Getting VacSeen ***- ated:*** *Open Data for Improved Vaccine Information Systems* in Benin

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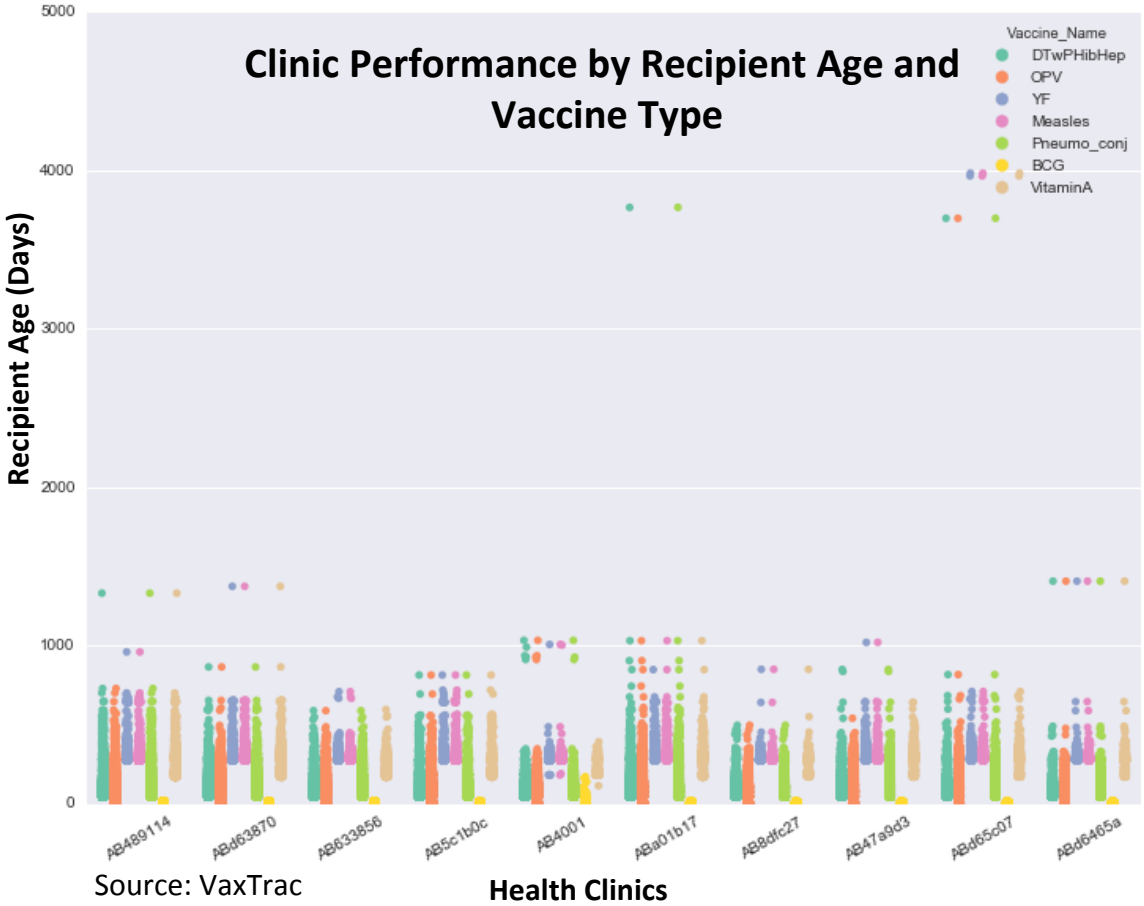
Motivation

Vaccine coverage in Benin is incomplete…

- The coverage rates range from about 60% to 80%[1]
- The proportion of unvaccinated children increased between 2006 and 2012 from 7% to 10%[1]

- **100% coverage is critical for disease eradication**
- **The last mile and population segment is the hardest to immunize[2]**

…and prone to deviation from adherence to schedule



Source: VaxTrac

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Sources in the Notes Section

