EPIDEMIOLOGY OF INVASIVE PNEUMOCOCCAL DISEASE: SYSTEMATIC REVIEW OF SEROTYPES IDENTIFIED BETWEEN 2010-2017

Dylan Green, Lola Arakaki, Jennifer Slyker

10/10/2017

START CENTER
STRATEGIC ANALYSIS,
RESEARCH & TRAINING CENTER

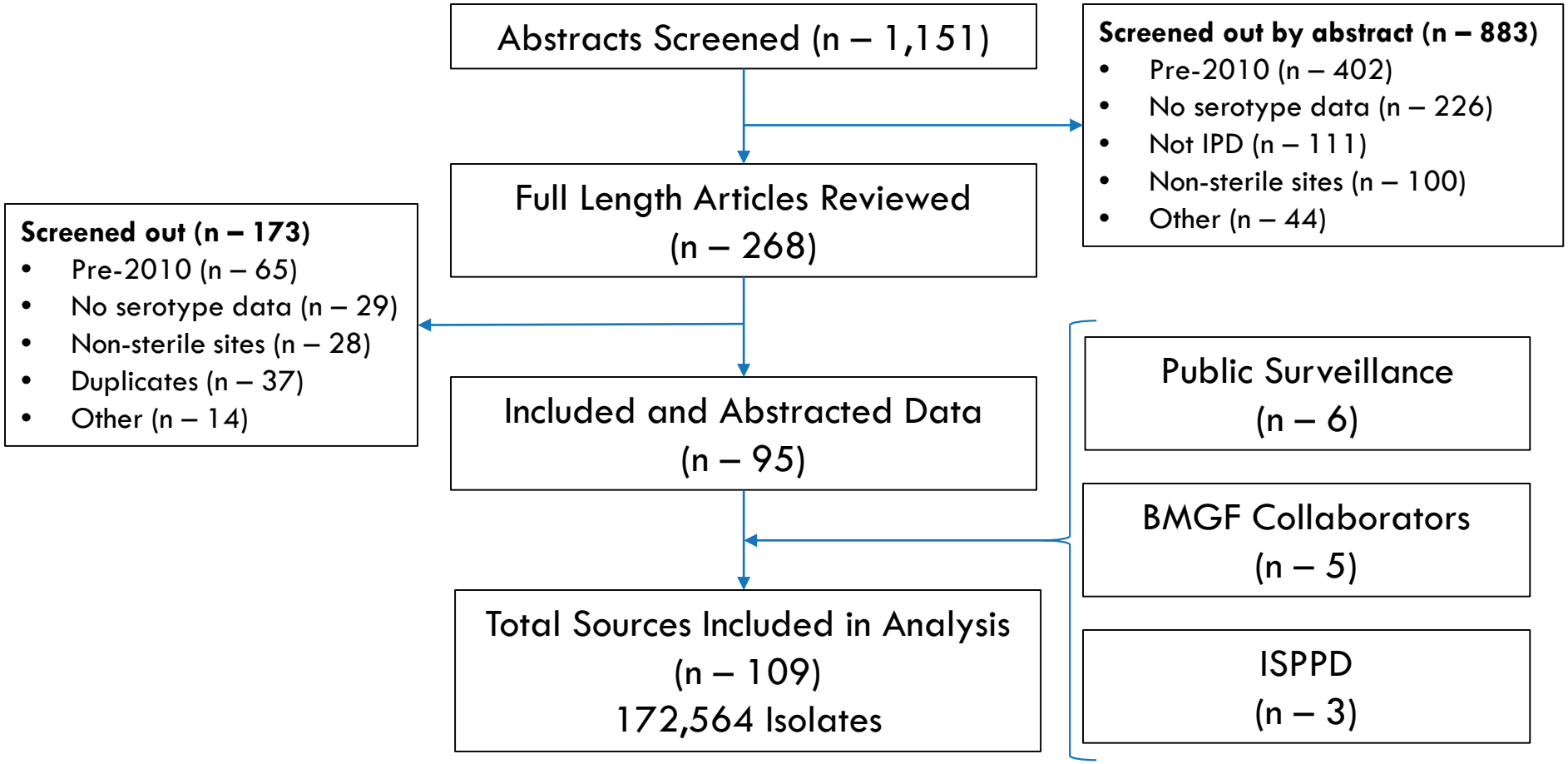
Objectives and Methods

- Objective
  - To conduct a systematic review of pneumococcal serotypes identified in cases of invasive pneumococcal disease (IPD) among persons of all age since 2010, to inform the potential next generation of Pneumococcal vaccines

