

Child Health Evaluation
and Research Unit



University of Michigan



University of Michigan
C.S. Mott Children's Hospital

Electronic Health Record (EHR) Interoperability with MCIR

Progress to Date

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October 8, 2013

Background

HL7 messaging with MCIR:

- Pilot testing initiated – December, 2010
- Live production reporting – March 2012

Potential benefits:

- Real time reporting – faster?
- Automatic reporting – more complete?
- Linked to EHR – more accurate?

Objectives

Overall goals

- Assess evidence of changes in reporting to MCIR
- Measure key immunization data quality metrics
 - timeliness, completeness, accuracy
 - identify opportunities for improvement

Approach

- Evaluation sites selected from MCIR practices across several dimensions
 - practice medical specialty
 - EHR vendor
 - method of data transfer pre-HL7
 - geographic area, sub-state HIE affiliation
- Goal: evaluate 200 sites
- Evaluate 180 days pre-/post HL7

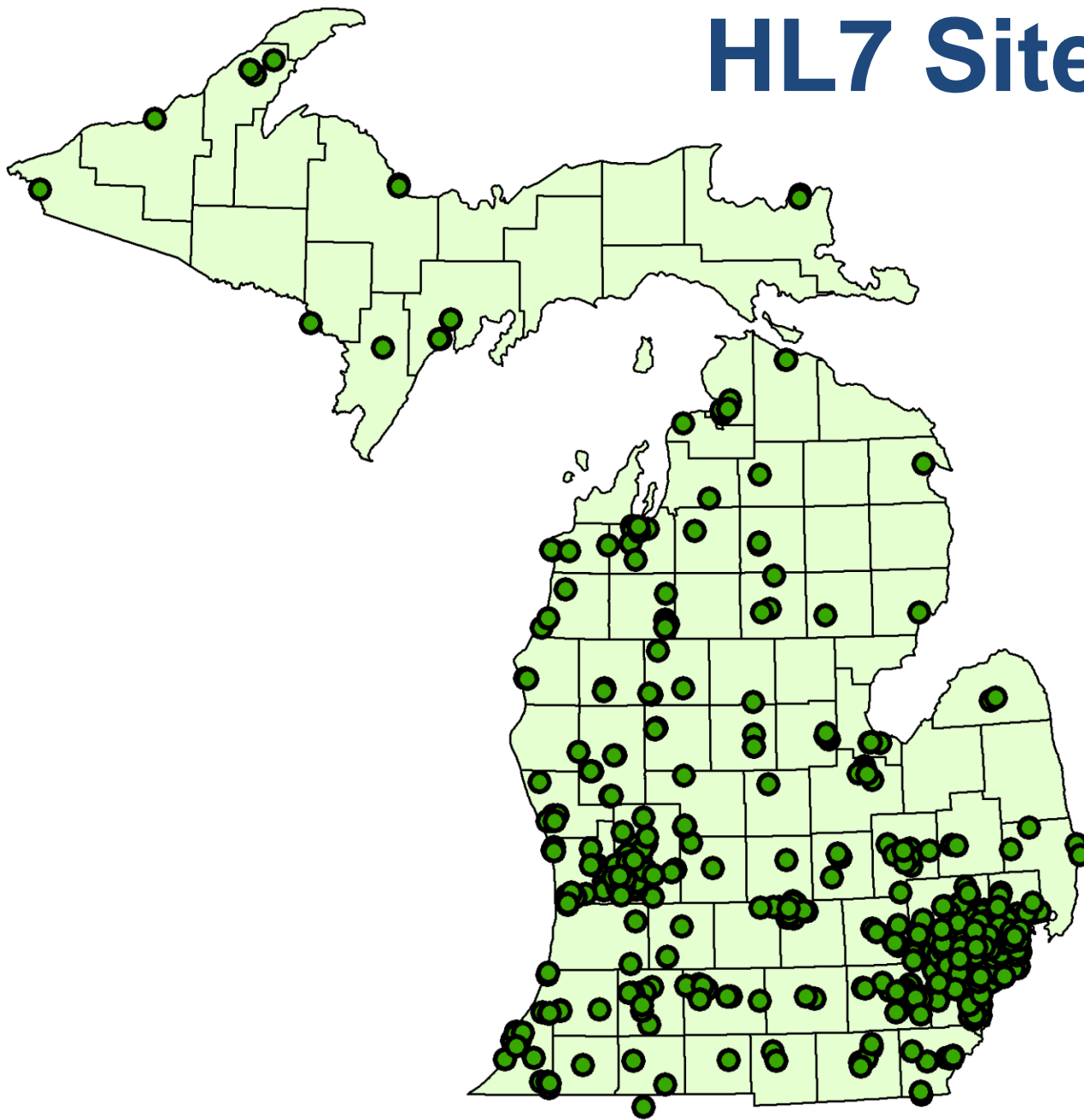
Evaluation Sites

- Based on availability of 6+ months of data post–HL7 “go live” date
- As of August 28, 2013:
 - 84 sites had sufficient post-HL7 data
 - go-live dates range:
5/14/2012 – 2/28/2013

