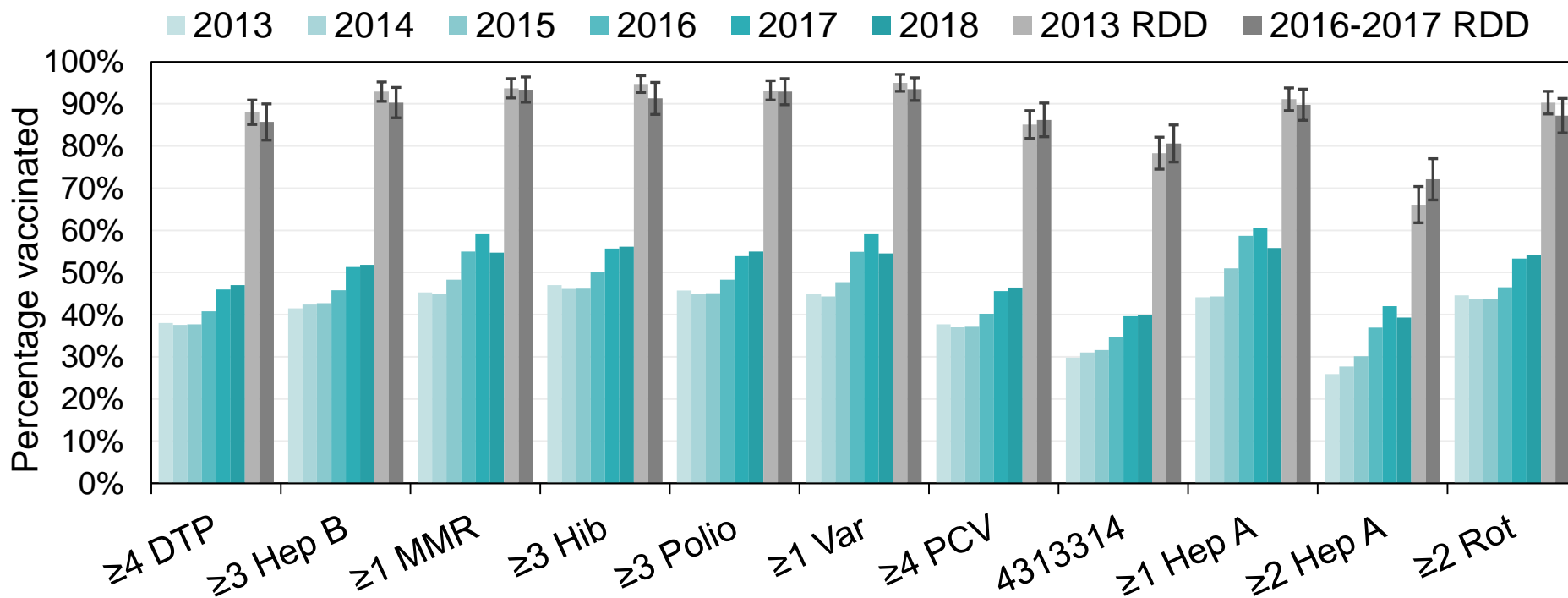




# ADDITIONAL ANALYSIS



**Method A:** all children 19-35 months of age, only demo and IZ records entered in SDIR on or before Dec. 31 of each year 2013-2018



→ **Increased use of SDIR since 2013!**

→ **Not shown:** over 30 alternate methods of calculating rates

→ None produced estimates same as RDD survey

# AREAS FOR IMPROVEMENT



LIVE WELL  
SAN DIEGO

- Exclude deceased at time of assessment
- Exclude inactive records at geographic level
  - Currently SDIR has inactive at provider level
- Better identification & exclusion of inactive and duplicate records
- Characteristics of records with <2 IZs
- Coverage rates by provider and region
- Under/over representation of regions or demo groups in SDIR

# CONCLUSIONS



- Estimating population level immunization coverage rates in IIS's with voluntary reporting is difficult
- All methods currently underestimate coverage rates in San Diego County
- Increased coverage rates since 2013 reflect increased use of SDIR
- We anticipate the trend of better estimates to continue as data quality and completeness increases

# THANK YOU



## SDIZ.ORG

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On May 17, 2016, the County of San Diego Health and Human Services Agency Division of Public Health Services received accreditation from the Public Health Accreditation Board.