Results

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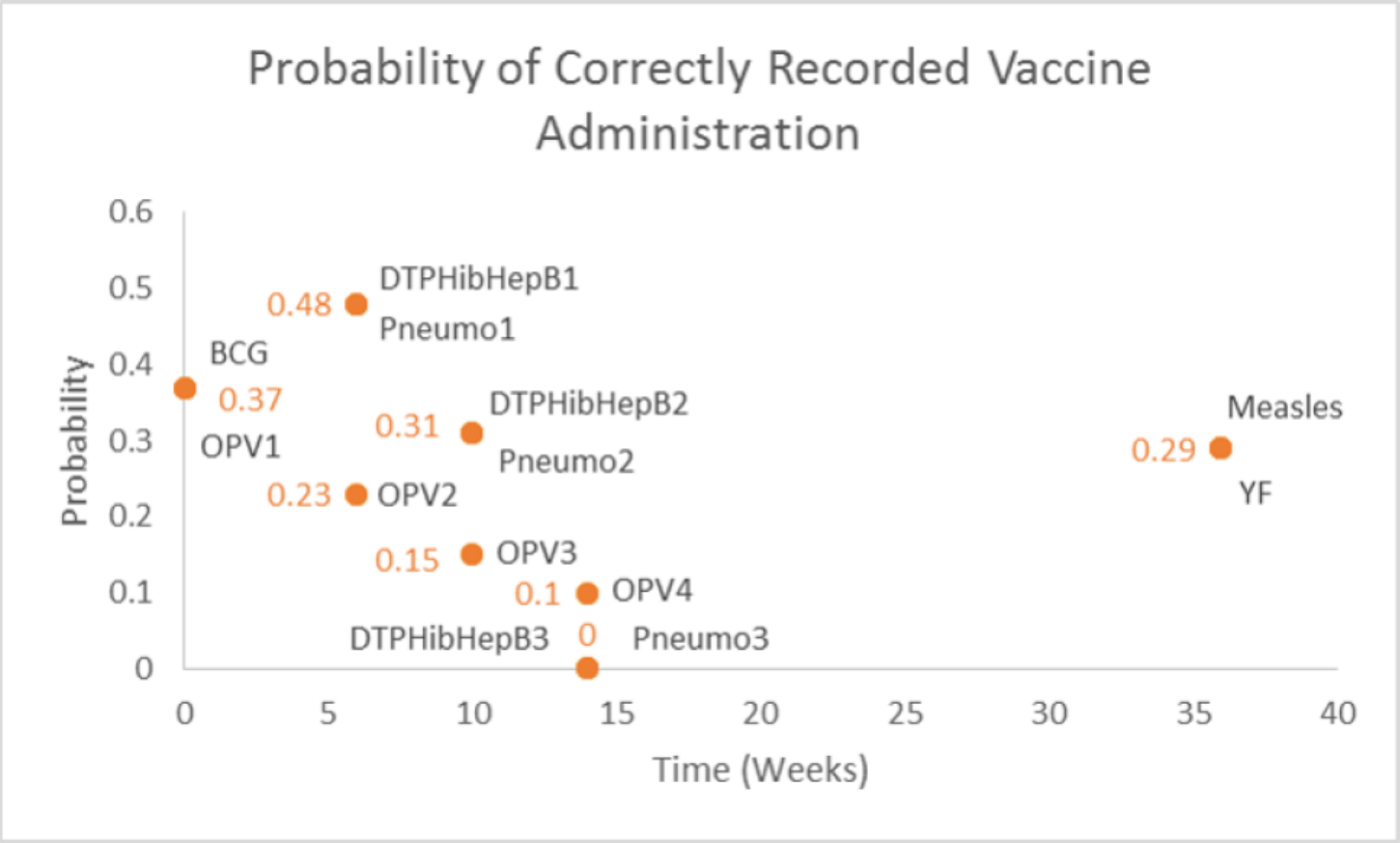
