

Community Acquired Bacteremia in Nigerian Children: A Preliminary Report

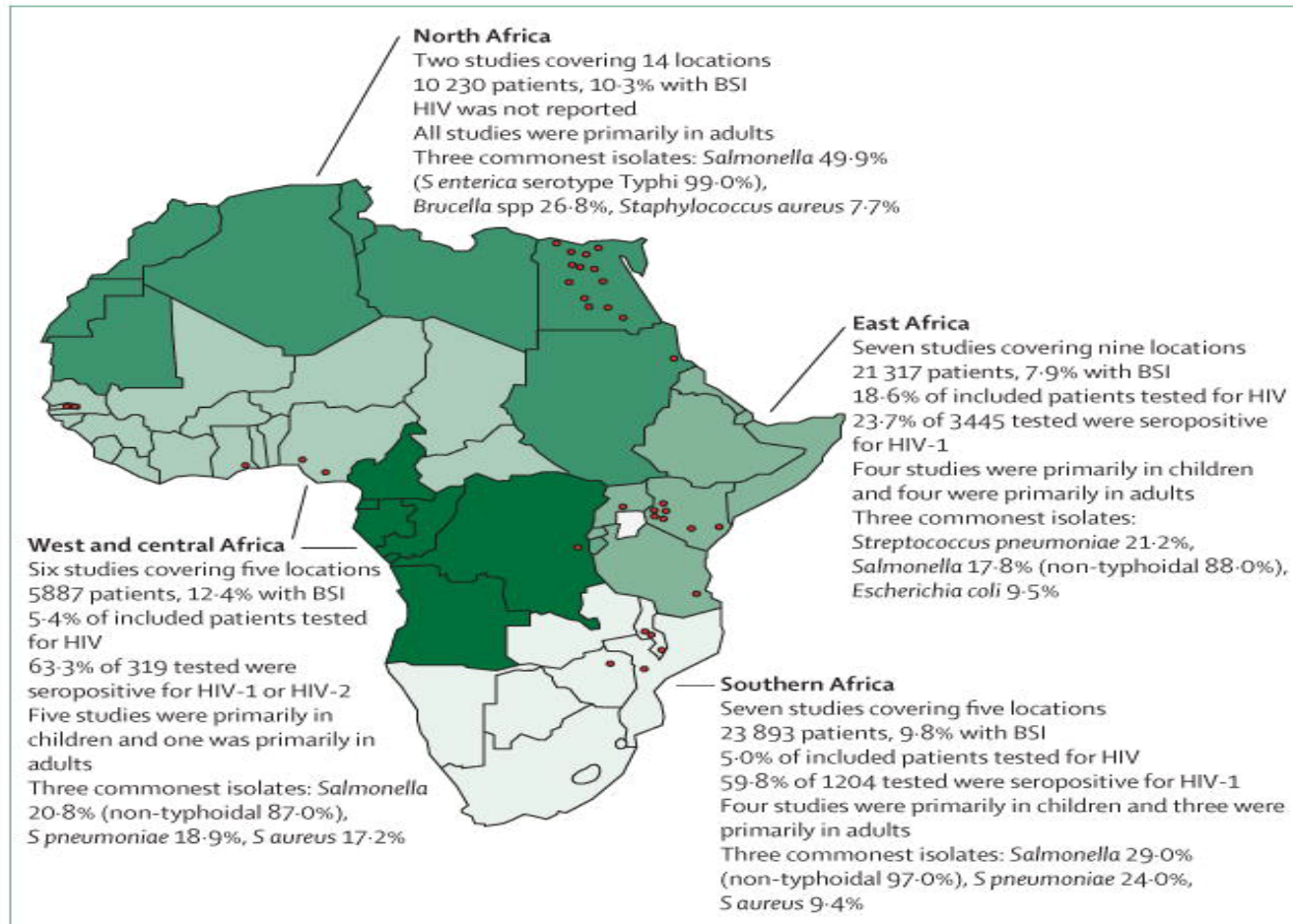
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Overview



- Background
- Community Acquired Bacteremic Syndromes in Nigerian Children- A pilot study
- Epidemiologic surveillance