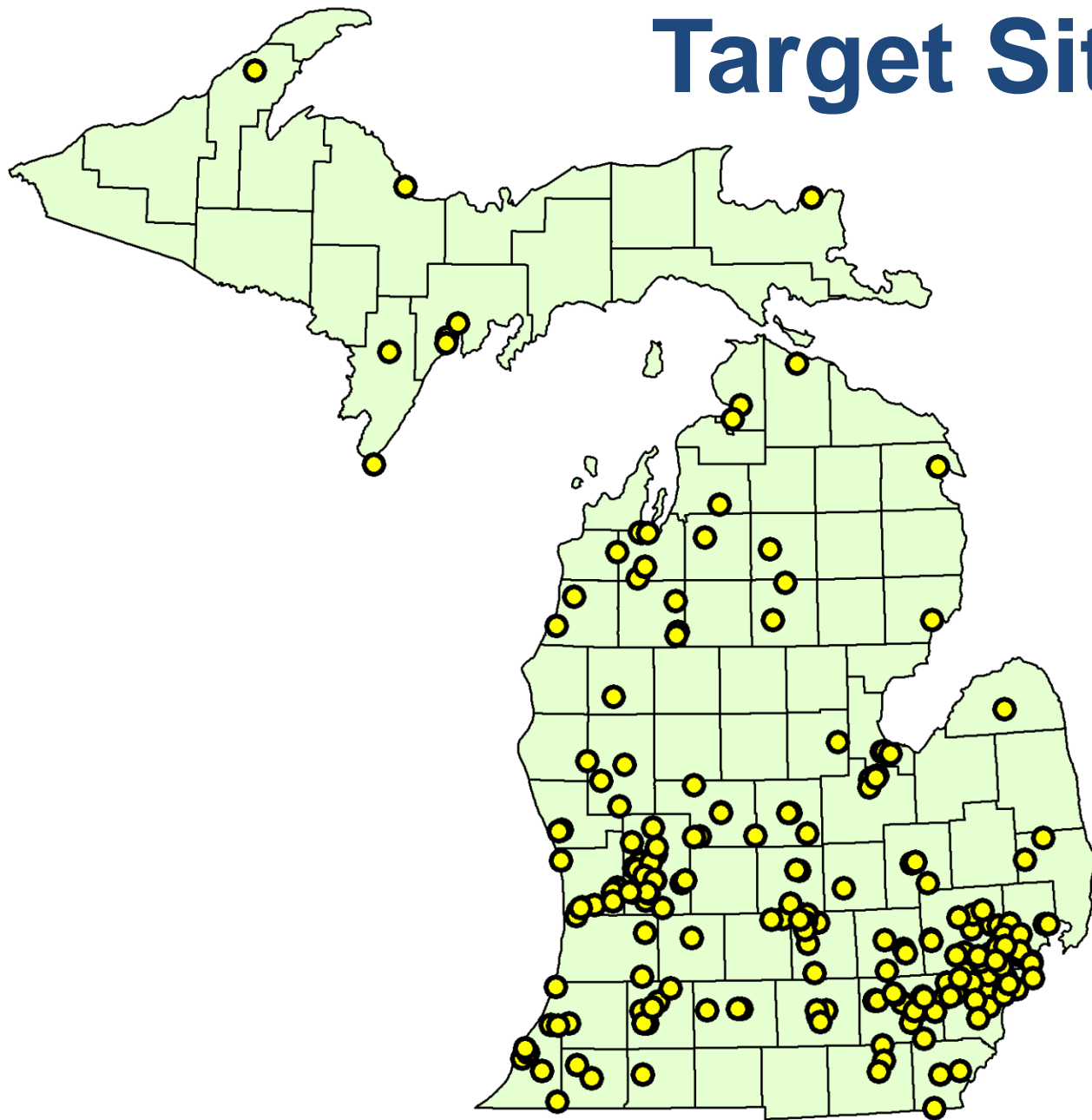
Evaluation Sites

- Categorized based on pre-HL7 method of reporting:
 - Transfer Sites: used electronic file transfer (n=50)
 - Hand Entry Sites: use keyboard data entry (n=34)

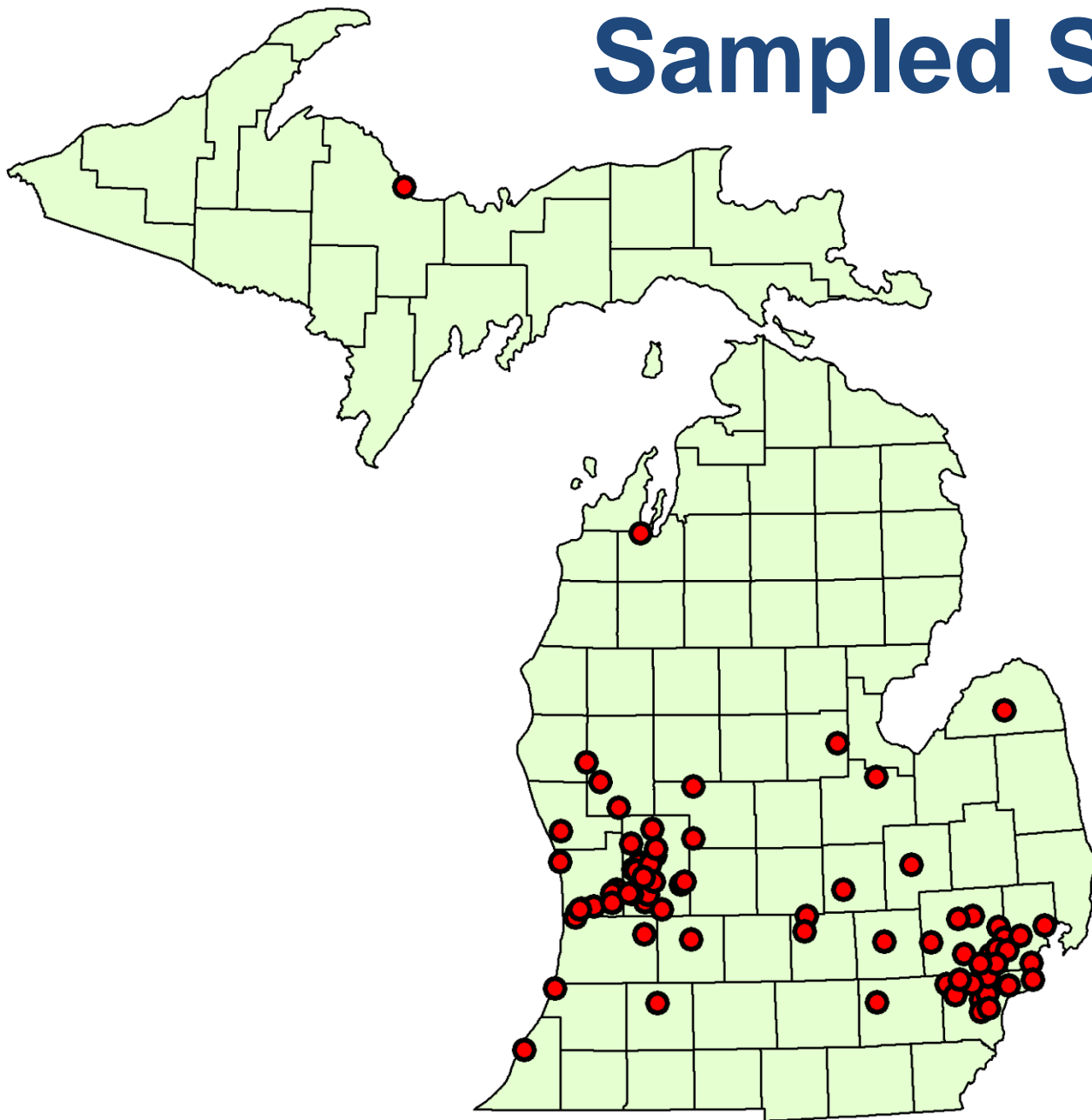
HL7 Sites



Target Sites



Sampled Sites



Approach

- Data Quality Reports
 - evaluate timeliness, completeness, accuracy
 - based on methods developed by Nathan Bunker
- Contact information
 - assess address, patient, responsible party modifications

A diagram on a dark blue background. A vertical yellow line runs from the bottom to the top. At the bottom of the line is the text "Go Live Date". To the left of the line, there is a yellow arrow pointing left, containing the text "Pre-HL7 Time Period (180 days)". To the right of the line, there is a yellow arrow pointing right, containing the text "Post-HL7 Time Period (180 days)".

Pre-HL7 Time Period
(180 days)

Post-HL7 Time Period
(180 days)

Go Live Date

Pre-HL7 Time Period
(180 days)

Post-HL7 Time Period
(180 days)

Data Quality Report

- Timeliness
- Accuracy
- Completeness

Go Live Date

Pre-HL7 Time Period
(180 days)

Post-HL7 Time Period
(180 days)

Data Quality Report

- Timeliness
- Accuracy
- Completeness

Data Quality Report

- Timeliness
- Accuracy
- Completeness

Contact Information

- Address
- Patient
- Responsible Party

Go Live Date



Patient Fields

	<u>Required</u>
Patient ID	✓
First Name	✓
Last Name	✓
Birth Date	✓
Sex Code	✓
Address	✓
Street	✓
City	✓
State	✓
Zip	✓
Middle Name	
Phone Number	
Mother's Maiden Name	

Patient Fields

	<u>Required</u>	<u>Expected</u>
Patient ID	✓	
First Name	✓	
Last Name	✓	
Birth Date	✓	
Sex Code	✓	
Address	✓	
Street	✓	
City	✓	
State	✓	
Zip	✓	
Middle Name		✓
Phone Number		✓
Mother's Maiden Name		✓

Vaccine Fields

	<u>Required</u>
Administration Date	✓
Vaccine Code	✓
Lot_Tx	
Lot Nbr	
Lot ID	
MFR Code	
VFC Code	

Vaccine Fields

	<u>Required</u>	<u>Expected</u>
Administration Date	✓	
Vaccine Code	✓	
Lot_Tx		✓
Lot Nbr		✓
Lot ID		✓
MFR Code		✓
VFC Code		✓

