

# Impact of Linking an Immunization Information System (IIS) and a School Immunization Compliance Database

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# NYC Citywide Immunization Registry (CIR)

- CIR established in 1997
- Mandatory reporting for children 0 -18 years
- 6.5 million patients; 88 million immunizations
- Pediatric data are complete and timely
  - >90% providers report regularly
  - >90% population capture with immunizations
  - ~96% of immunizations are reported within 30 days of administration

# NYC Citywide Immunization Registry (CIR)

- Reporting methods: Online Registry, flat file (batch), HL7 Web service
- Access methods: Online Registry, HL7 Web service, My Vaccine Record
- HL7 Web service established in 2009
  - > 2,400 facilities report
  - > 1,100 facilities can query and receive evaluated vaccination histories

# NYC Department of Education (DOE)

- Operates NYC public schools, largest system of schools in the United States
  - 1,875 schools with 1.1 million students
- Since 1989 has routinely assessed individual student compliance with immunization requirements
- Compliance is tracked through Automate the Schools (ATS) database
  - Captures immunizations for all students in public school

# ATS Database

- Prior to 2011, school staff manually entered immunizations from paper records submitted by parents and from CIR's Online Registry
- Algorithms calculate immunization completeness
  - Updated yearly to reflect changes in New York State's school vaccination requirements
- Produces compliance reports by school
- In 2011, ATS began querying CIR via Web service

# A Few Examples of Recent Changes in School Entry Requirements

- 2014-15:
  - School requirements more closely aligned with ACIP schedule (# of doses, minimum intervals, minimum ages)
  - 2 doses of varicella for K and 6th (was 1 before)
- 2015-16:
  - 2 doses MMR for K (was 1 before)
- 2016-17:
  - MenACWY for 7<sup>th</sup> and 12th grade (new)

# Objective

- To describe and quantify the impact of linking an IIS to a school immunization compliance database

# Methods: Query and Response

- At the beginning of school year, ATS runs a “compliance” report to identify students who do not meet NYS school requirements
- For non-compliant students, ATS queries CIR
- Throughout the year, ATS continues to query the CIR daily
- School staff can query the CIR for individual students manually
- For every student found, CIR returns all immunizations



# Methods: Merging and Correction

- ATS absorbs only valid CIR immunizations and combines them with existing data
- Compliance algorithm is run again
- Errors: School secretaries can manually fix errors that result from combining immunizations
- School secretaries can add immunizations from paper records brought in by parents