Epidemiology of Bacteremia in Africa



Risk Factors that Modify Epidemiology of Childhood Bacteremia in Africa

- Malaria
- Hemoglobinopathies
- HIV
- Malnutrition
- Antibiotic use
- ? Other

Background

- Most populated country in sub-Saharan Africa
- High infant mortality
- High under 5yr mortality
- Poorly defined burden of vaccine preventable bacterial diseases
- Poor immunization coverage

Previous Studies

Limitations of previous studies

- Sub optimal laboratory Methods
- Culture media
- Agar preparation- suboptimal blood agar source
- Identification of isolates- misidentification
- Incomplete characterization



Community Acquired Bacteremic Syndrome in Young Nigerian Children (CABS SYNC)

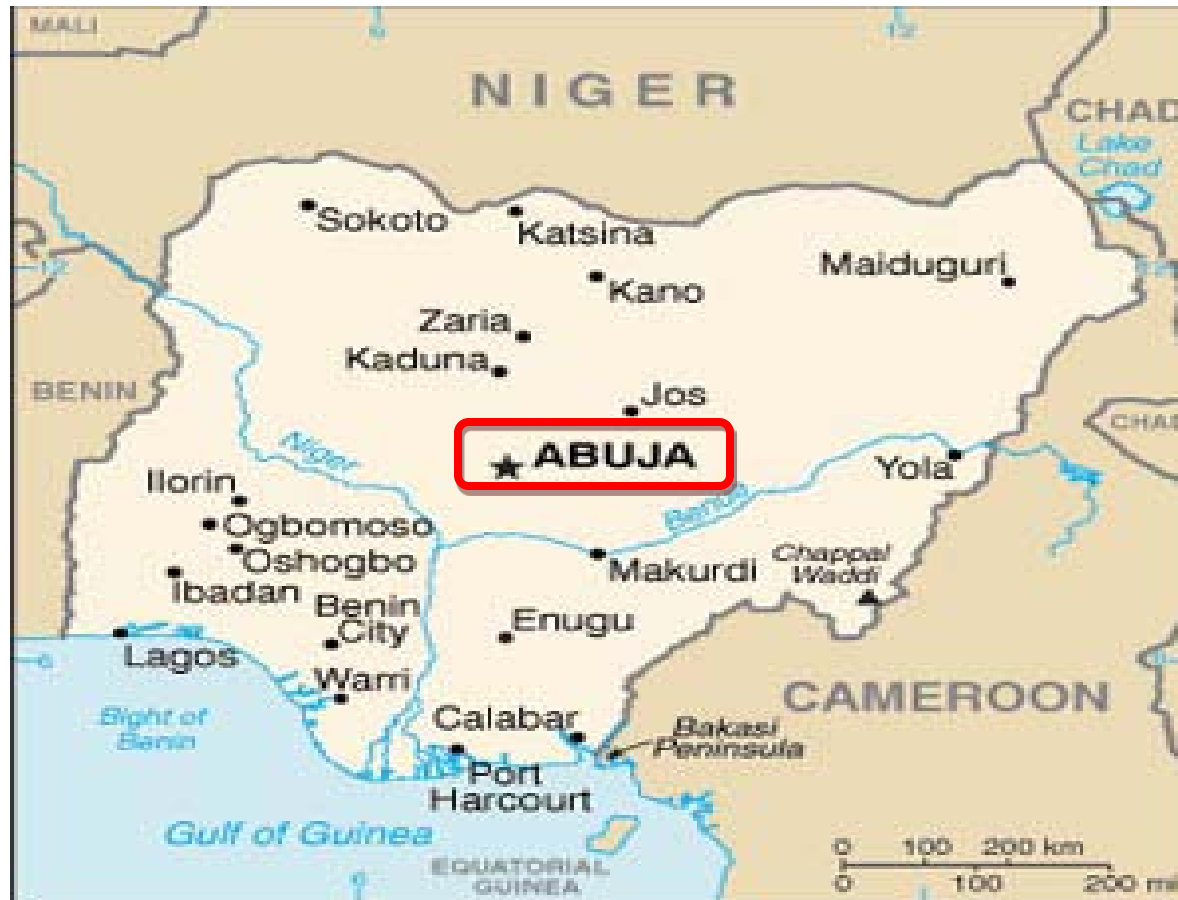
A COLLABORATIVE STUDY
National Hospital Abuja
Zankli Medical Center
MRC Laboratories, The Gambia
Michigan State University
CDC, ATLANTA