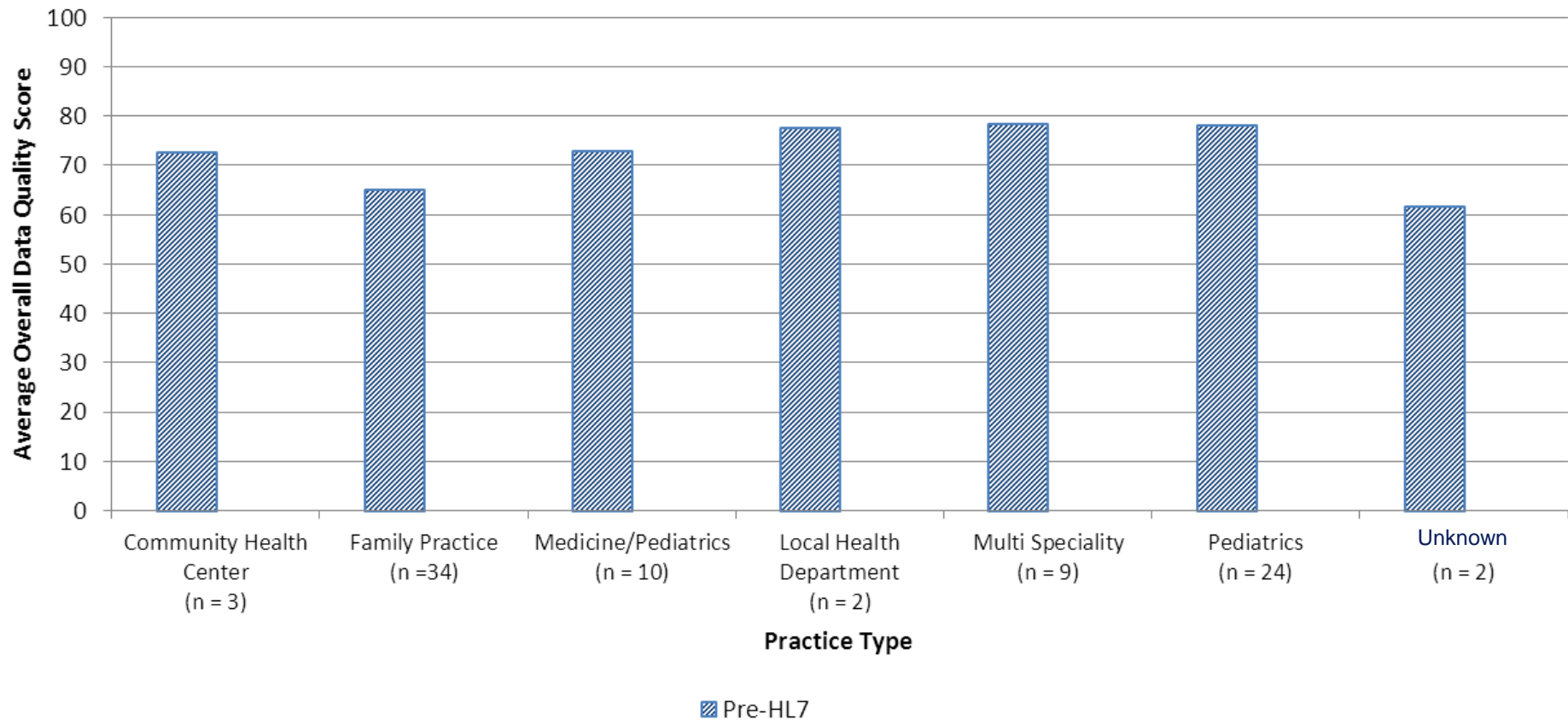
Vaccine Group Fields

	<u>Required</u>	<u>Expected</u>
DTaP		✓
Hep B		✓
Polio		✓
Hib		✓
Influenza		✓
MMR		✓
Varicella		✓
PCV		✓

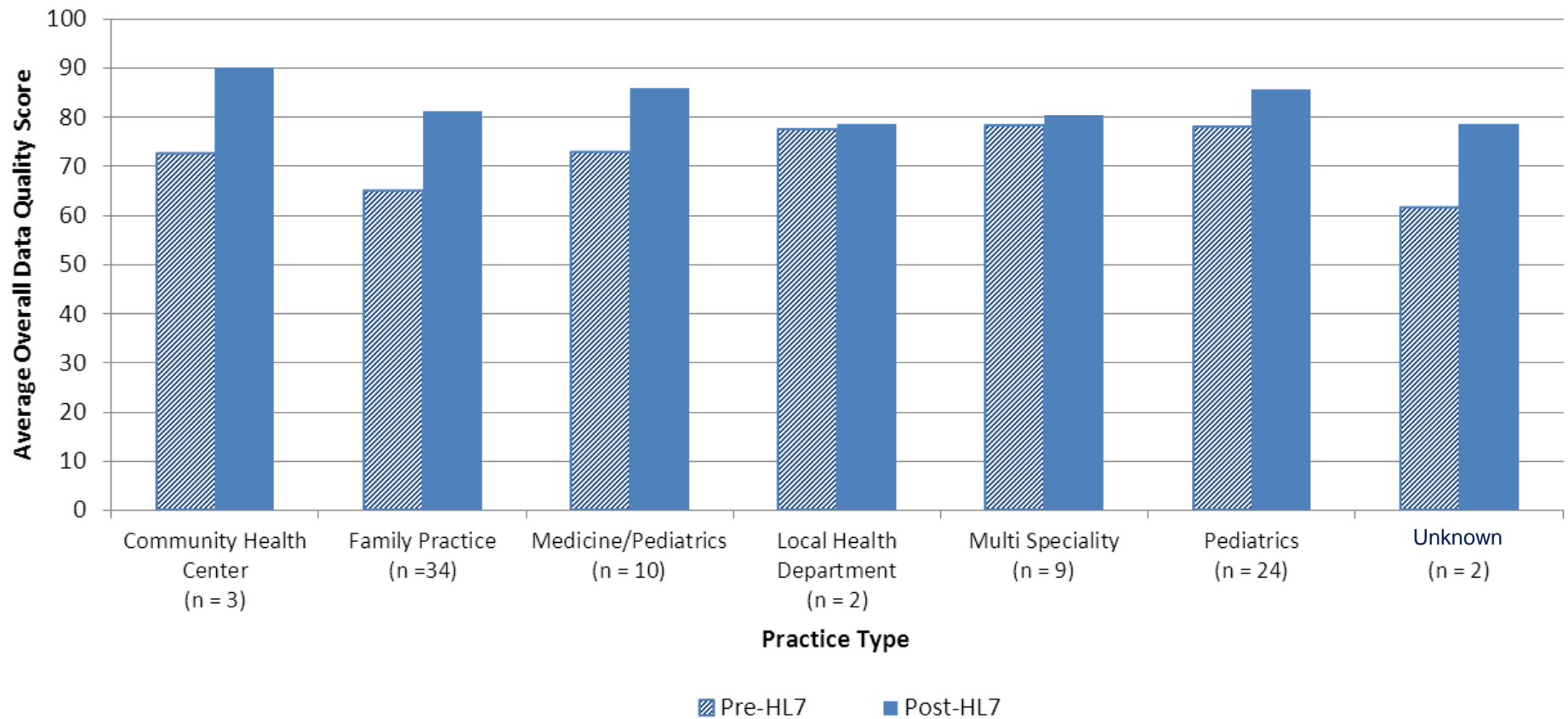
Preliminary Results

- DQA results summarized by various site characteristics, including:
 - practice type
 - pre-HL7 data entry method
 - EHR vendor
 - HIE affiliation