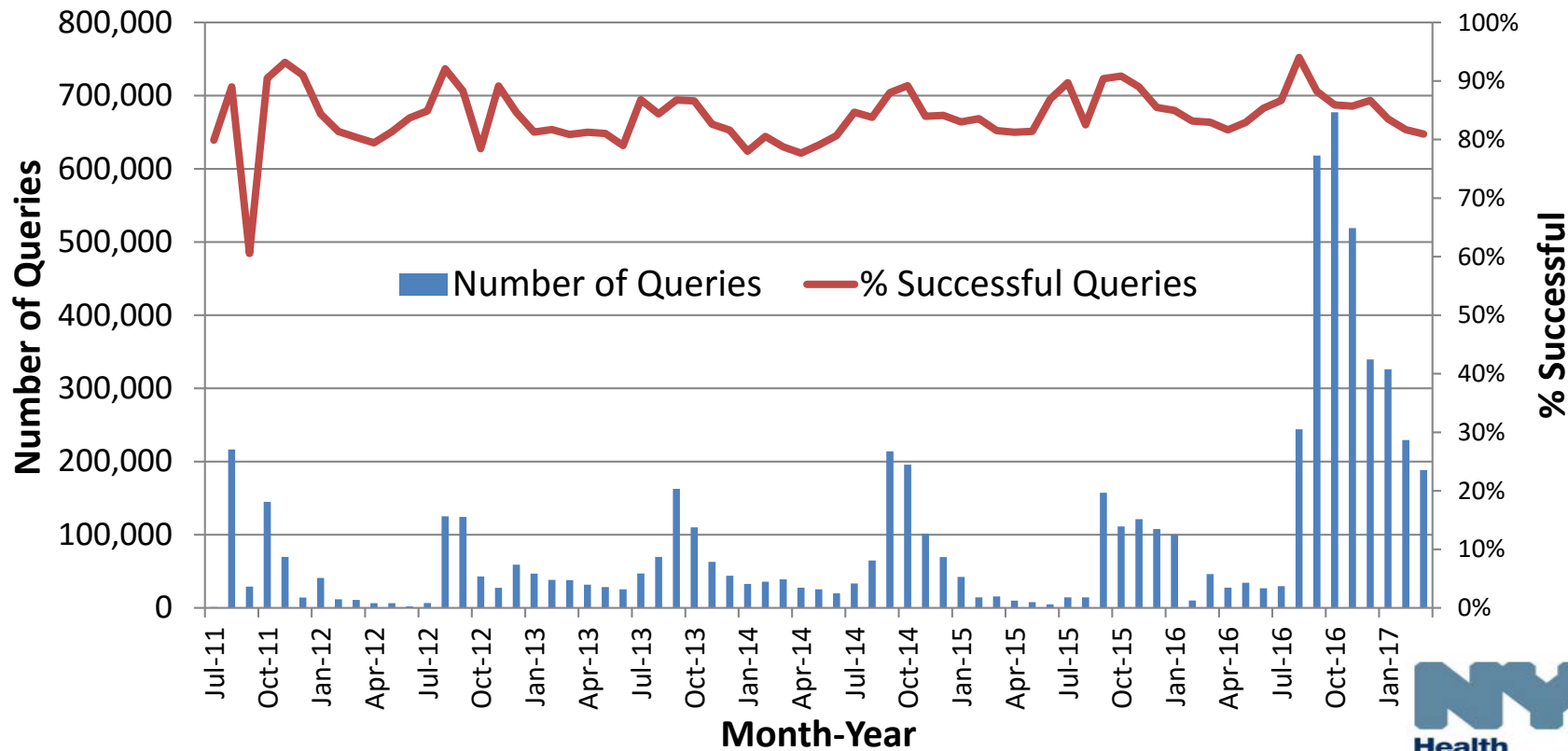
# Results

# Queries by ATS (July 2011-March 2017)

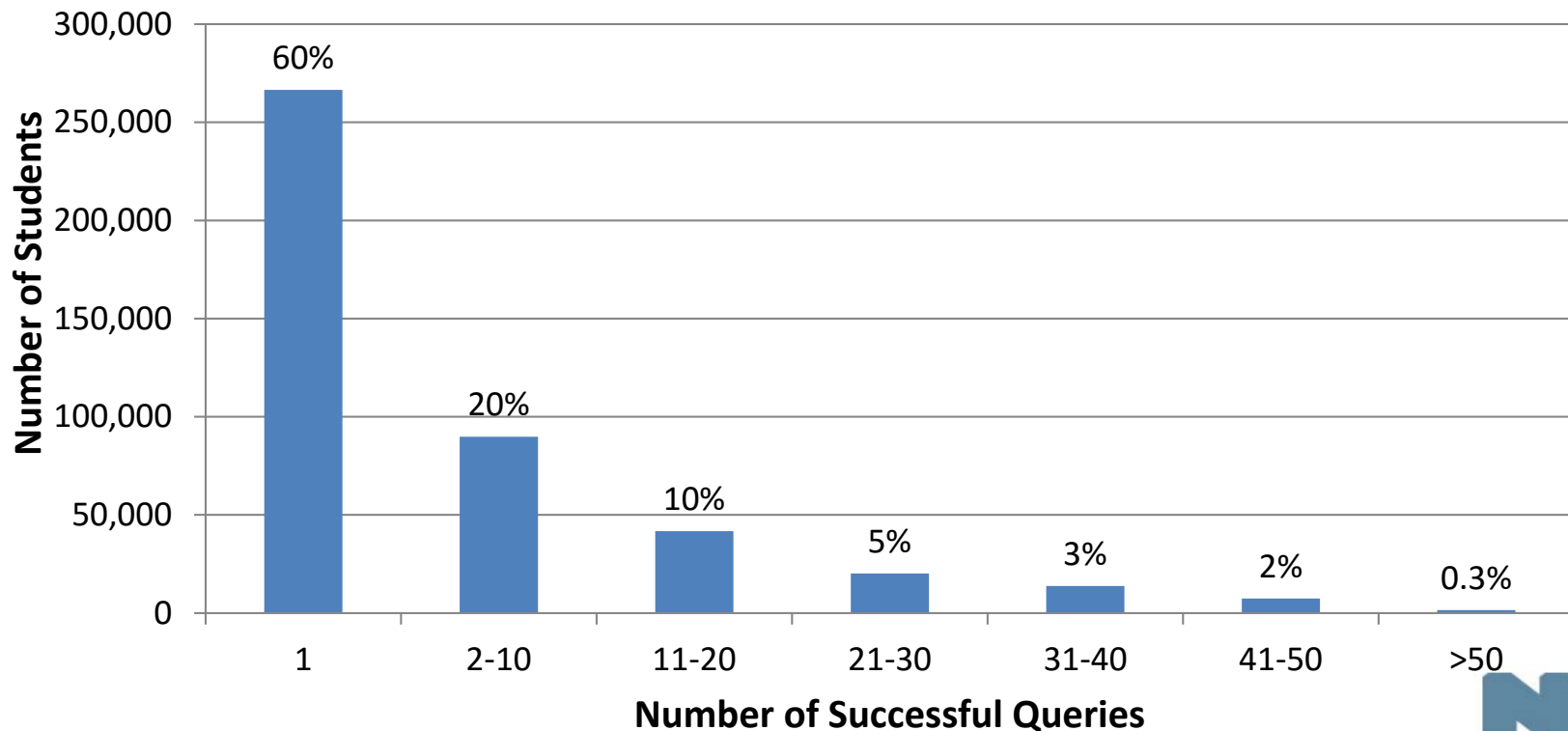
- 6,545,219 queries\* for students' immunization records
- 86% of students were found in the CIR
  - 30,873,972 immunizations were sent to ATS for 1,310,737 students