Community-Acquired Bacteremia in Young Nigerian Children- A pilot Study

Objectives

- To introduce automated blood culture system to pediatric clinical care
- Pilot study of the etiologic agents of bacteremia in young children in central Nigeria
- Define invasive pneumococcal disease burden

Bacteremia Surveillance in Young Children



Abuja City



Satellite Settlements Around Abuja



Satellite Settlements Around Abuja



Equipping the Laboratory







Laboratory Personnel Training



Methods I

- Enrolment from Sept 2008-
- All children aged 2months-5years
- Fever or hypothermia (temp greater or equal to 38.5°C or less than 34.5°C **plus** prostration, respiratory distress, convulsion or diarrhea
- Informed consent

Methods II

- Blood drawn aseptically into culture bottle with other clinically indicated tests
- Culture bottles incubated for 5 days (max)
- Positive cultures Gram stained and subcultured on appropriate agar plates
- Identification by standard biochemical method (API)

Methods-III

- Secondary ID confirmation of bacterial isolates identity an International Reference laboratory (Medical Council Laboratories, The Gambia or Sparrow Regional Laboratories, Lansing USA).
- Antimicrobial activity in serum was determined by inhibition of *Micrococcus luteus* assay.

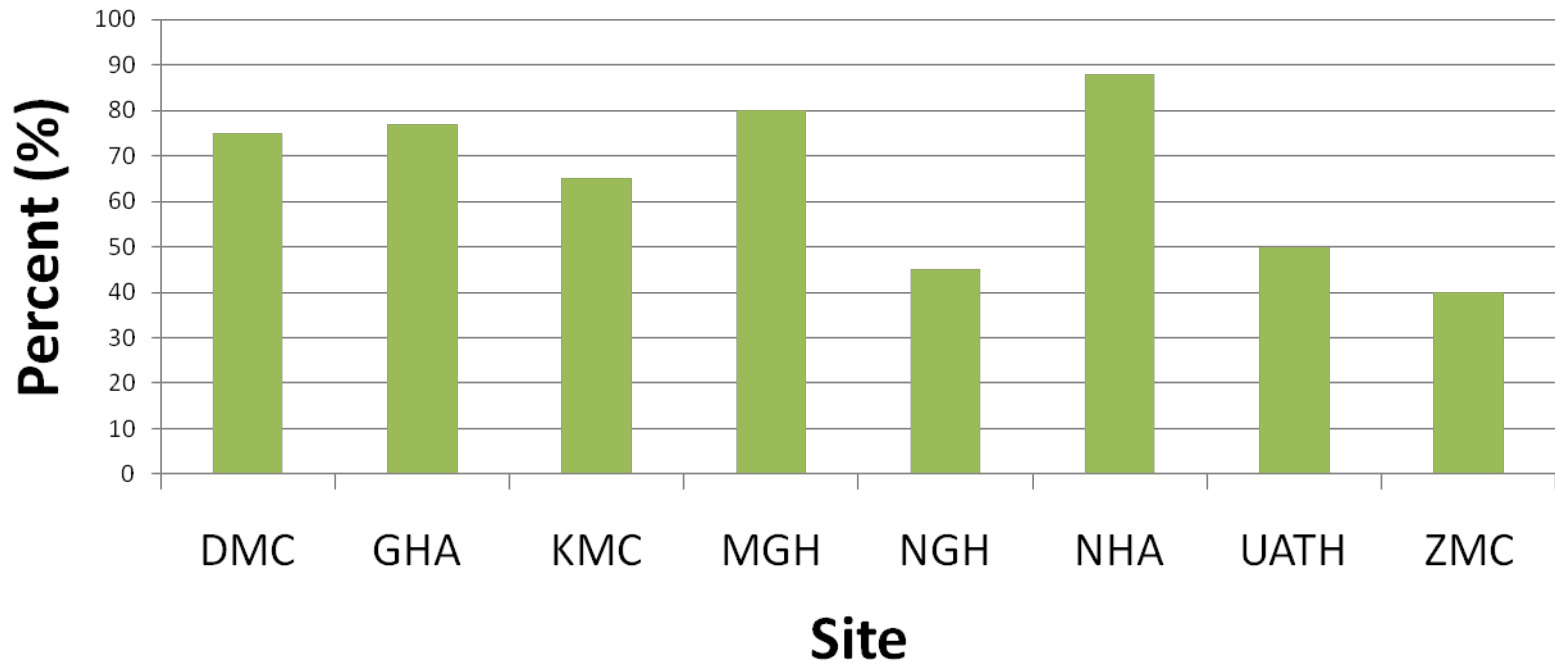
Methods IV

- *Salmonella* isolates were tested for susceptibility to a panel of 15 antimicrobials used by the NARMS program.
- Antimicrobial MICs of *Salmonella* isolates were determined via the Sensititre automated antimicrobial susceptibility system