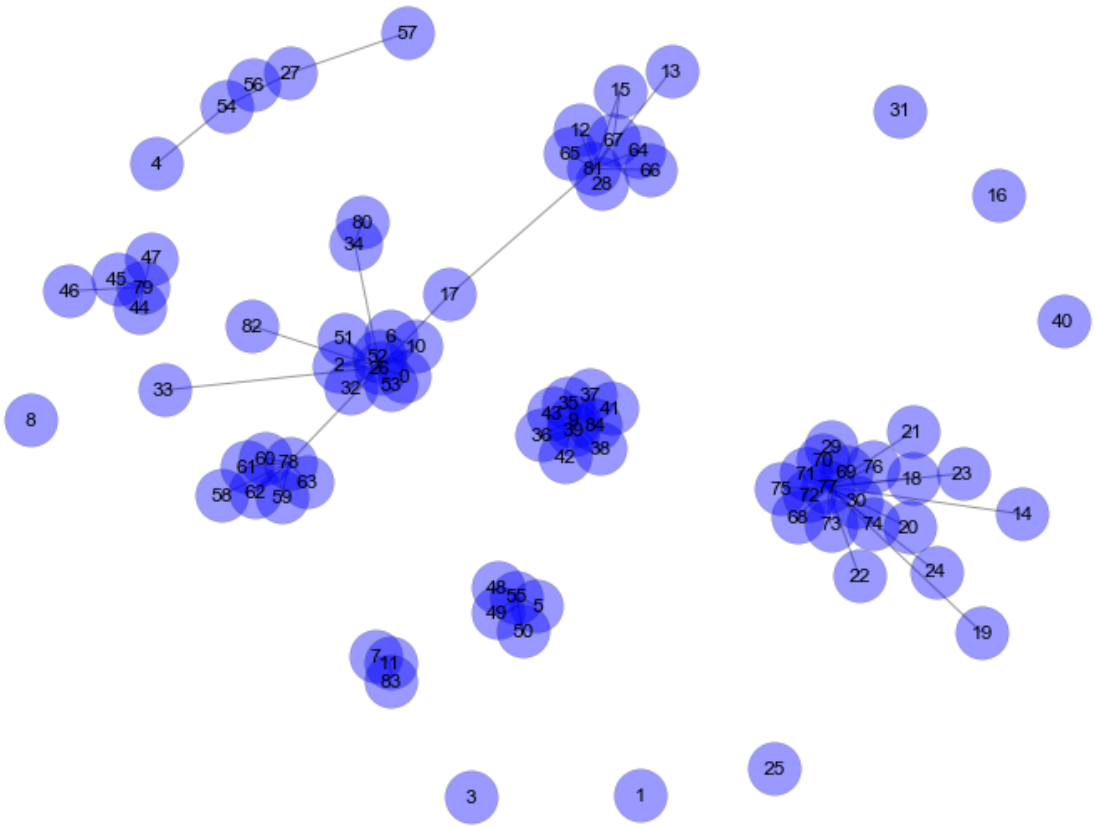
Record Classification