Overall Data Quality Score 180 Days Pre-/Post-HL7 n = 84



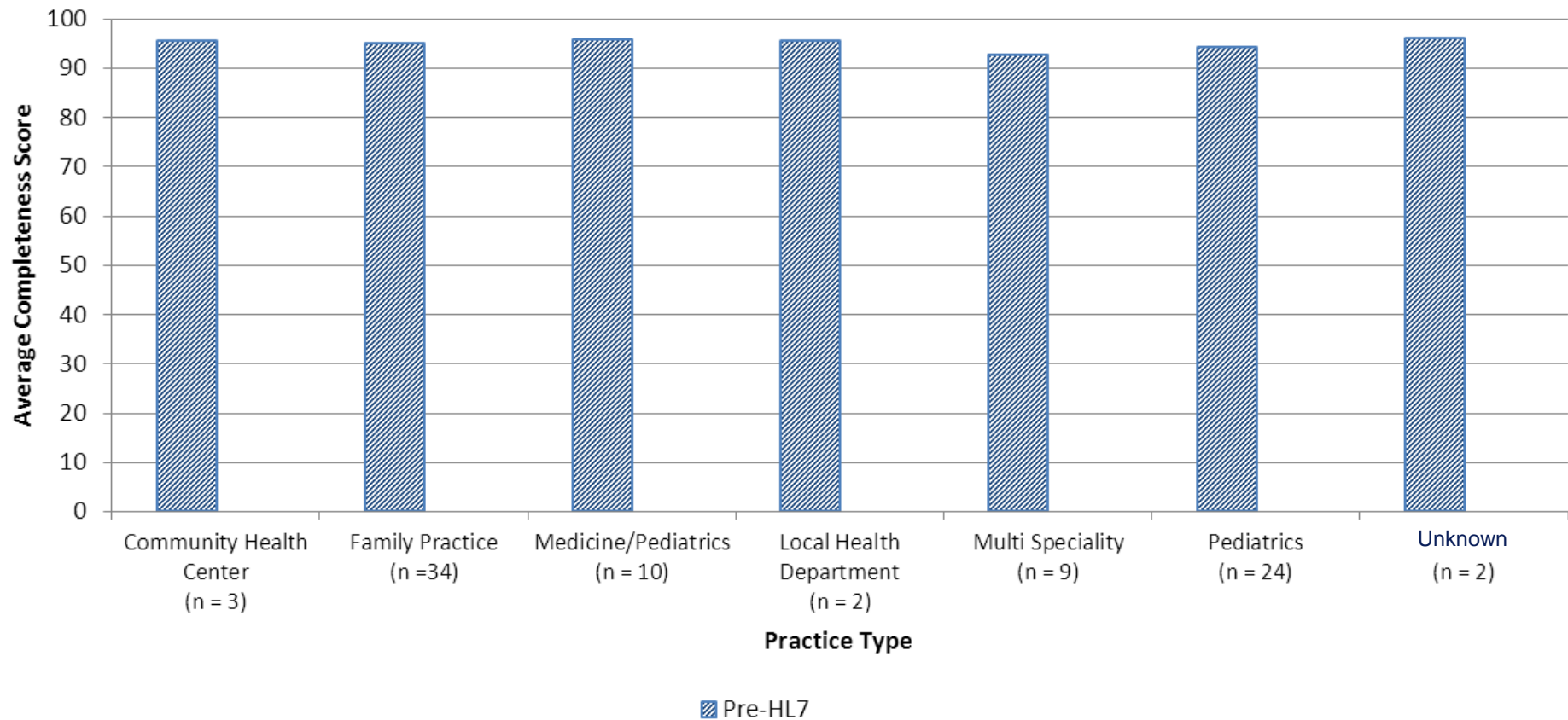
Overall Data Quality Score 180 Days Pre-/Post-HL7 n = 84



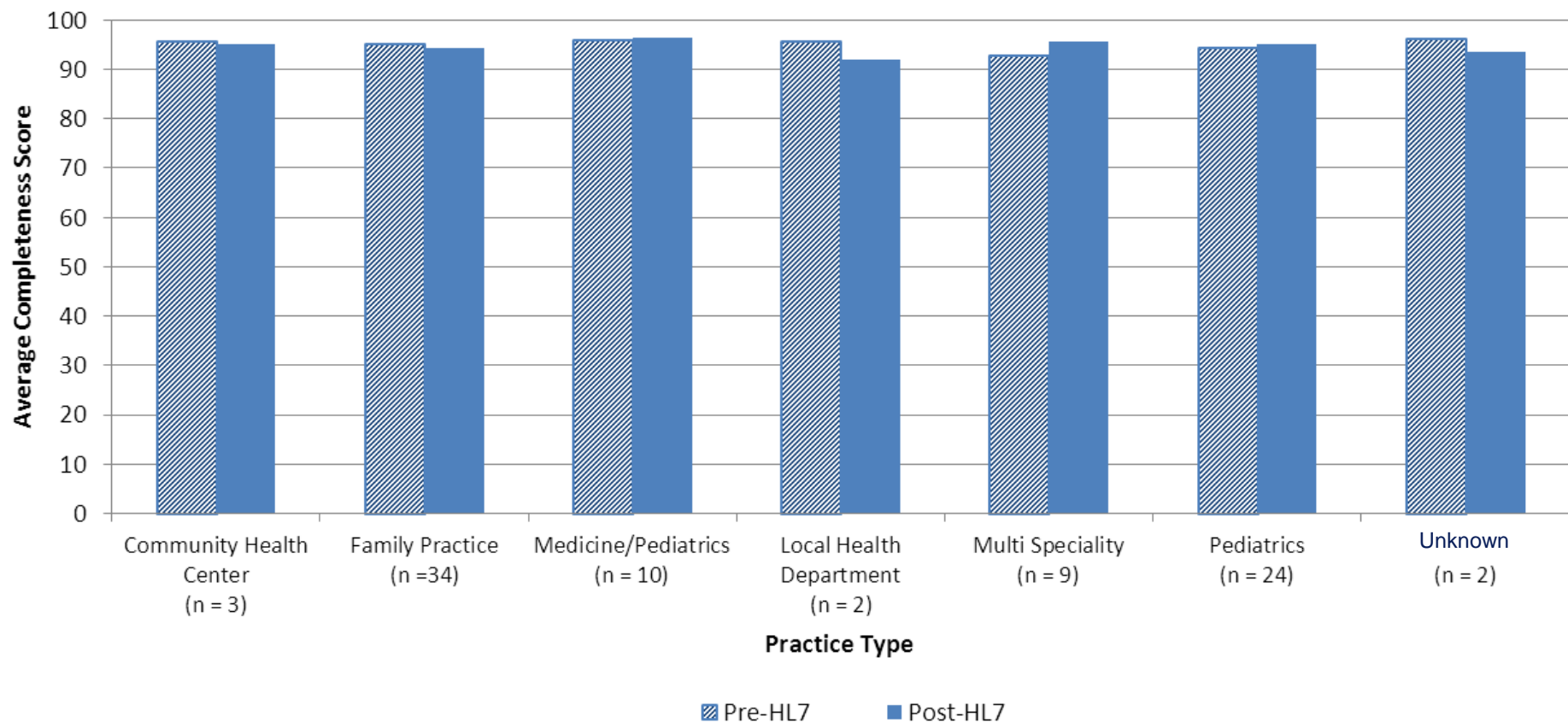
Data Quality Score

- Completeness Score (50%)
 - completeness of child, shot, and responsible party information submitted