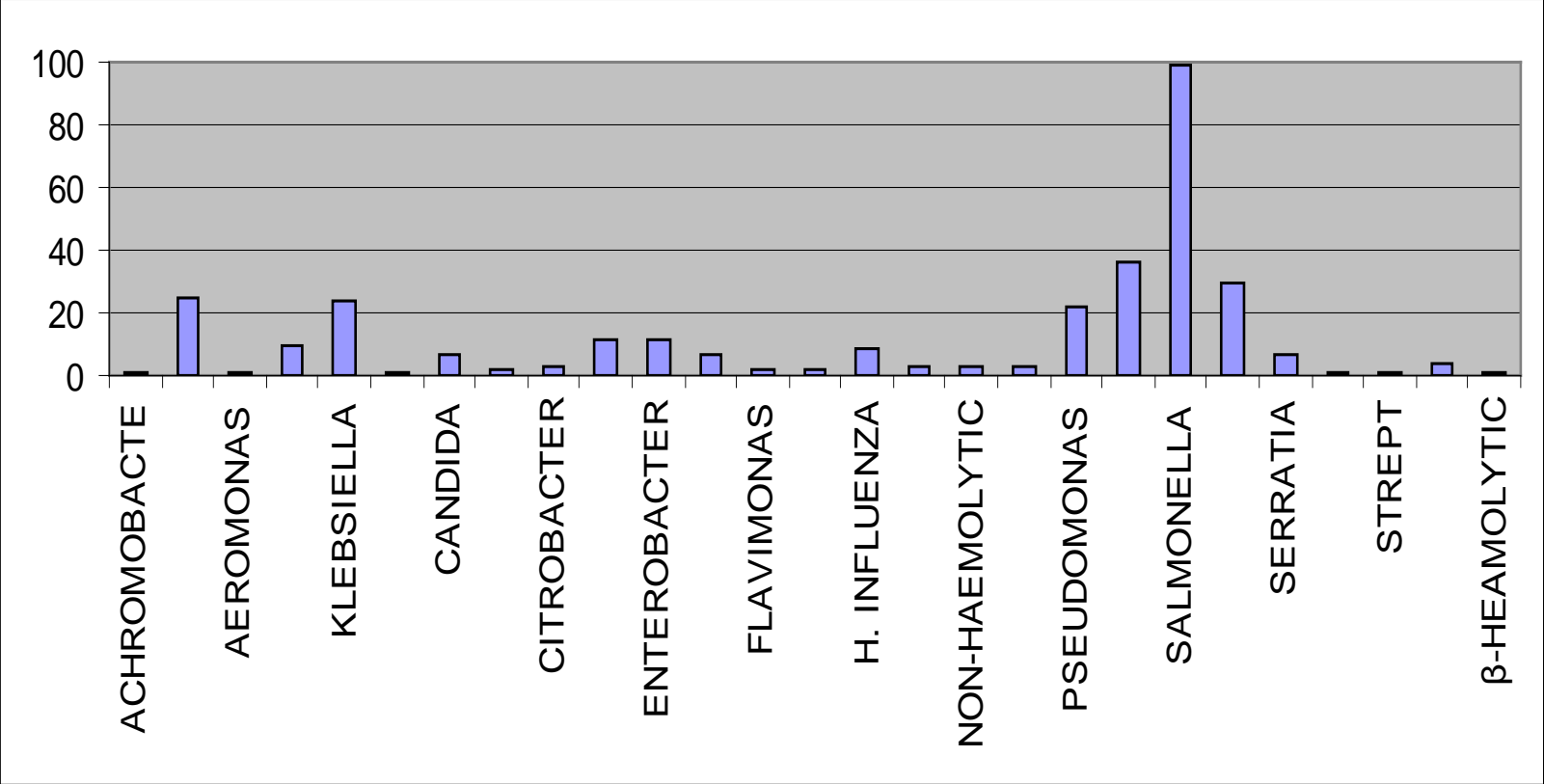
RESULTS

Pre-Consultation