We discovered that the collected data has high degree of incompleteness and error



Network Analysis – Recipient Mobility (1/4)

We also discovered that recipients are mobile across clinics…

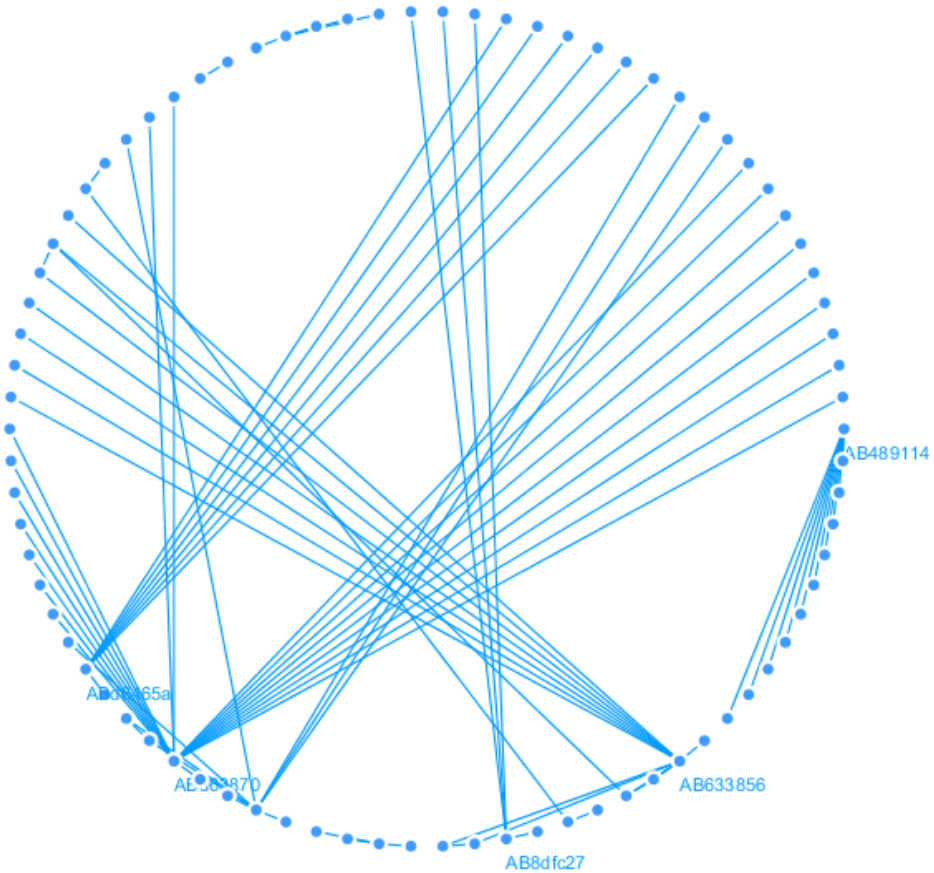


Parameter	Value
Link Density	2.51
Average Degree	213
Cluster Coefficient	0.014
Number of Clusters	14
Nodes	86
Edges	9161
Multiedges	144

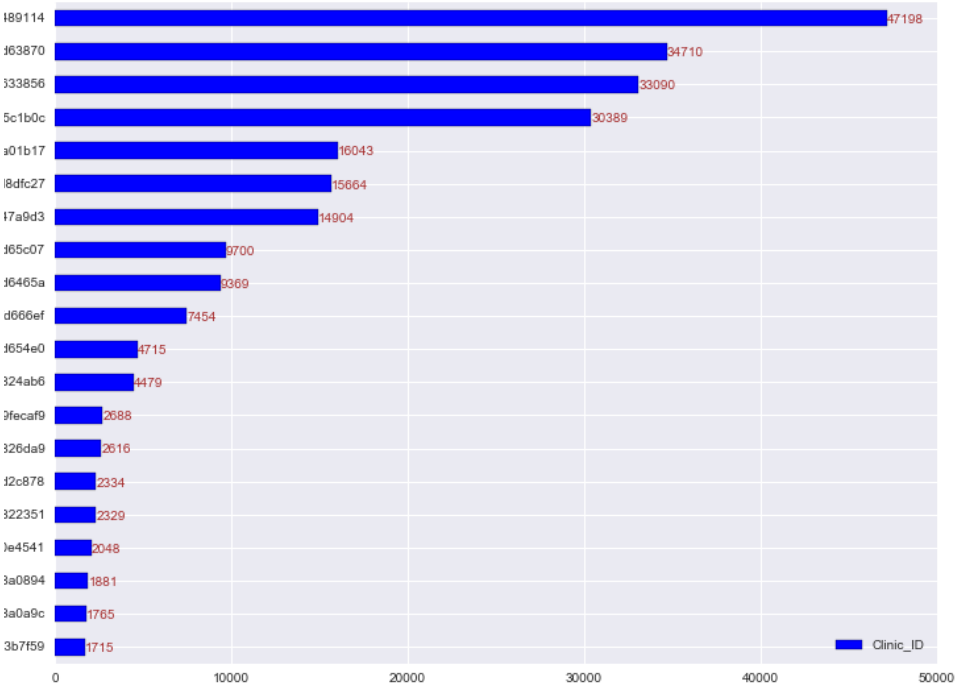
CAVEAT: Interim results; potential errors resulting from recently discovered issues in source data

Network Analysis (2/4)

