Community-Driven Data Engineering for Opioid and Substance Abuse in the Rural Midwest

Raghu Machiraju[1], Ayaz Hyder[1], Anish Arora[1], Courtney Lynch[1], Pamela Salsberry[1], Simon Lin[2], Rayid Ghani[3], Amit Sheth[4]
[1]The Ohio State University; [2]Nationwide Children's Hospital [3]University of Chicago [4]Wright State University

The Problem:

- Ohio ranks 2nd in opioid overdose death rate (32.9/100,000 persons, 2016).
- Rural communities are disproportionately affected;
- Critical data in silos across agencies and jurisdictions;
- Data are not harmonized;
- Lack of a privacy and security framework;
- Data are not timely/real-time;
- Lack of tools and easy-to-use apps;
- Lack of data analytics resources/ expertise in rural counties;
- Lack of wireless connectivity/coverage

The Solution: Scalable, flexible, and connectivity-rich data-driven BIGDATA (BD) approach, *OpenOD*

OpenOD is an agile, user-driven framework for creating application-specific, to-scale, BD solutions for the Common Good.

Connection To Hub: Smart & Connected Communities
- Developing national partnerships
- Scaling community engagement > OH
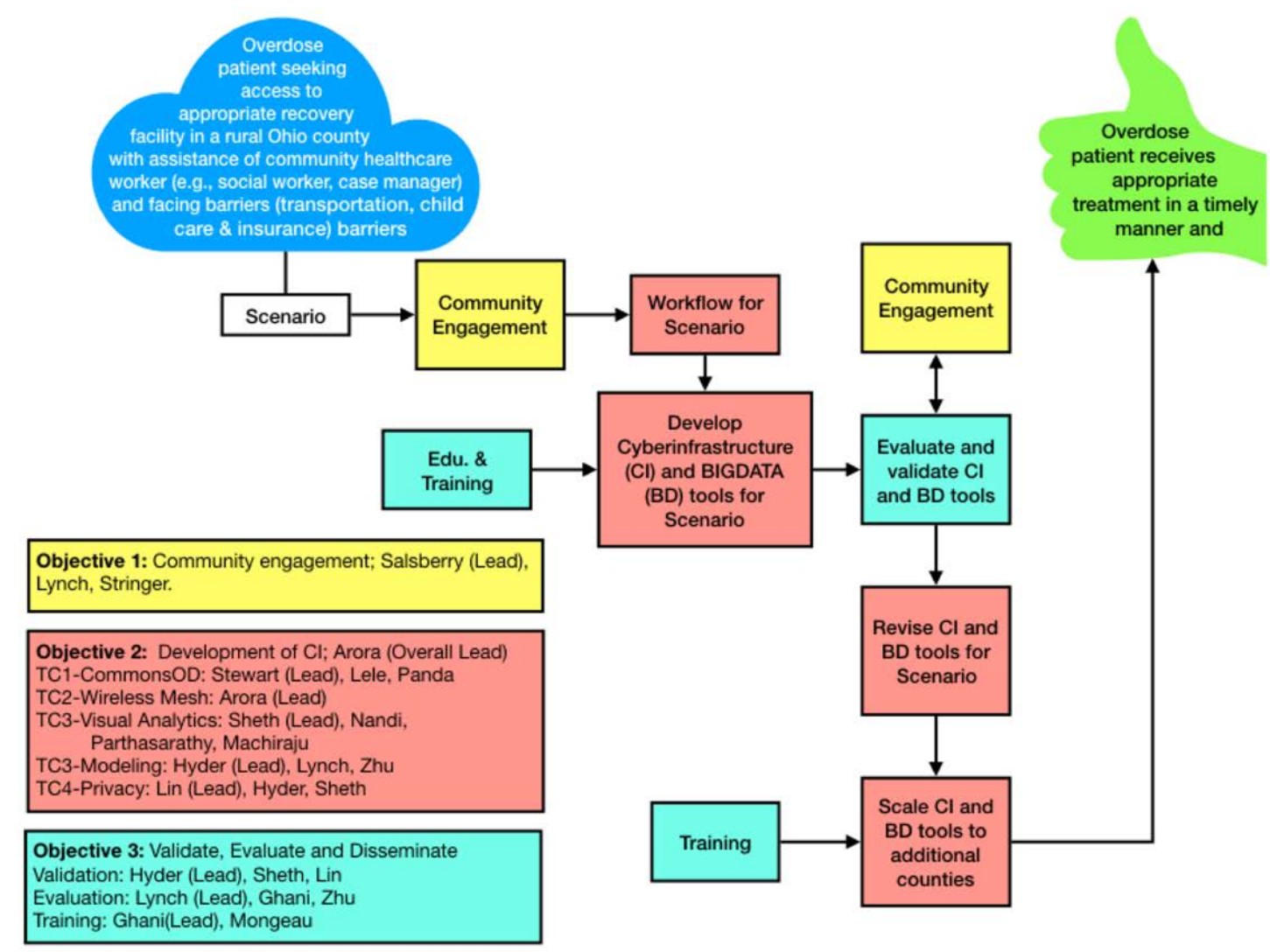- Leveraging resources incl. National Data Service.