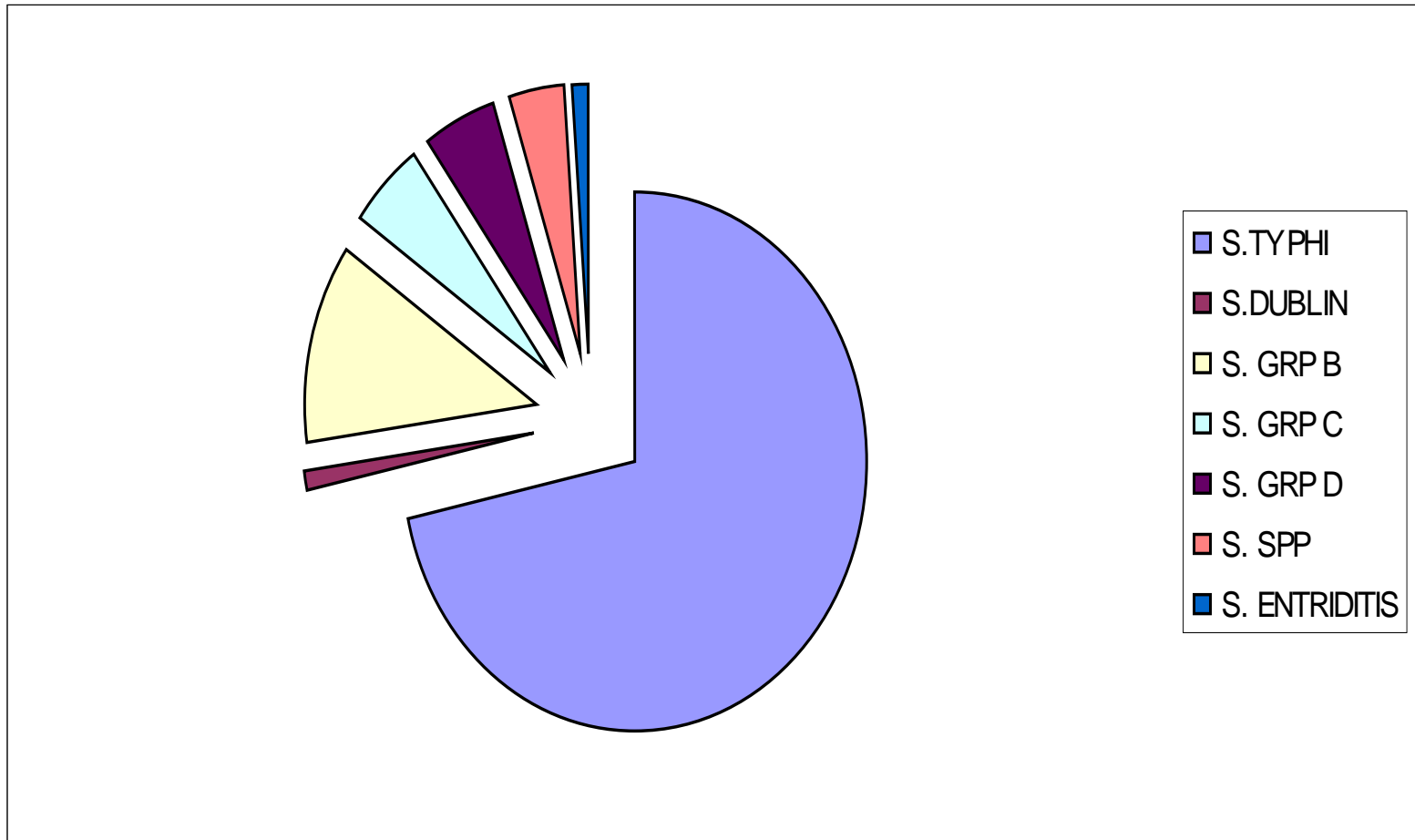
Fig 2. Serum Antimicrobial Activity in Sub-Population by Site