…and clinics with high dose volumes also have highest mobility



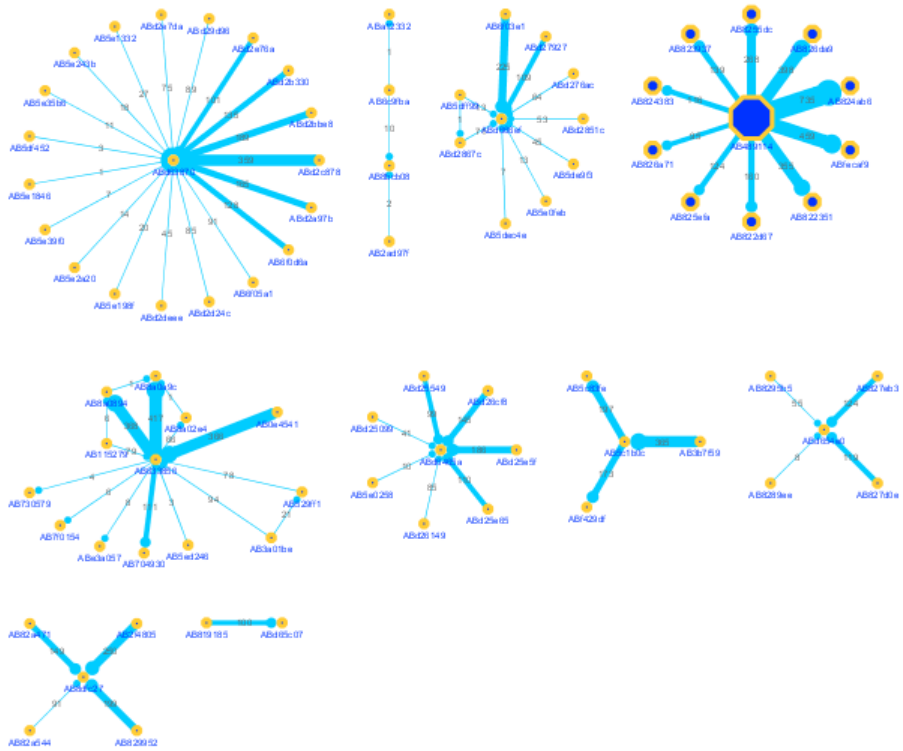
The clinics with most recipients also happen to be the most connected



CAVEAT: Interim results; potential errors resulting from recently discovered issues in source data

Network Analysis (3/4)

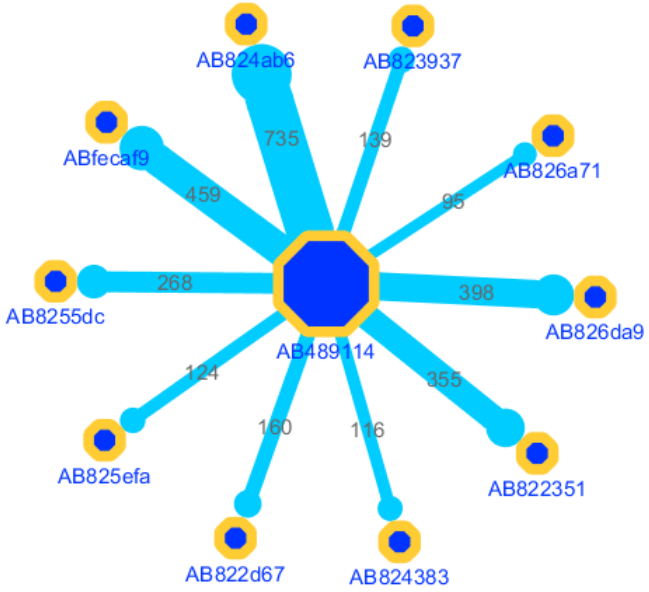
Upon studying the mobility patters across clinics…



CAVEAT: Interim results; potential errors resulting from recently discovered issues in source data

Network Analysis (4/4)

…we discovered varied degrees of coupling between clinics



CAVEAT: Interim results; potential errors resulting from recently discovered issues in source data

Proposed Work

We will link proprietary and open data to enable follow-up with vaccine recipients with sub-optimal adherence to immunization schedule and profile the risk in logistics performance

Aug H1	Aug H2	Sep H1	Sep H2	Oct H1	Oct H2	Nov H1	Nov H2	Dec H1
Ontology Refine.								
	Data Ana. – P1		Data Ana. – P(hase) 2					
					Implementation			

Knowledge Representation

- Refinement of ontology for profiling recipients, follow up action, and logistics risk
- **Open Data Used:** Vaccine ontologies

Data Analysis - Phase 1

- Application of ontology to updated data for actionable insight generation

Open Data Review

- Identification of datasets for profiling vaccine logistics performance

Data Analysis - Phase 2

- Risk profiling of clinics
- **Open Data Used:** Benin's regional infrastructure, socio-economic indicators, weather

Implementation

- VaxTrac to use the model to follow up with recipients and enhance clinic performance
- VaxTrac to approach Ministry to advice on supply chain