\*There can be multiple queries for the same student

# ATS Queries over Time (July 2011-March 2017)



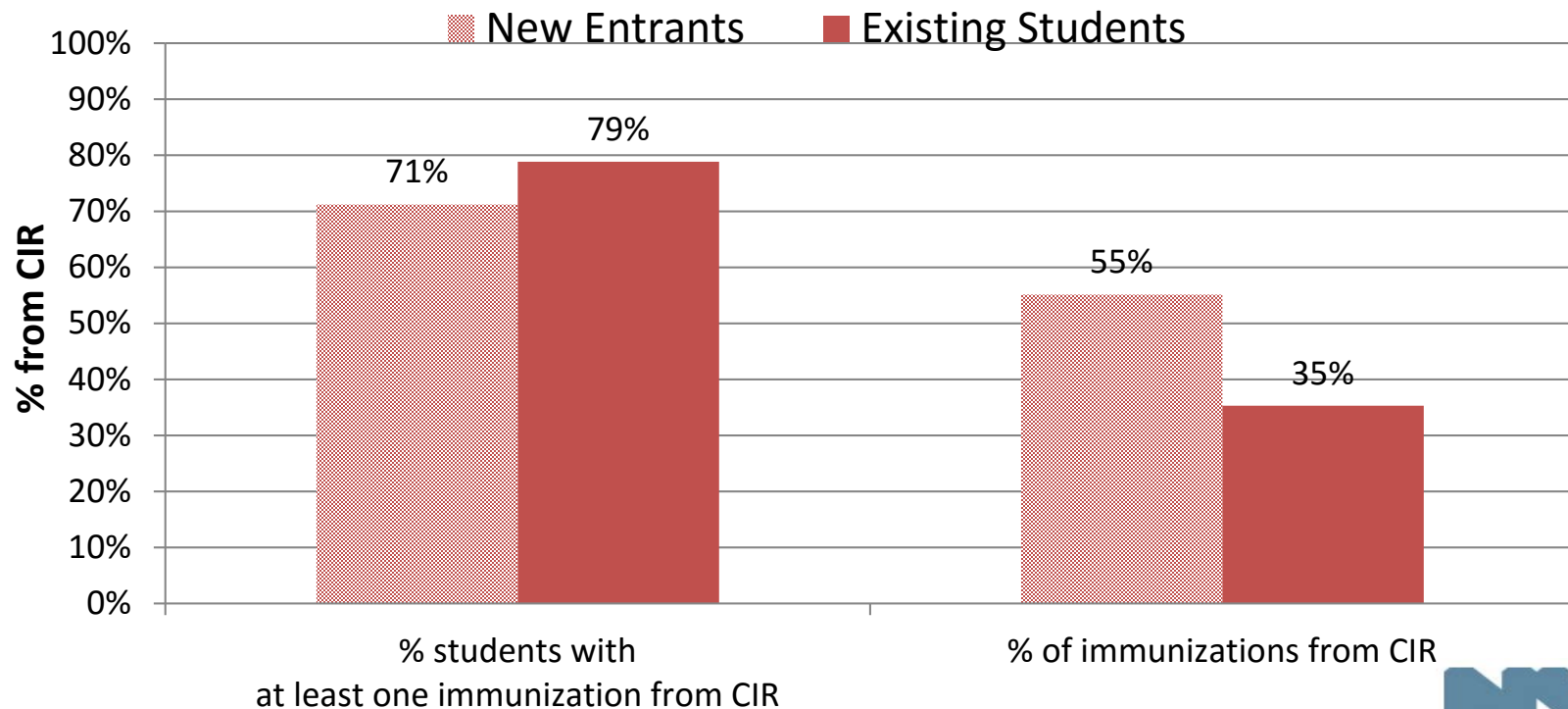
# Number of Times Students were Successfully Queried by ATS (July 2016-March 2017)