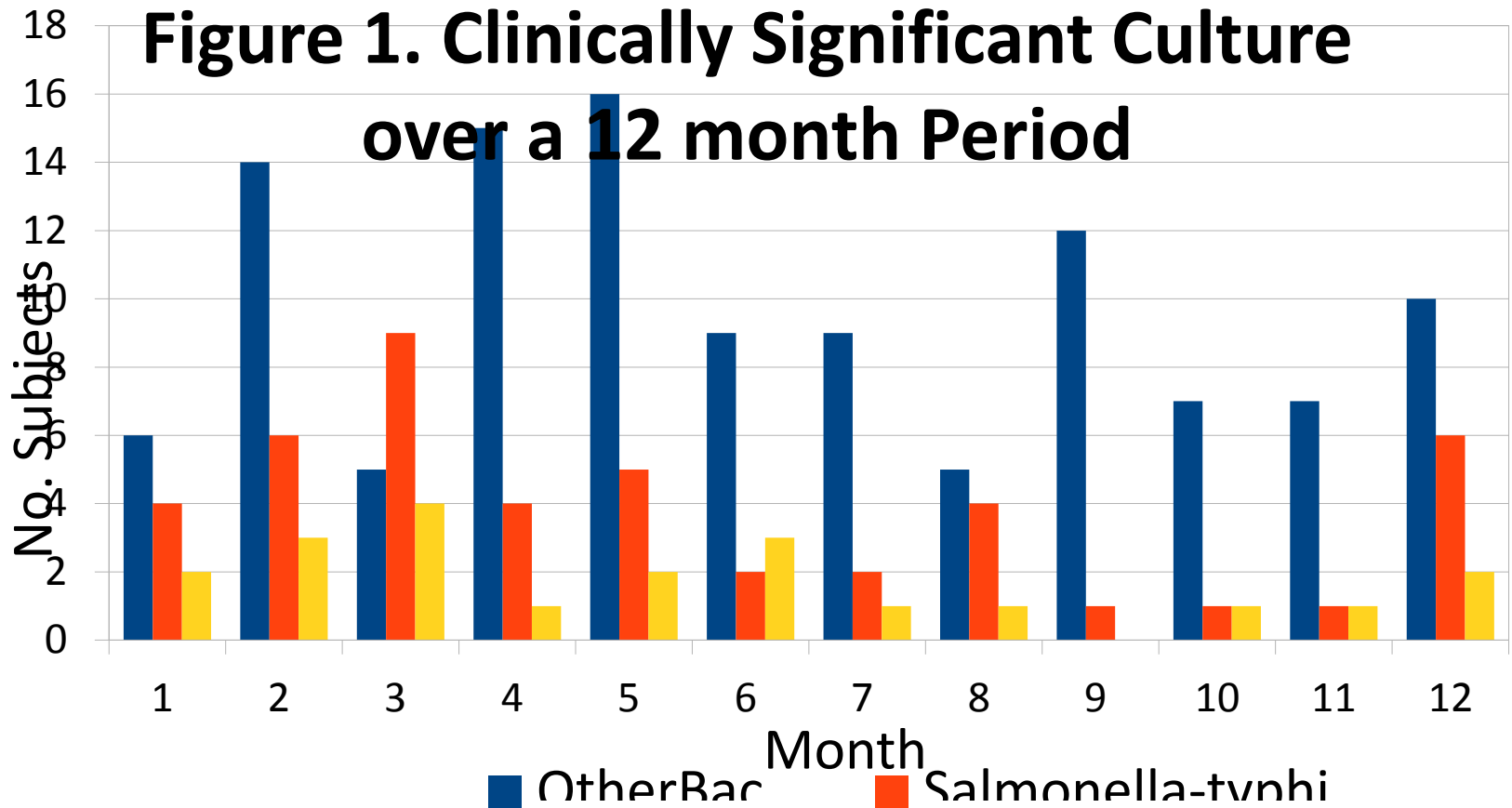
Distribution of Bacterial Isolates



Distribution of Salmonellae Isolates