Completeness Score 180 Days Pre-/Post-HL7 n = 84



Completeness Score 180 Days Pre-/Post-HL7 n = 84



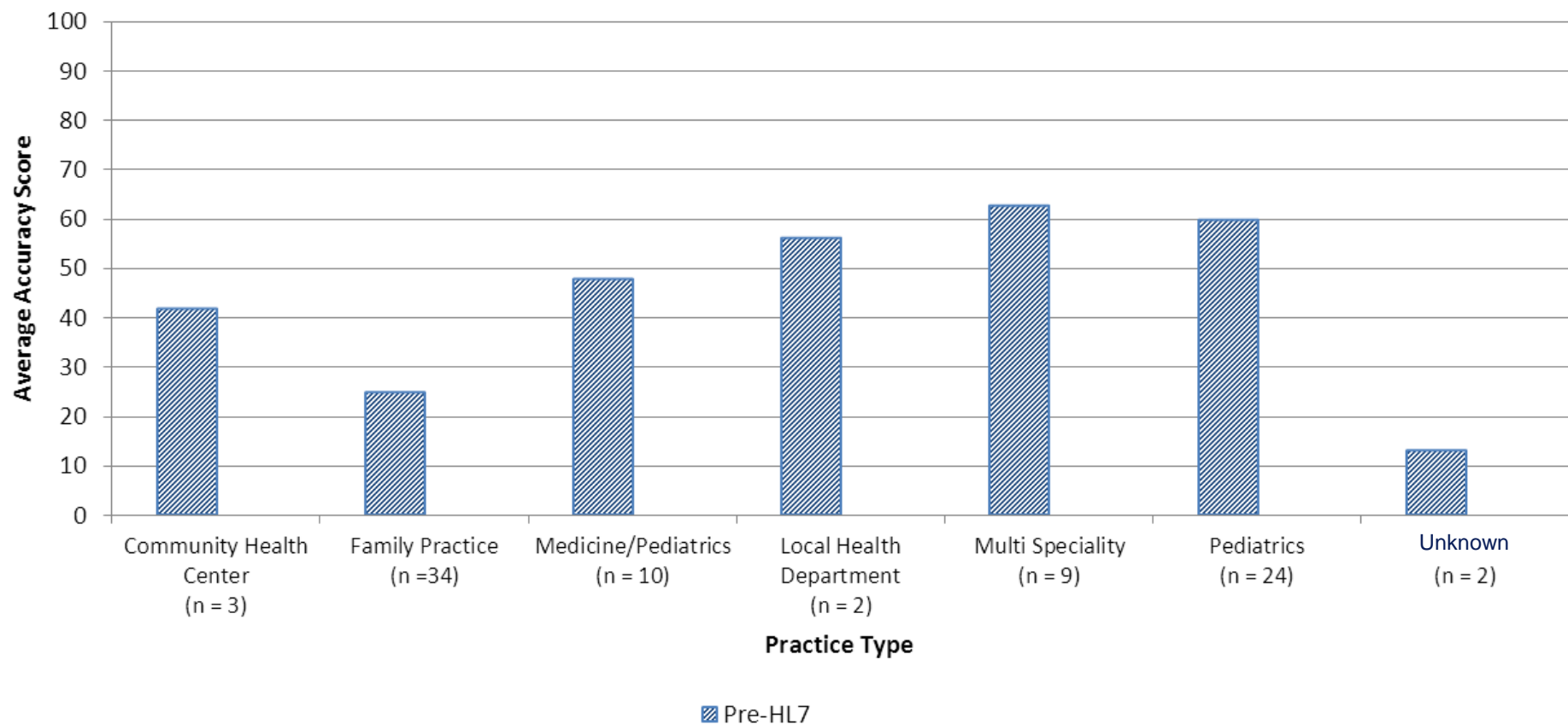
Completeness

- Post-HL7 similar to pre-HL7
- Consistent across practices types

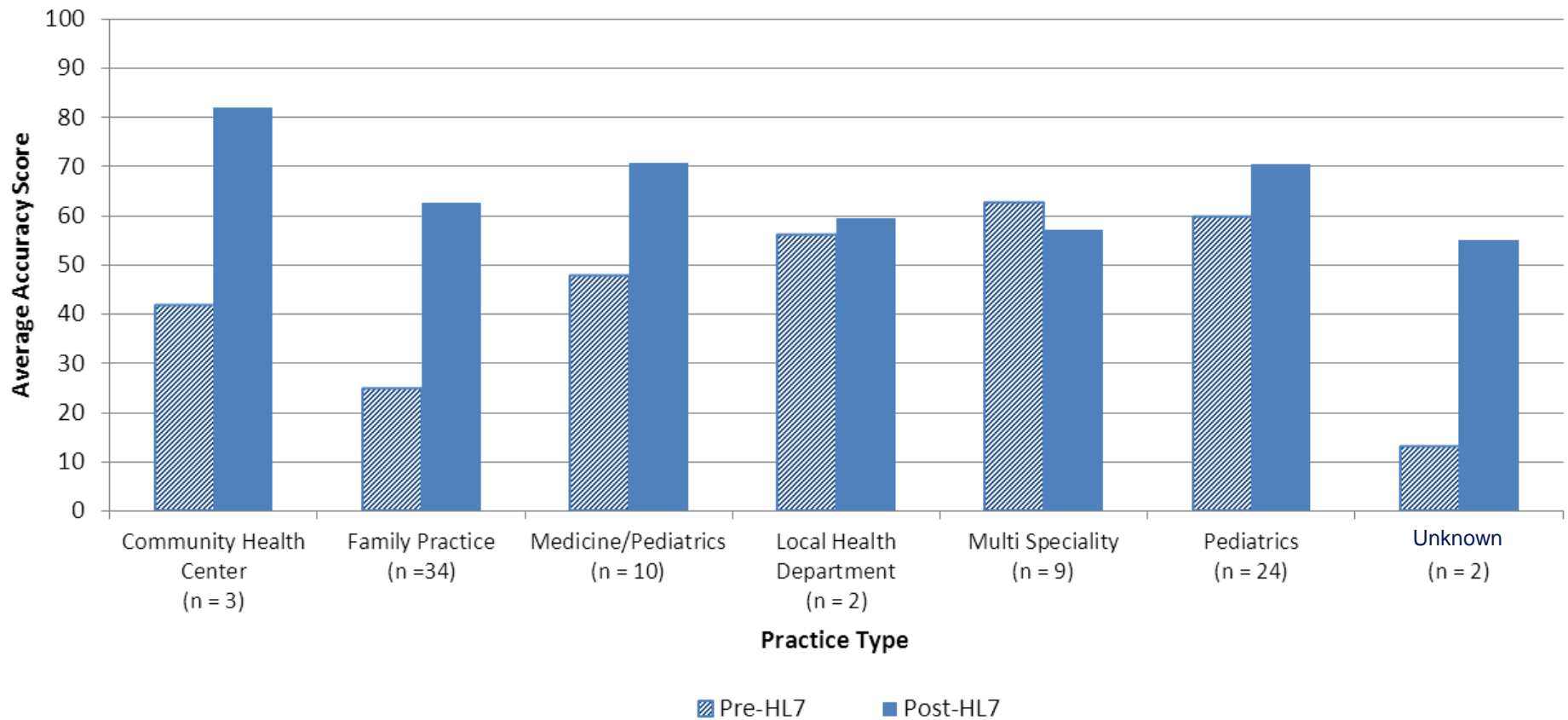
Data Quality Score

- Accuracy Score (40%)
 - describes frequency of fields with invalid values

Accuracy Score 180 Days Pre-/Post-HL7 n = 84



Accuracy Score 180 Days Pre-/Post-HL7 n = 84