Figure 1. Schematics for *OpenOD* - For a given scenario (blue bubble) workflows are realized (rectangles) and applications (green thumb). Various blocks/stages in the workflow are listed in color coded boxes with colors of the corresponding objectives. For every objective, we list are various investigators at NCH-Nationwide Children's Hospital, OSU-Ohio State, UC-University of Chicago, and WSU-Wright State. The work flow will be realized on a data commons, *CommonsOD*, and through portable wireless meshes. *CommonsOD* will be available on the cloud and provide access to various visual analytics and modeling applications and is crafted with suitable user input. Lastly *OpenOD* is open-source and open-specification.

Objective 1: Collaborate with local communities to understand strengths and gaps in cyberinfrastructure, substance use data availability, and need for data analytics workforce skills.

Objective 2: Build-out a flexible cyberinfrastructure using a variety of BD technologies that include a data commons, *CommonsOD*, stakeholder-usable and cloud-amenable data analytics and visualization tools, and internet connectivity with both mobile and non-mobile capabilities.

Objective 3: Validate, evaluate, and disseminate cyberinfrastructure and data analytic tools to stakeholder groups throughout the region. Build upon existing partnerships and create new partnerships with the support of the MBDH to validate the cyberinfrastructure and tools. Provide workforce training in use of cyberinfrastructure and tools.
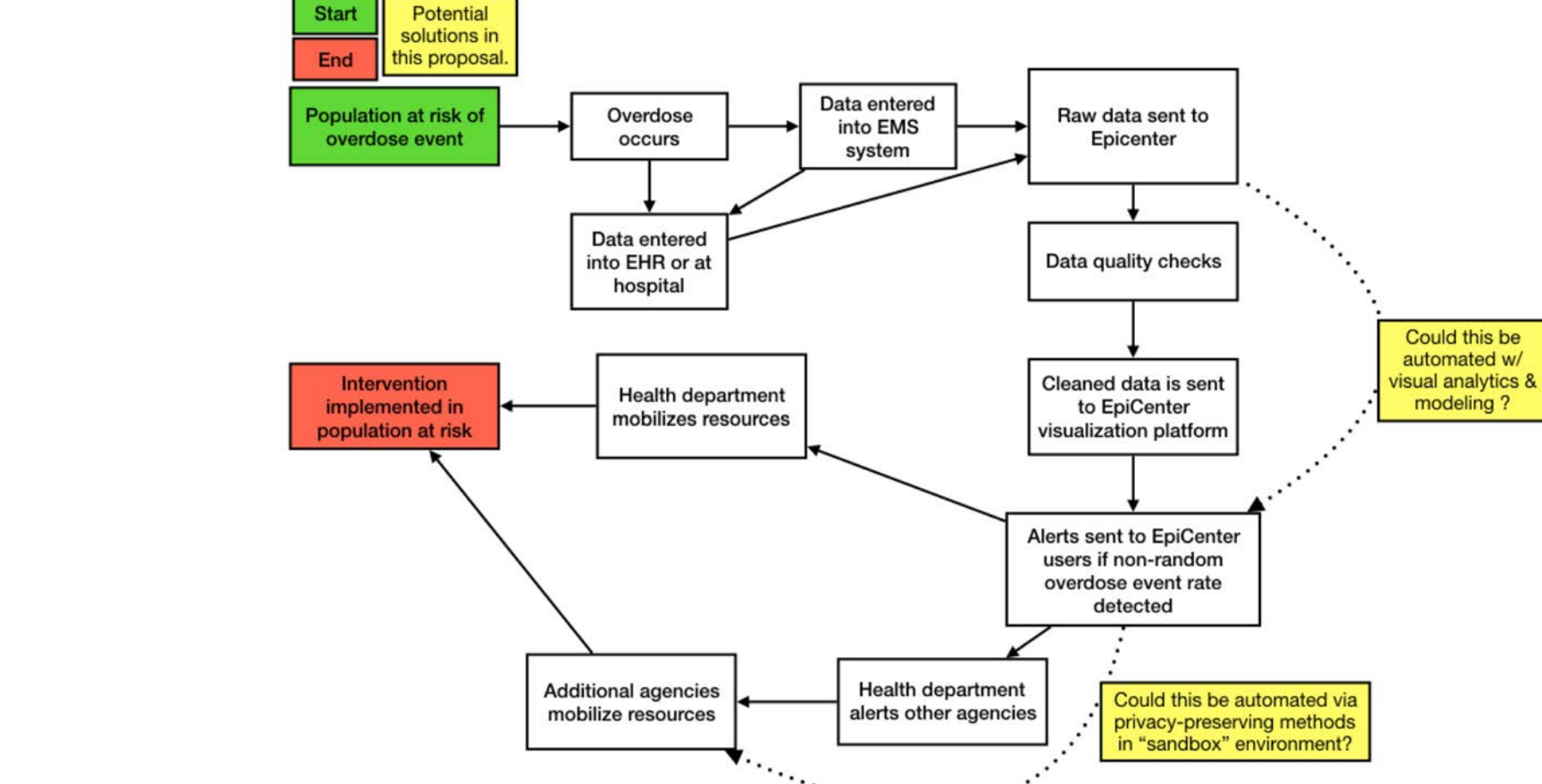
Data Commons – *Commons OD*
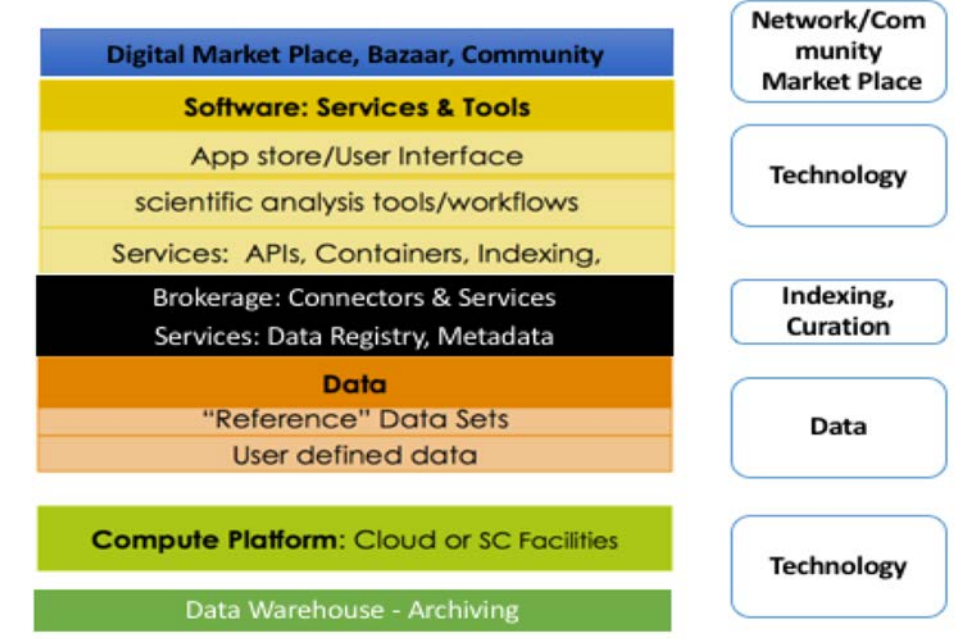
Wireless meshes for rural connectivity
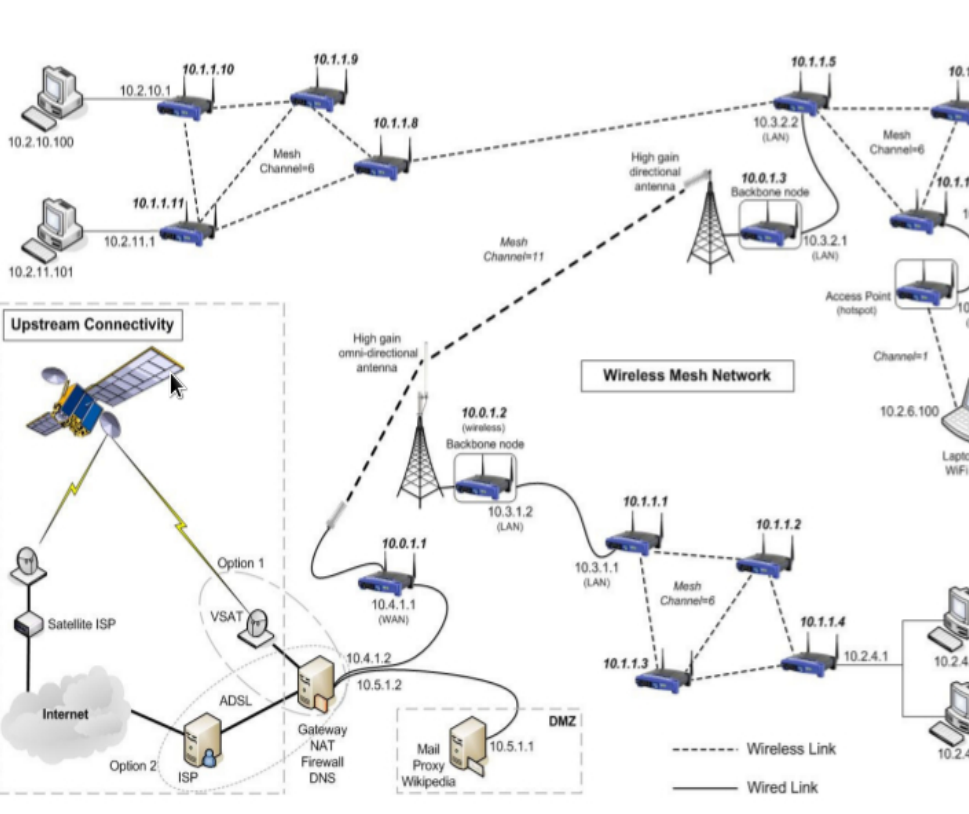
County Official Workflow

Social Worker Workflow