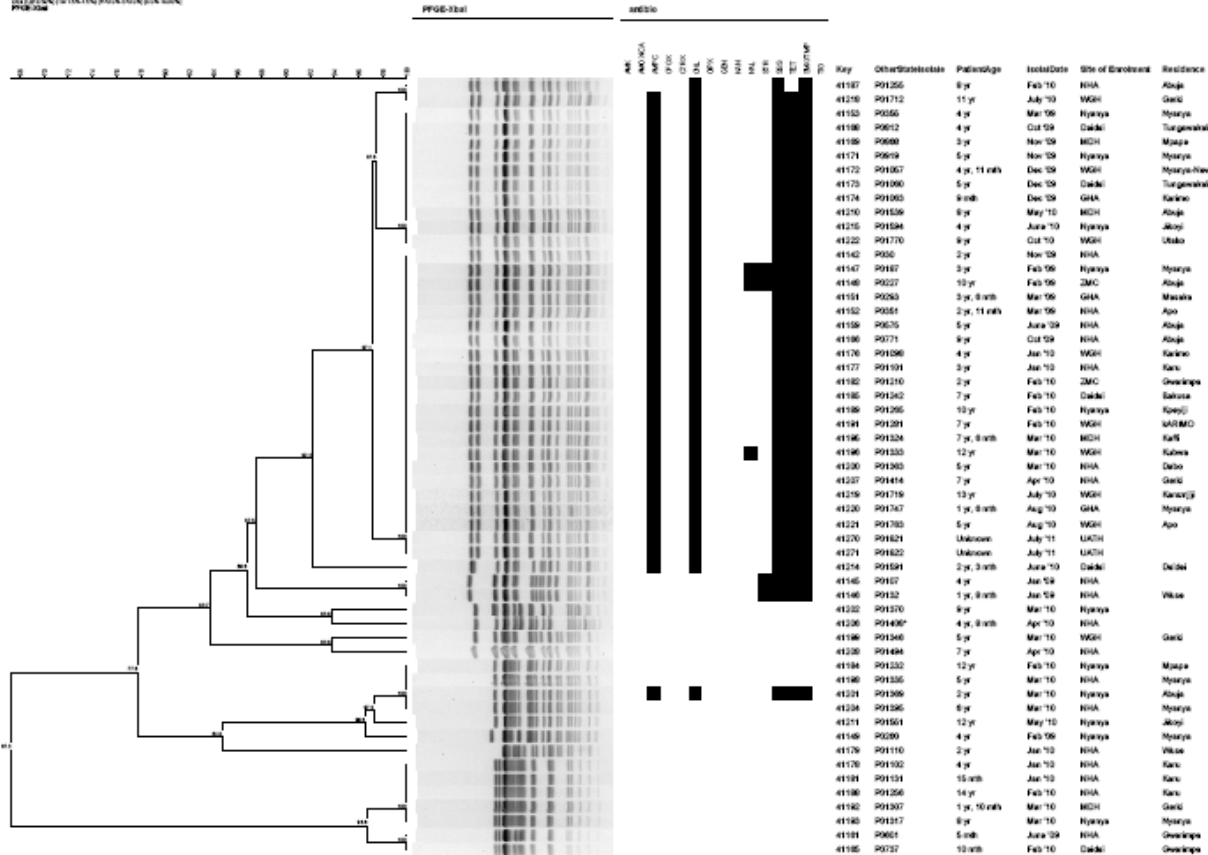
Seasonal Distribution of Etiologic Agents of Bacteremia