- Sources
  - Published primary literature
    - Utilized search terms from previously published systematic reviews
    - Expanded age ranges to include individuals >5 years old
  - International Symposium on Pneumococci & Pneumococcal Diseases (2014, 2016)
  - BMGF Collaborators [unpublished data]
  - Publicly available surveillance data

- Inclusion Criteria
  - Serotype counts or incidence, published after 2010, and isolates from sterile sites

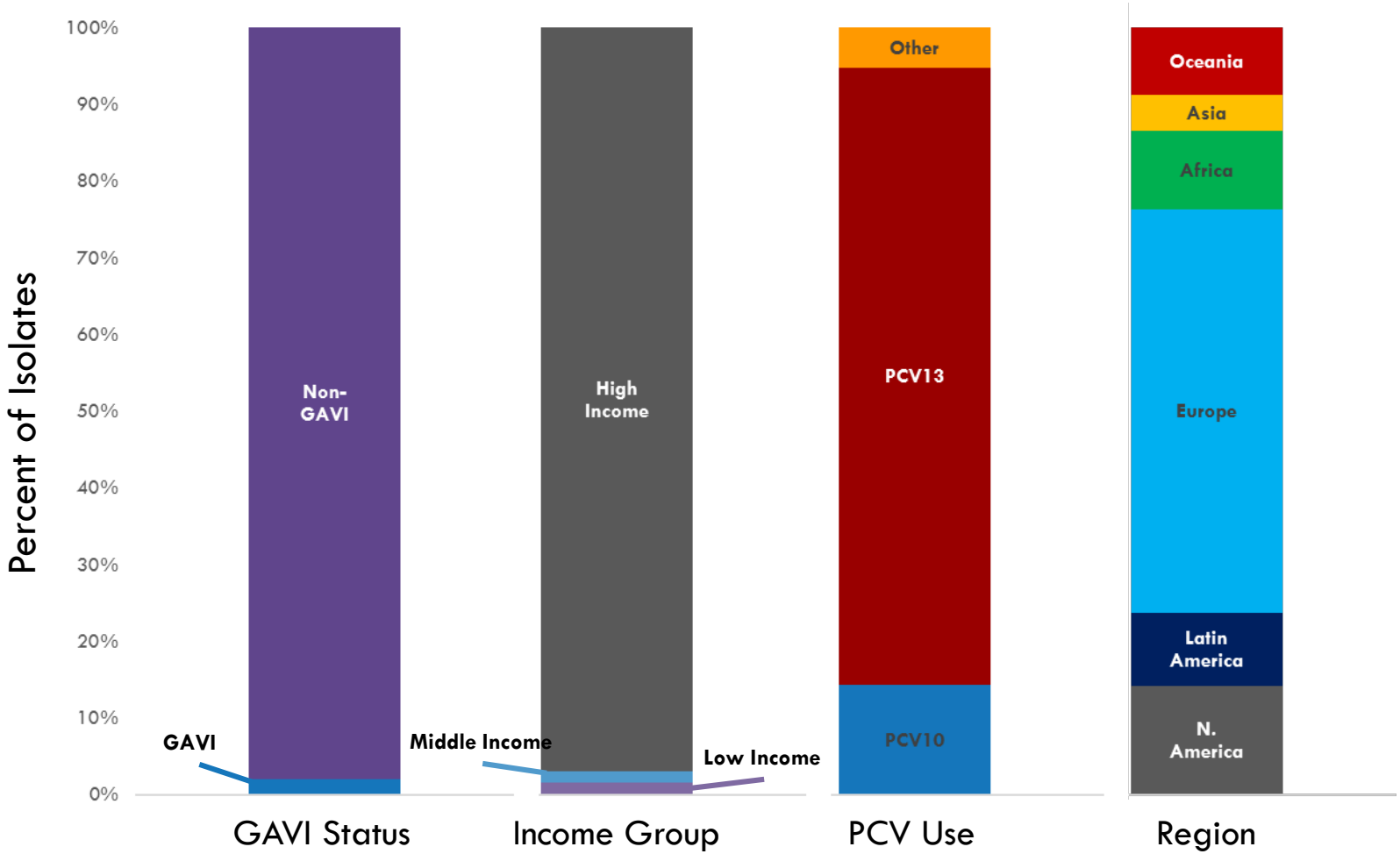
Data Sources for IPD Systematic Review



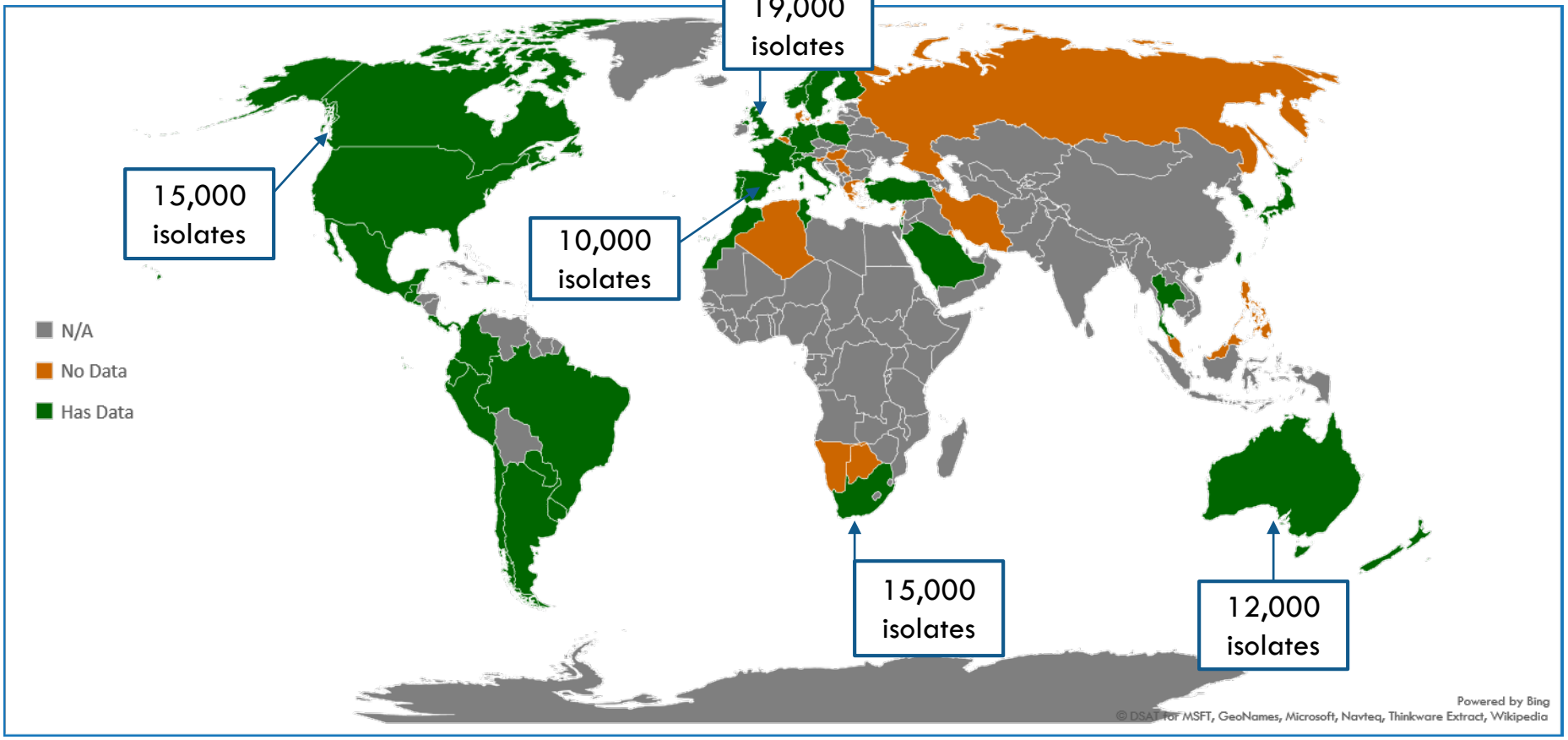
Data Elements Collected

- The following data elements were collected from each data source:
  - Serotype case counts
  - Age range for cases
  - Year/year range of isolates
  - Country
  - GAVI Alliance Status
  - Per Capita Income Group
  - PCV use and coverage
  - Region
  - Study duration less than one year
  - Study/sampling design
  - Whether study also reported 1) incidence and 2) antimicrobial resistance data

Available serotype data from 2010+ are primarily sourced from wealthy, non-GAVI countries that have implemented PCV13