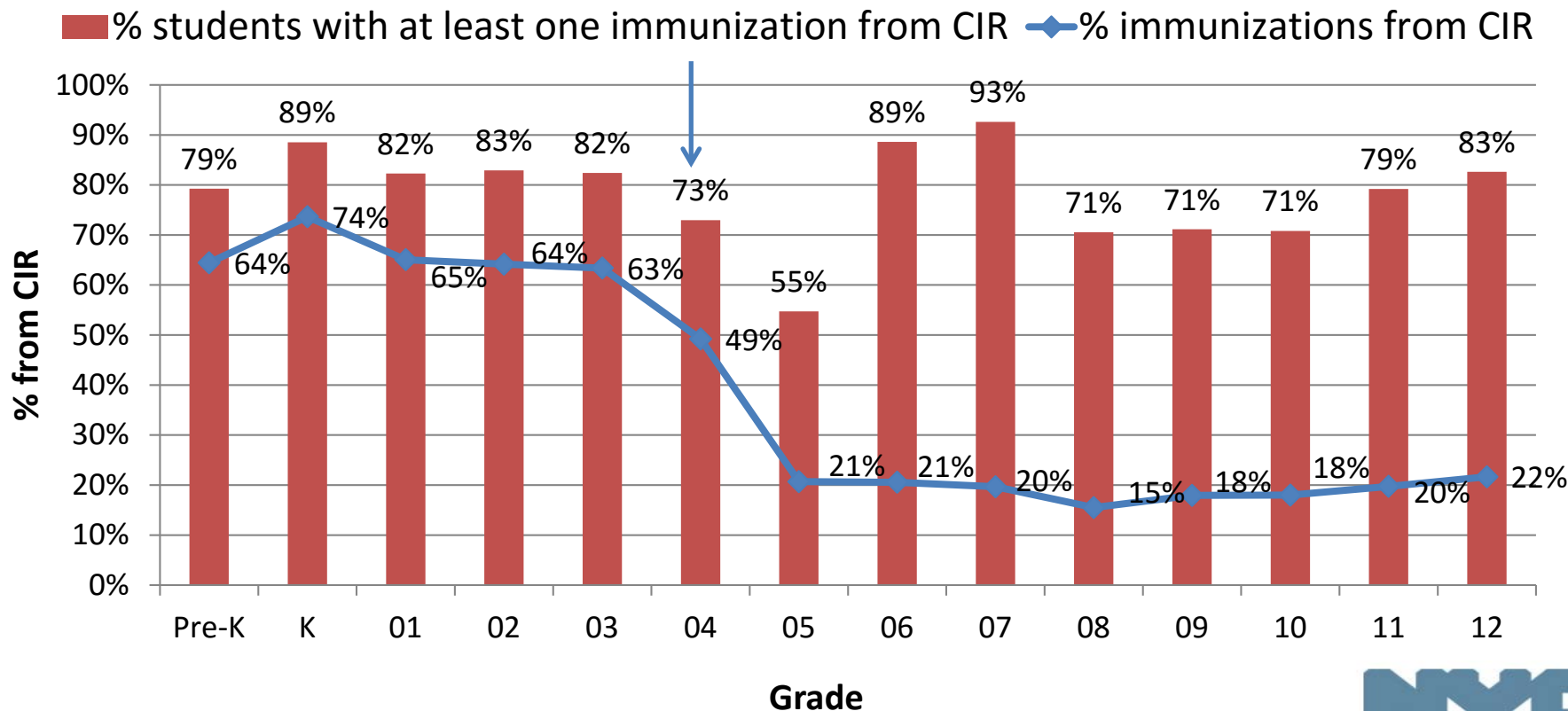
# Overall CIR Contribution to ATS

- Of the 1,096,491 students in public schools in 2016-17 academic year:
  - 858,600 (78%) had at least one immunization from the CIR
- Of a total of 18 million immunizations in ATS, 6.7 million (37%) were imported from the CIR