S. Typhi

404.04 WHO-GFN Sal Typhi (55 entries)

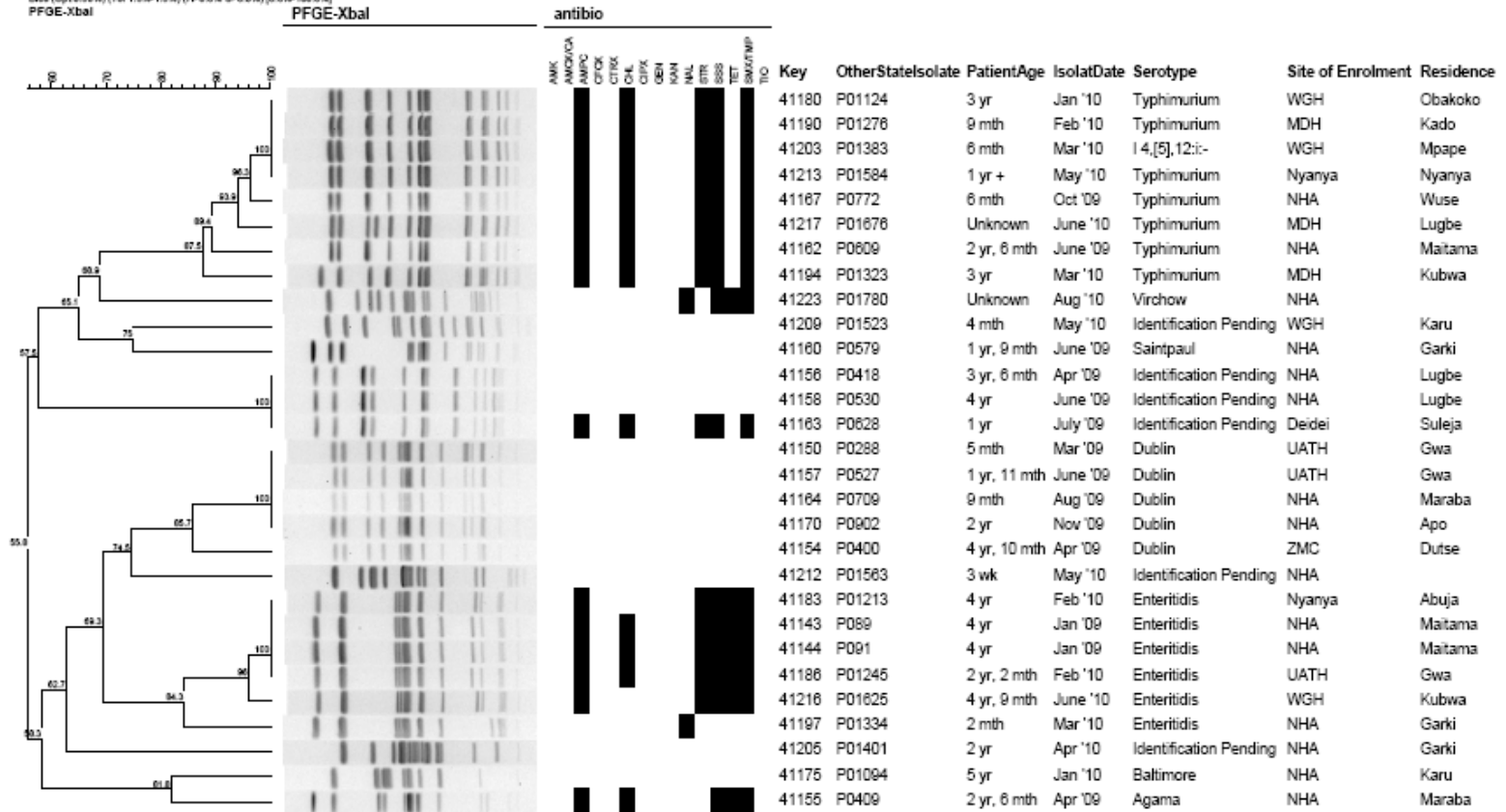
Shigella (Salmonella) Typhi (55 entries)
PFGE-Net



NTS

404.04 WHO-GFN nonTyphi (29 entries)

Dise (Op(10.50%) (Tot 1.5%-1.5%) (H+0.0% S+0.0%) (0.0%-100.0%)
PFGE-XbaI



Molecular Pattern of Salmonella Isolates

Certain PFGE pattern clusters correlated well with their antimicrobial resistance profiles.

- All 8 *S. Typhimurium* isolates, showed the ACSSuT resistance profile, and all five Dublin isolates were completely susceptible to all antimicrobials tested.
- One major clone of Typhi contains 34 isolates, all were resistant to 3 to 7 antimicrobials and majority of them were resistant to AMPC- CHL- SSS-TET- SMX/TMP

Conclusions

- In central Nigeria, *Salmonellae* spp are the leading cause of CAB in young children
- There is high prevalence of MDR *Salmonella* infection
- Use of culture-based surveillance alone may underestimate disease burden
- Expanded surveillance is required at other locations
- Epidemiologic studies to identify host and environmental risk factors will inform optimal preventive strategies

Bacteremia Surveillance in Young Children



Future Studies

- Community-Acquired Pneumonia and Invasive Bacterial Disease in Young Children
 - Etiologic agents of community acquired pneumonia, bacteremia, meningitis
 - Identification of host risk factors
 - Incidence estimates
- ?Epidemiology of Invasive Salmonellosis