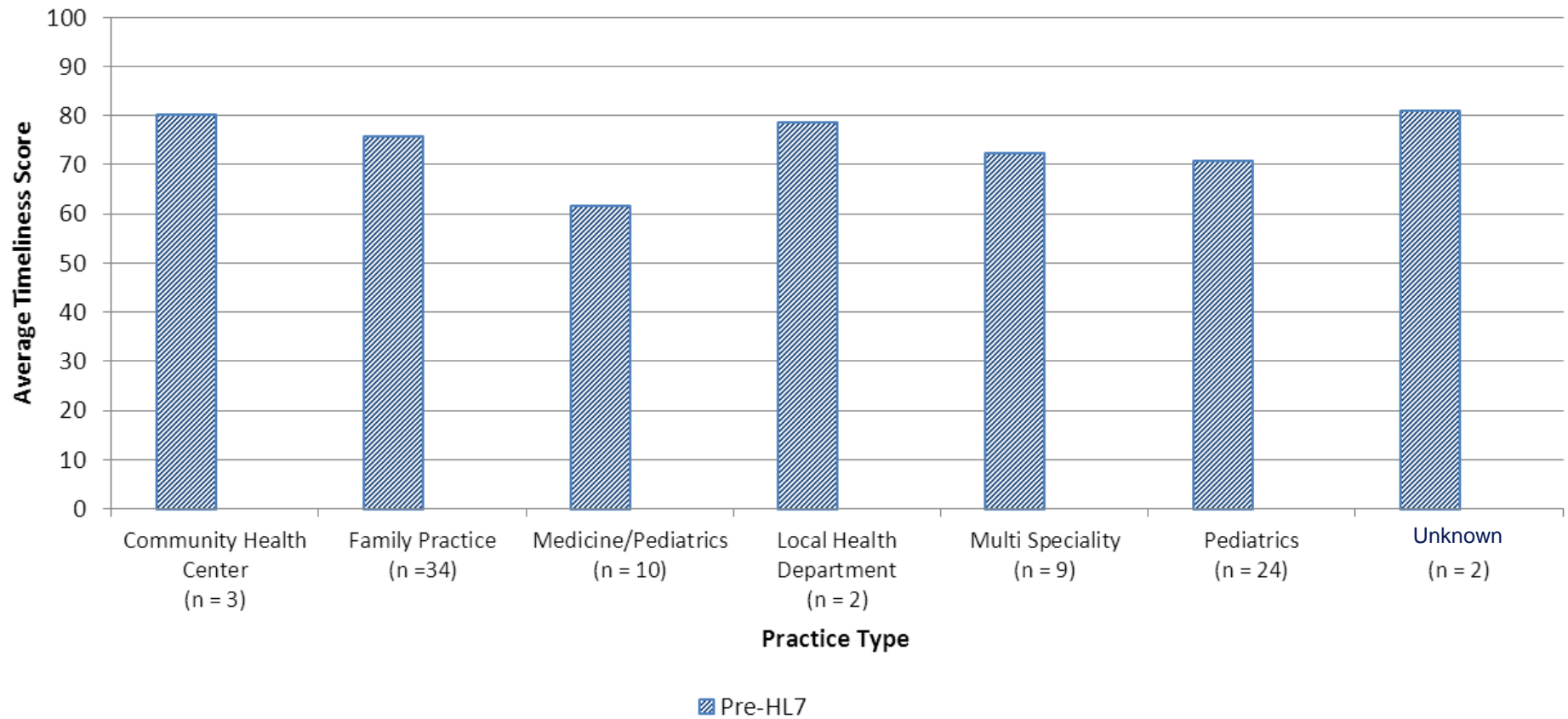
Accuracy

- Post-HL7 accuracy scores generally higher than Pre-HL7 counterparts
- One consistent issue
 - missing vaccination lot number

Data Quality Score

- Timeliness Score (10%)
 - average score for all transfer jobs sent over a given timeframe
 - based on most recent dose administered date

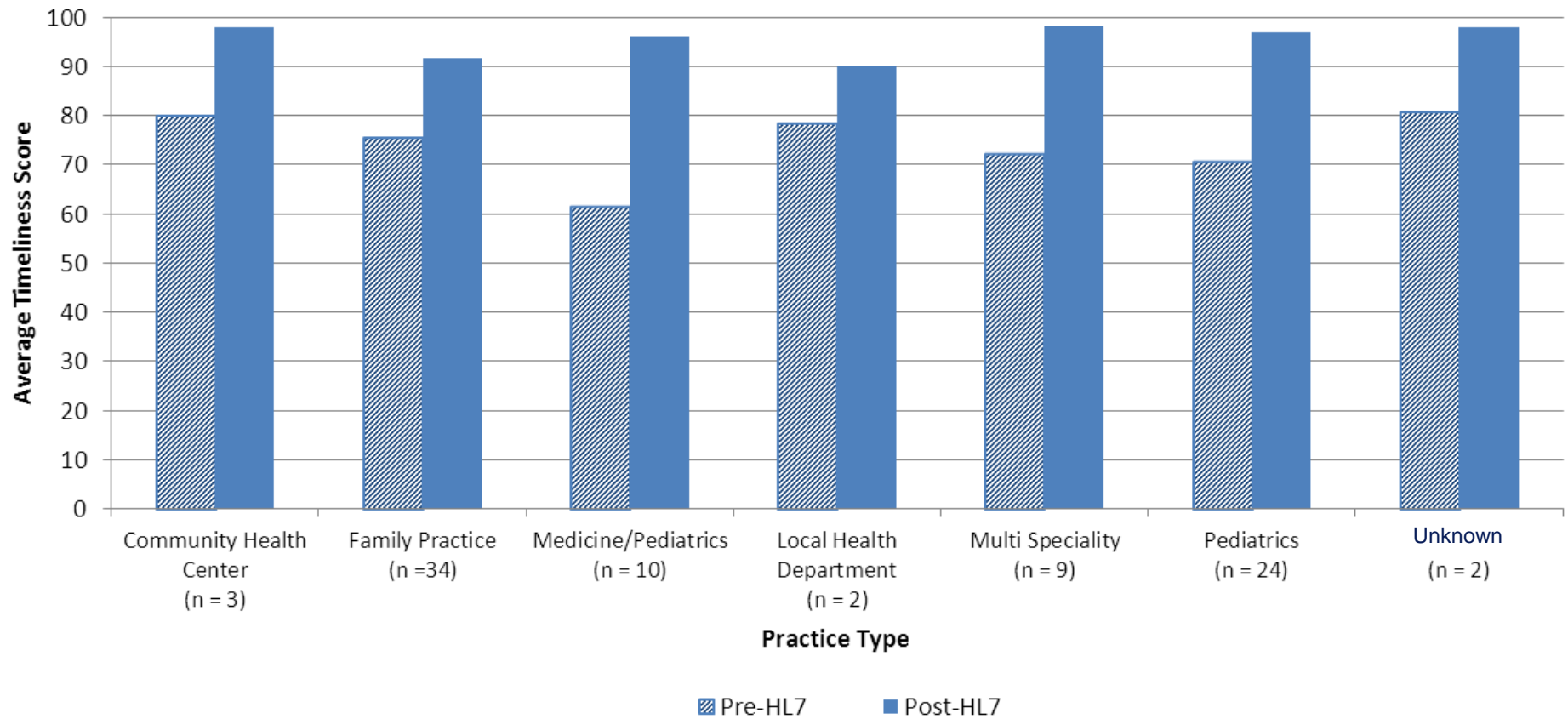
Timeliness Score 180 Days Pre-/Post-HL7 n = 84