# CIR Contribution by Student Entry Status (2016-2017)

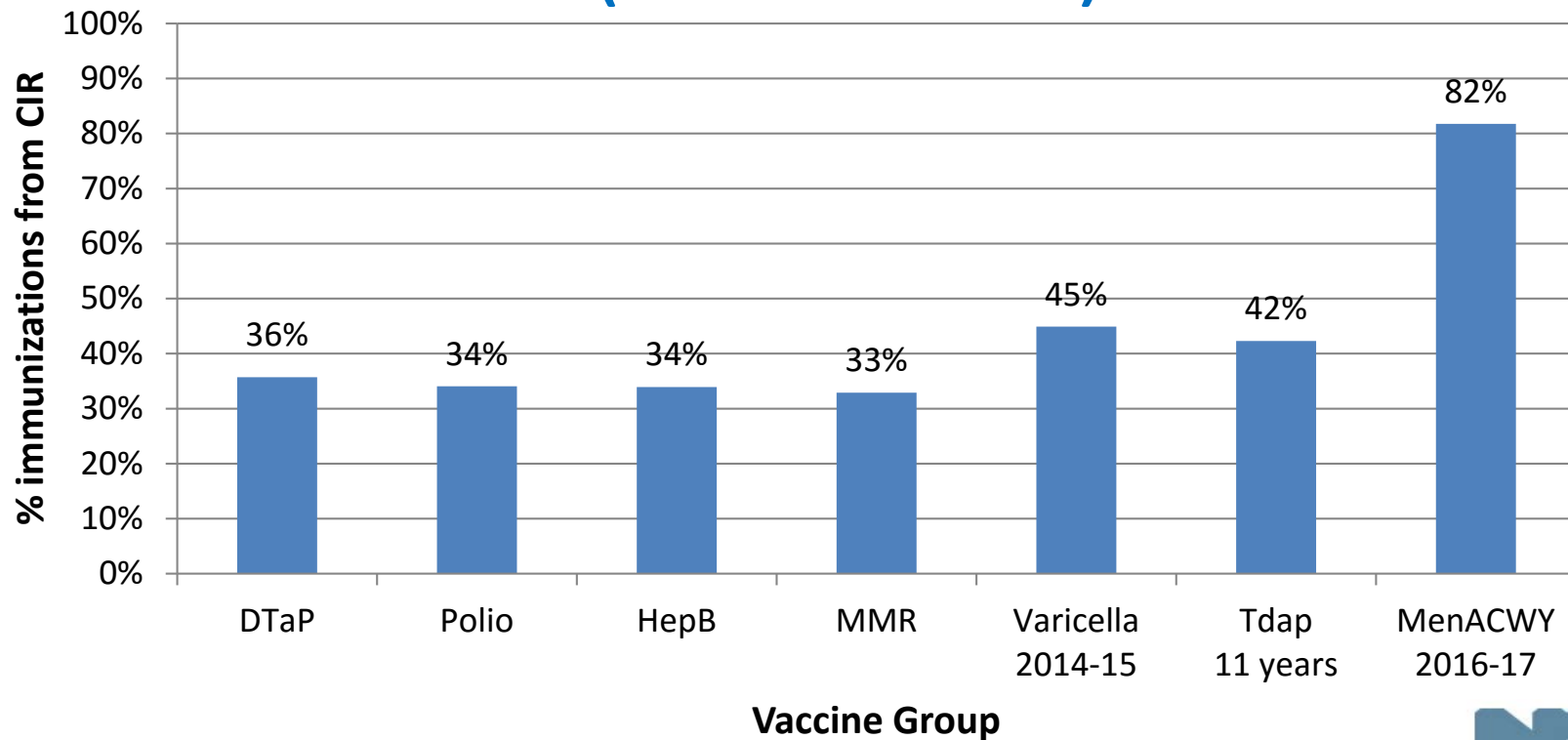


# CIR Contribution by Grade (2016-2017)

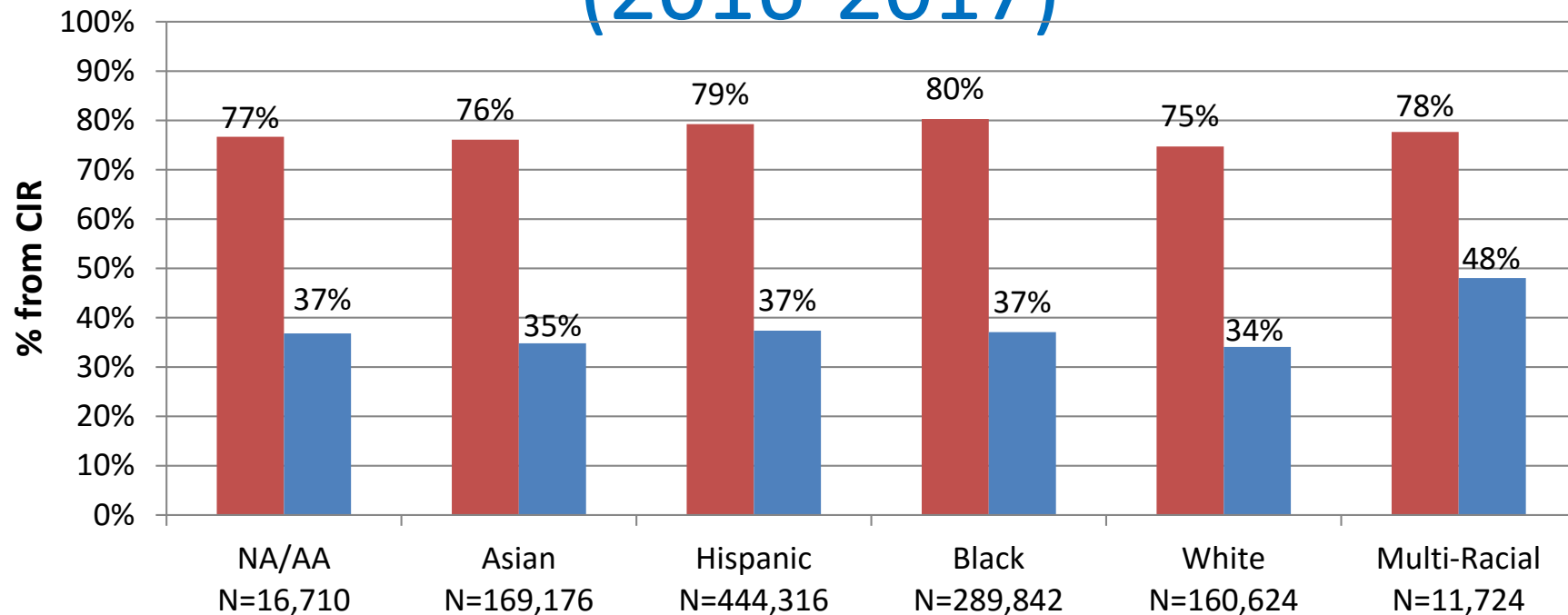




# CIR Contribution by Vaccine Group (2016-2017)

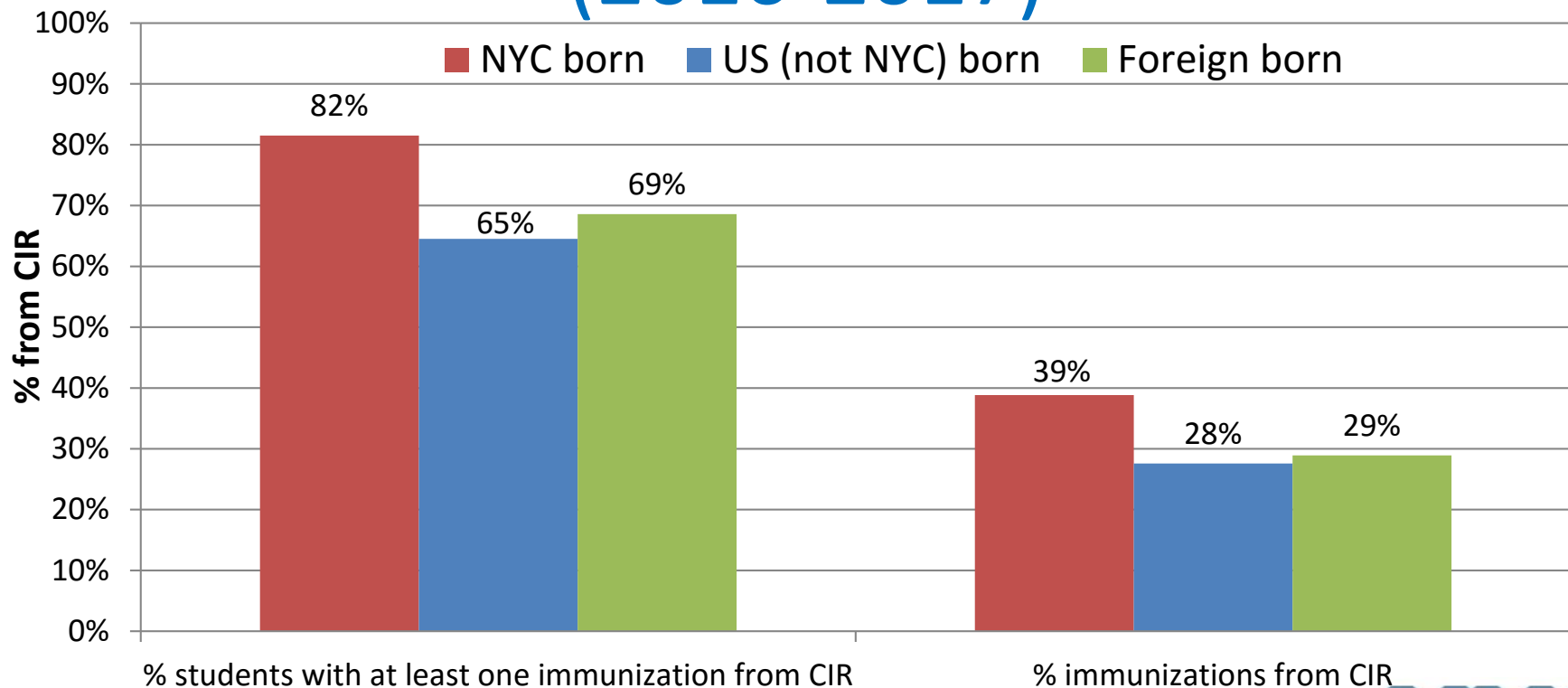


# CIR Contribution by Race/Ethnicity (2016-2017)



■ % students with at least one immunization from CIR  
■ % of immunizations from CIR

# CIR Contribution by Place of Birth (2016-2017)



# Challenges

- Algorithm differences between CIR and ATS, CIR algorithm more complex, follows CDSi
  - Frequent phone calls and queries from ATS staff
  - School secretaries report bugs
- Reconciliation of immunizations challenging for school staff
- CIR cannot obtain immunizations in ATS missing from CIR due to Family Educational Rights and Privacy Act (FERPA)

# Benefits of CIR-ATS linkage

- A large number of students are queried and millions of immunizations imported by ATS: 78% of records were supplemented by immunizations from CIR
  - Saves time for school staff and parents
  - More accurate and timely data
  - CIR indicates validity of doses
- CIR's contribution is higher for lower grades, new entrants, NYC born, new requirements
  - E.g. MenACWY in school year 2016-2017

# Next steps

- Discussions on feasibility of replacing ATS' immunization module with CIR, but some challenges:
  - School staff must be permitted to enter missing immunizations
  - Preliminary ATS analysis shows high data quality
    - More detailed studies are needed
- Evaluate impact of linkage on compliance
- Discussions with DOE on using CIR to evaluate and improve ATS data

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