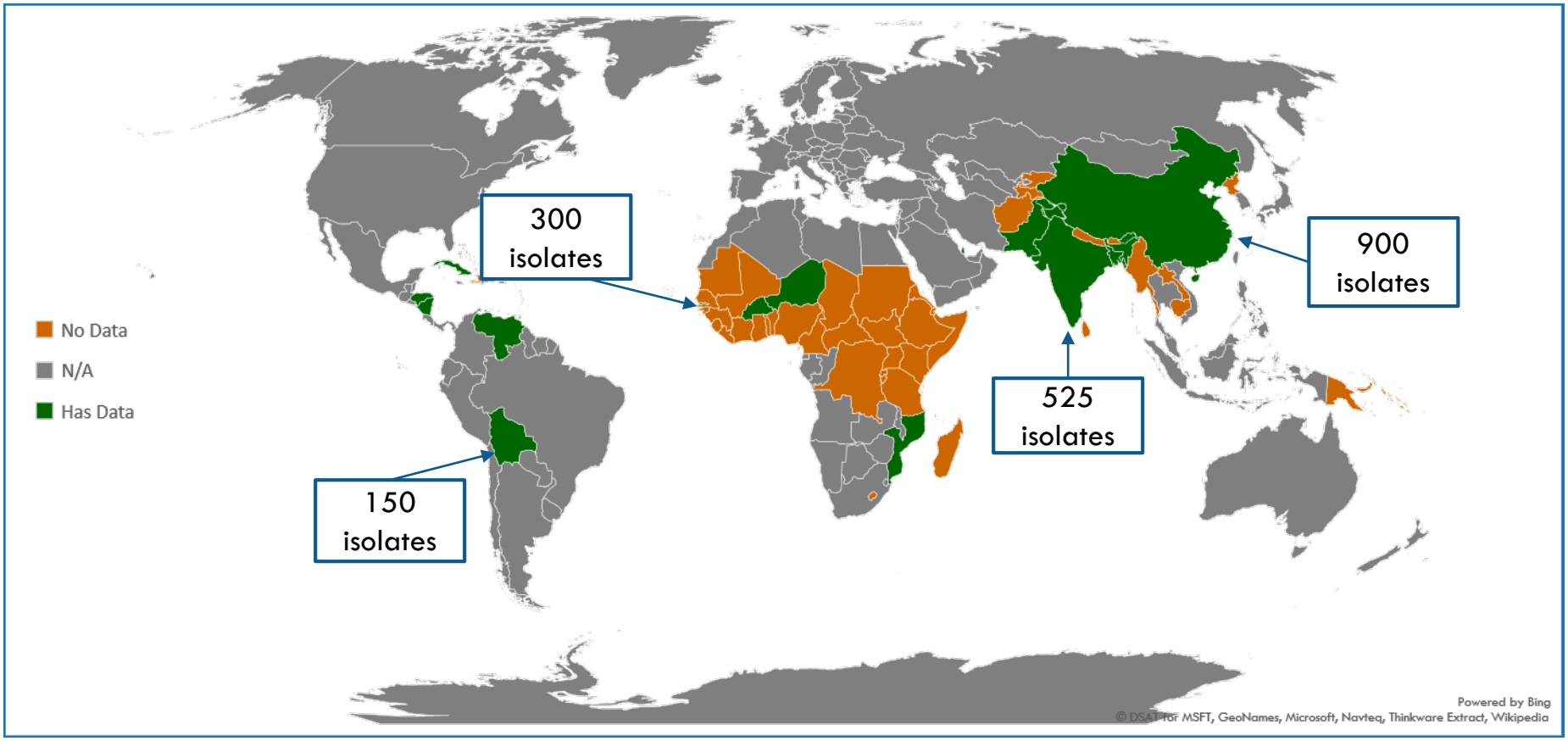


Five Countries Account for ~40% of Global IPD Isolates in Surveillance Reports and Published Primary Research



41 Non-GAVI countries and 168,000 serotype isolates included

Few IPD Isolates are Available from Only a Small Number of GAVI Countries



13 GAVI countries and 4,000 serotype isolates included

Data Considerations

- Highly skewed distribution of serotypes
  - 40 least common serotypes account for 1% of isolates
  - 11 Serotypes had no data reported - 6E, 6F, 6G, 6H, 11E, 20A, 20B, 33E, 43, 44, 47A
- Lack of serotype detail in many surveillance reports and publications
  - Uncommon isolates often grouped together as "Other" – 12.5%
    - European Surveillance accounts for 65% of this
  - Untypeable isolates reported as "Not Known" – 0.70%
  - Serogroup data with no serotype detail – 1.5% of isolates
- Lack of age disaggregation in many surveillance reports and publications
  - Age not specified: >50% of isolates
    - European Surveillance accounts for 50% of isolates categorized as "other"

Key Questions and Comparisons

- Data are stratified in the following ways:
  - All data (includes all ages, countries, and time periods)
  - GAVI vs Non-GAVI countries
  - Highly developed countries
  - Pre-2013 vs Post-2013 data

Only children <5 years, excluding "Other" & "Not Known" isolates

- Key questions within these strata:
  - What proportion of isolates are PCV types?
  - What are the most common non-PCV types?
  - How many serotypes account for 80% of isolates?