Timeliness Score

180 Days Pre-/Post-HL7

n = 84



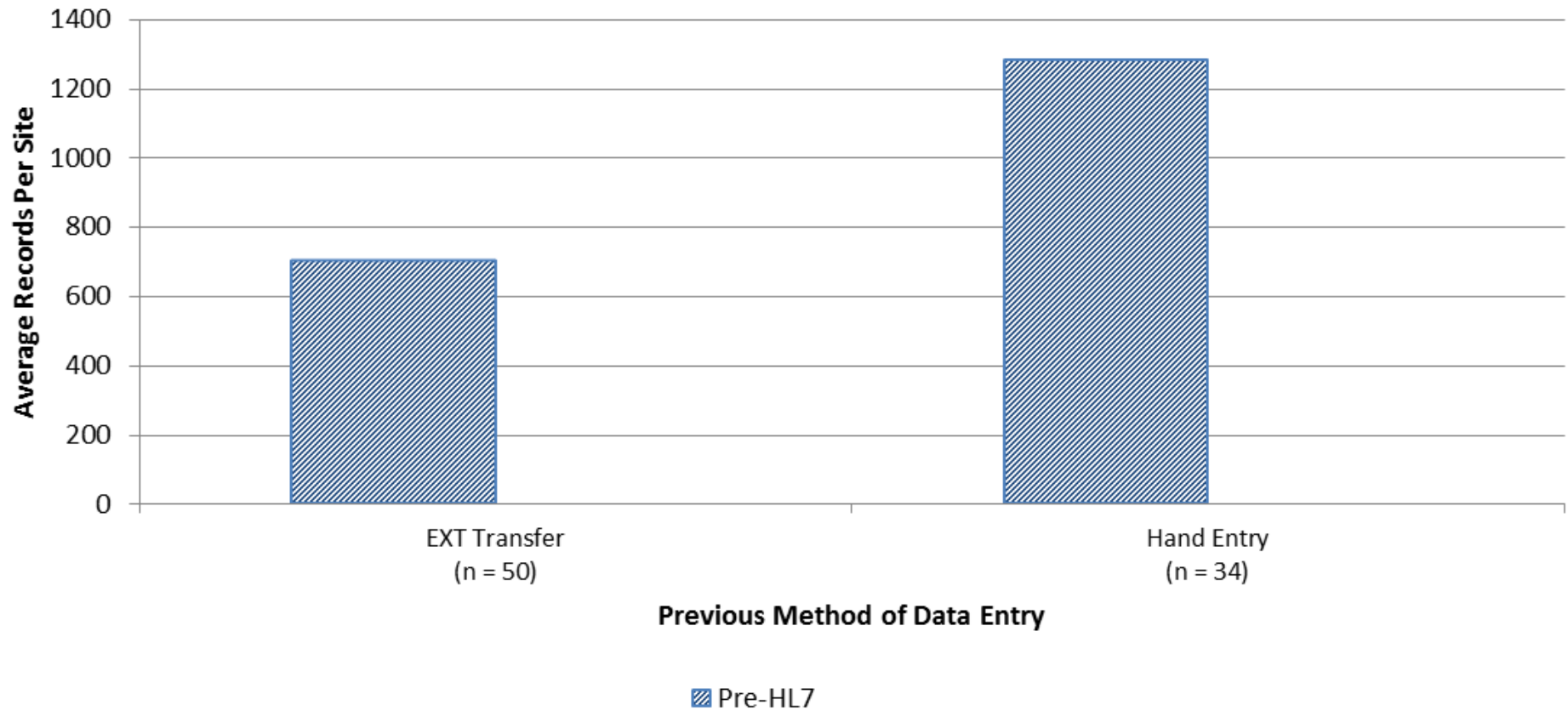
Timeliness

- Post-HL7 timeliness scores consistently higher than pre-HL7 scores
- High proportion of post-HL7 doses reported “early”
- Pre-HL7 doses more likely to be reported “on time” or “late”

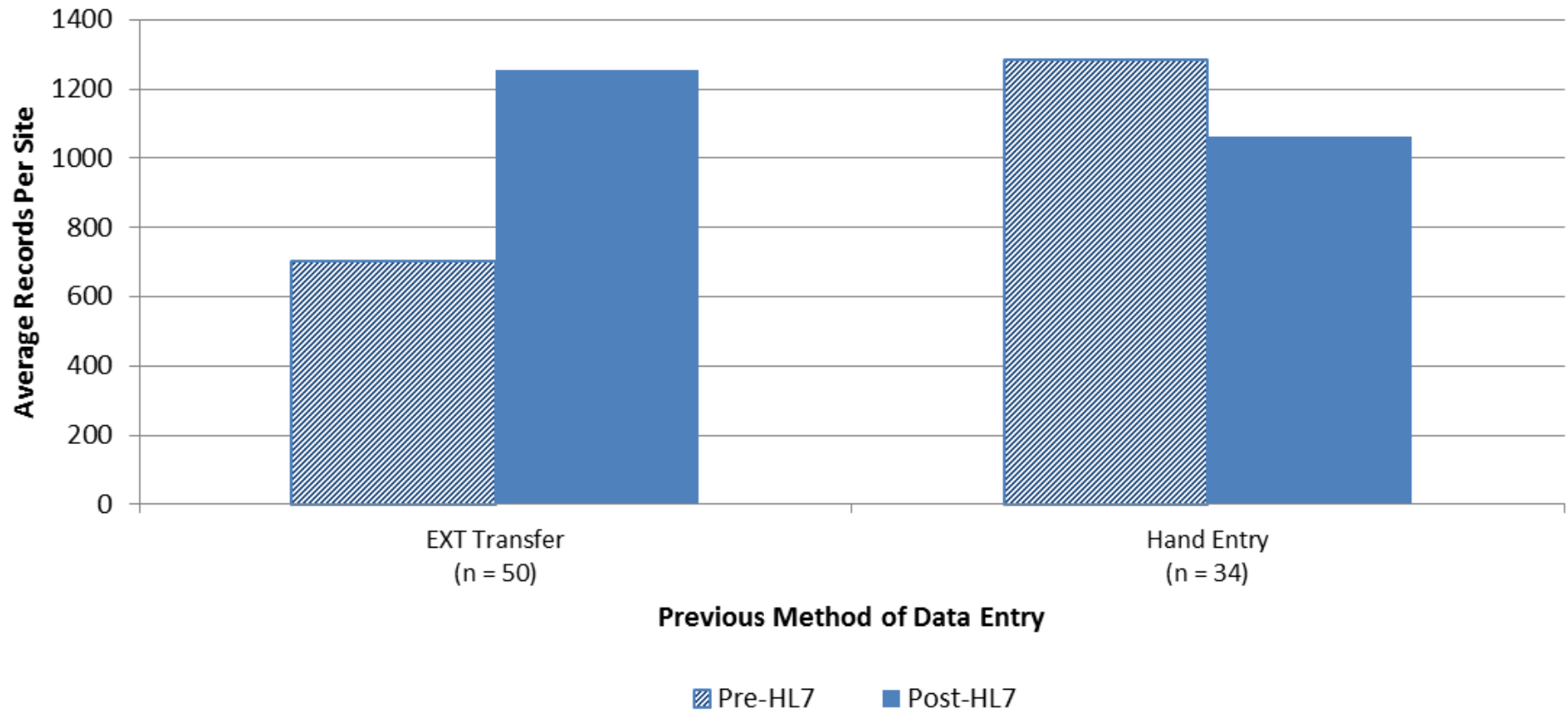
Contact Information

- Queried address, patient, and responsible party update information
 - frequency of records created or modified
- Summarized data according to site characteristics
 - practice type
 - pre-HL7 data entry method
 - EHR Vendor