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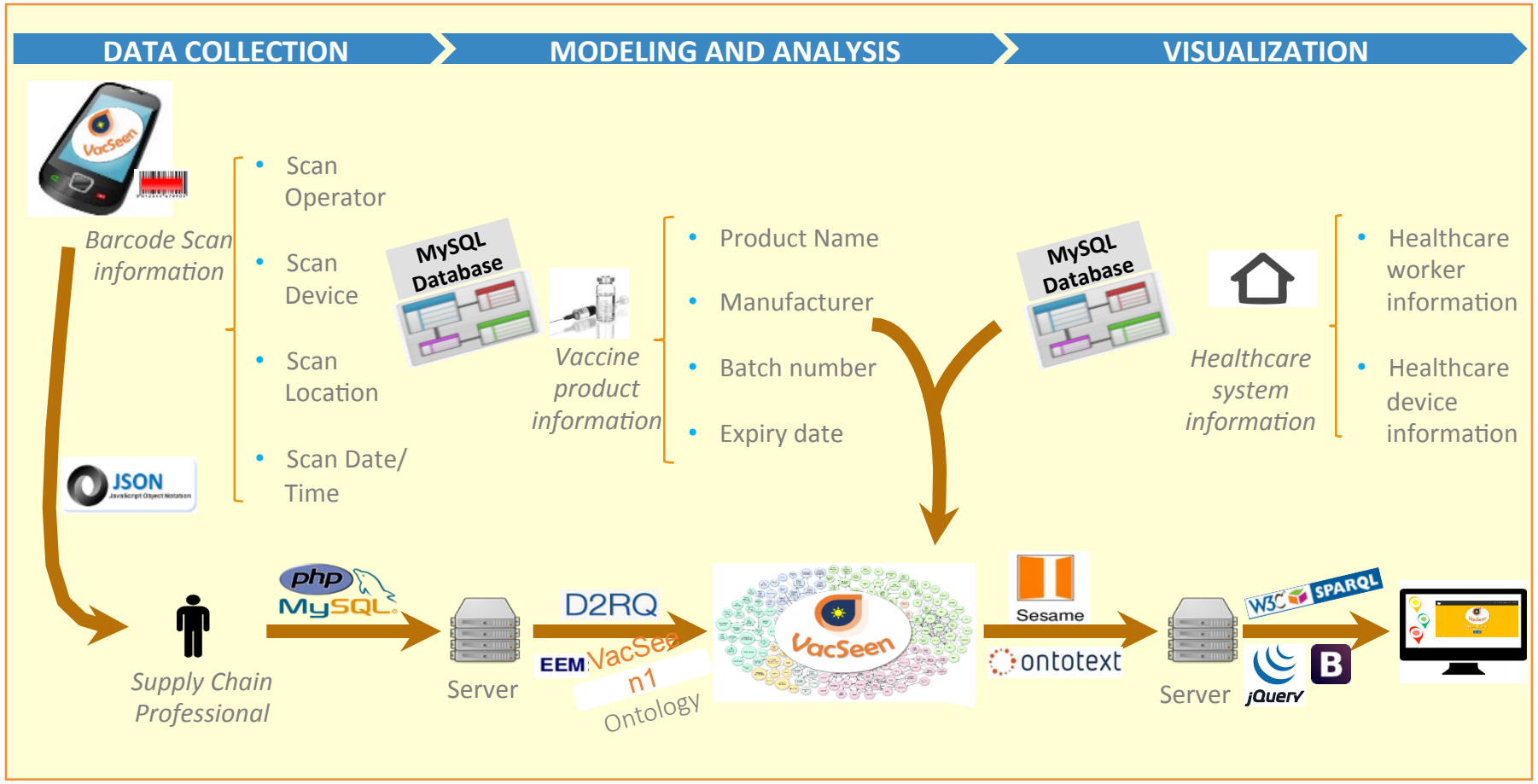
Appendix

Prior Work - VacSeen

Mobile-based barcode scans on the field are retrospectively validated using a data lake formed from logistical and health information systems



Source: Bhattacharjee, Partha S., et al. "VacSeen: A Linked Data-Based Information Architecture to Track Vaccines Using Barcode Scan Authentication.“, In proceedings of SWAT4LS 2015.

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Dissemination of Results

We expect the project to have both on-field and academic impact

Project Impact

On-Field Implementation

- VaxTrac will use the platform for decision-making.
- It will also use it for advocating supply chain improvements with Ministry

Linked Data Publishing

- Open Source code on GitHub.
- Linked data publishing under CC 3.0.

Academic Publication

- Planned paper in *Vaccines* journal.

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