Address Records Created 180 Days Pre/Post-HL7 n = 84



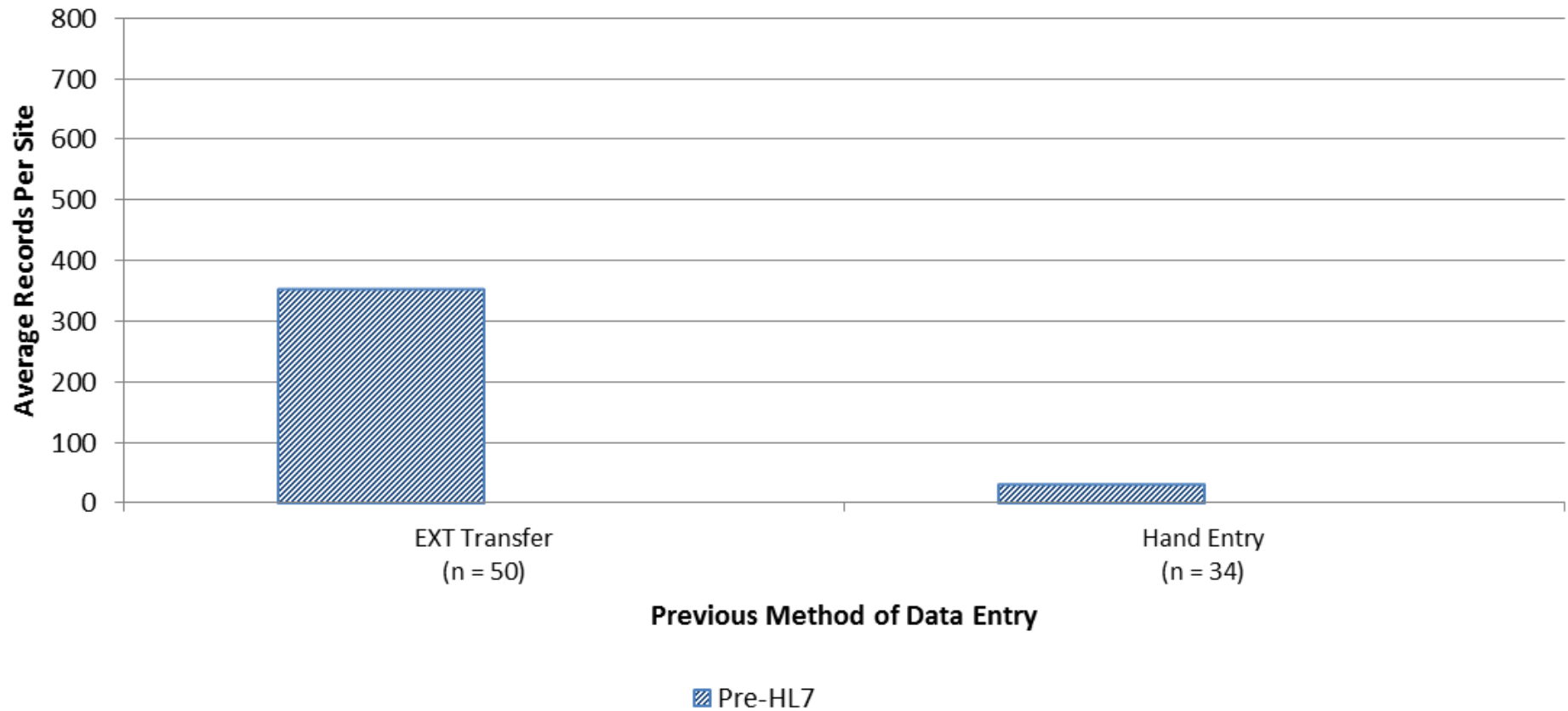
Address Records Created 180 Days Pre/Post-HL7 n = 84



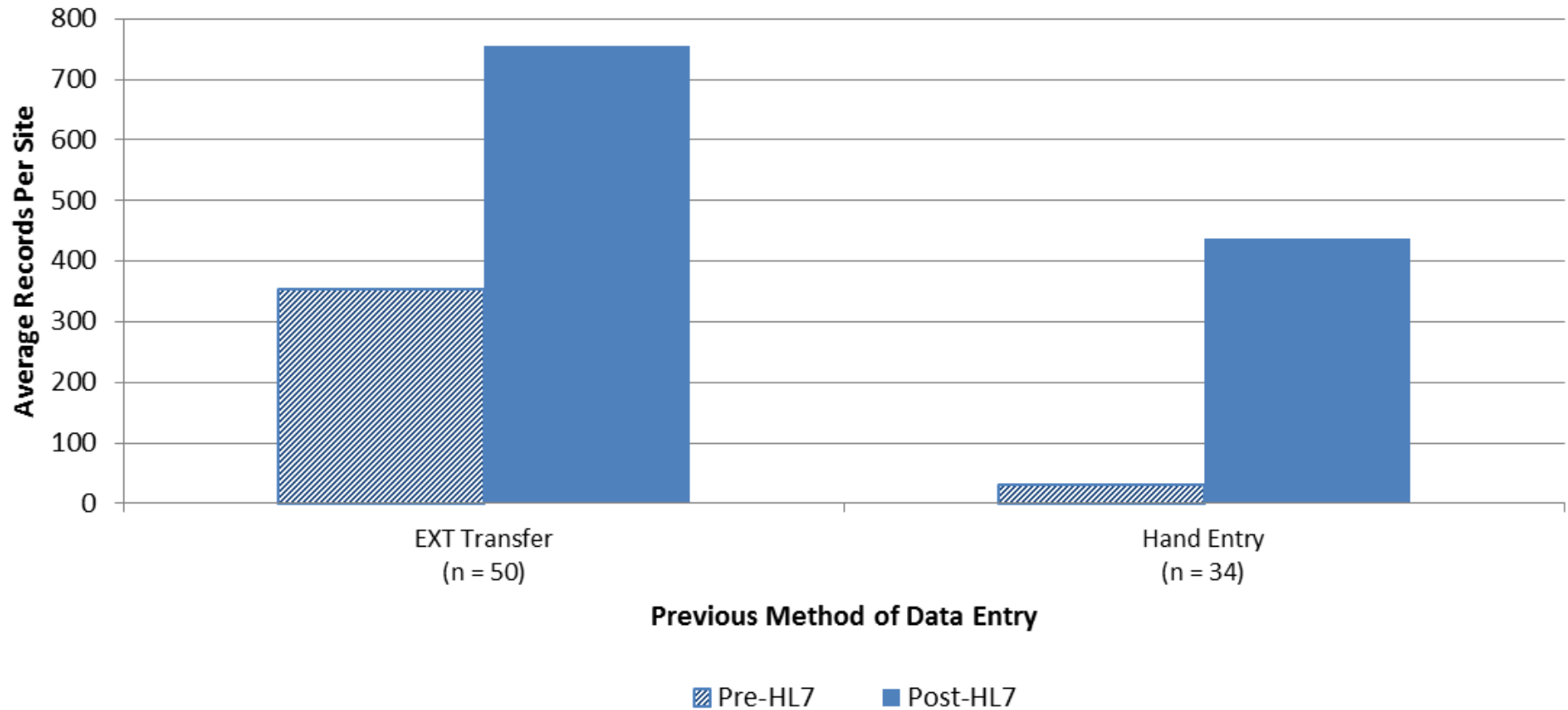
Records Created

- Increased for transfer sites
- Unknown whether duplication errors may exist

Address Records Modified 180 Days Pre/Post-HL7 n = 84



Address Records Modified 180 Days Pre/Post-HL7 n = 84



Records Modified

- Consistently higher post-HL7 than pre-HL7
- May reflect benefits of using EHR data which is routinely updated
- Content / accuracy of updates unknown

Next Steps

- Continued review and refinement
- Evaluate content of address additions / modifications
- Repeat queries as data for new sites become available
- Consider bi-directional interoperability

Collaborators

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