



1ST CAMBODIAN NATIONAL MEDICAL
LABORATORY QUALITY CONFERENCE

June 11-12, 2019

Strengthening Diagnostic Testing Capacity to Identify Salmonella Isolated from Blood Culture at Takeo Hospital Laboratory

**Ph Chak chanthou, MicroLab Manager
Takeo Provincial Referral Hospital (TPRH)**

Background

- **Microbiology testing was initiated in 2011 at the Takeo Hospital laboratory.**
 - Improving evidence base for treatment of patients.
 - Improve understanding of bacterial agents causing infection in patients.
- **In 2019, 6 microbiologists working in Takeo microbiology laboratory.**



Objective

- 1. Improve the Lab's capacity for Identification and AST of Salmonella species.**
- 2. Provide more timely report to clinician**
- 3. Notification to the MoH for Surveillance efforts.**

Method

- 1. Reviewing laboratory document, including a flowchart developed by DMDP, SOP and Job aids**
- 2. Recognition of colony morphology on different media**
- 3. Improving *Salmonella* record on worksheets**
- 4. Implementing Standardized Laboratory Information System (LIS) report to ensure immediate notification.**
- 5. Sending suspected isolate to confirm at referral laboratories**

Method

- Reviewing laboratory document, including a flowchart, SOPs and job aids developed by DMDP

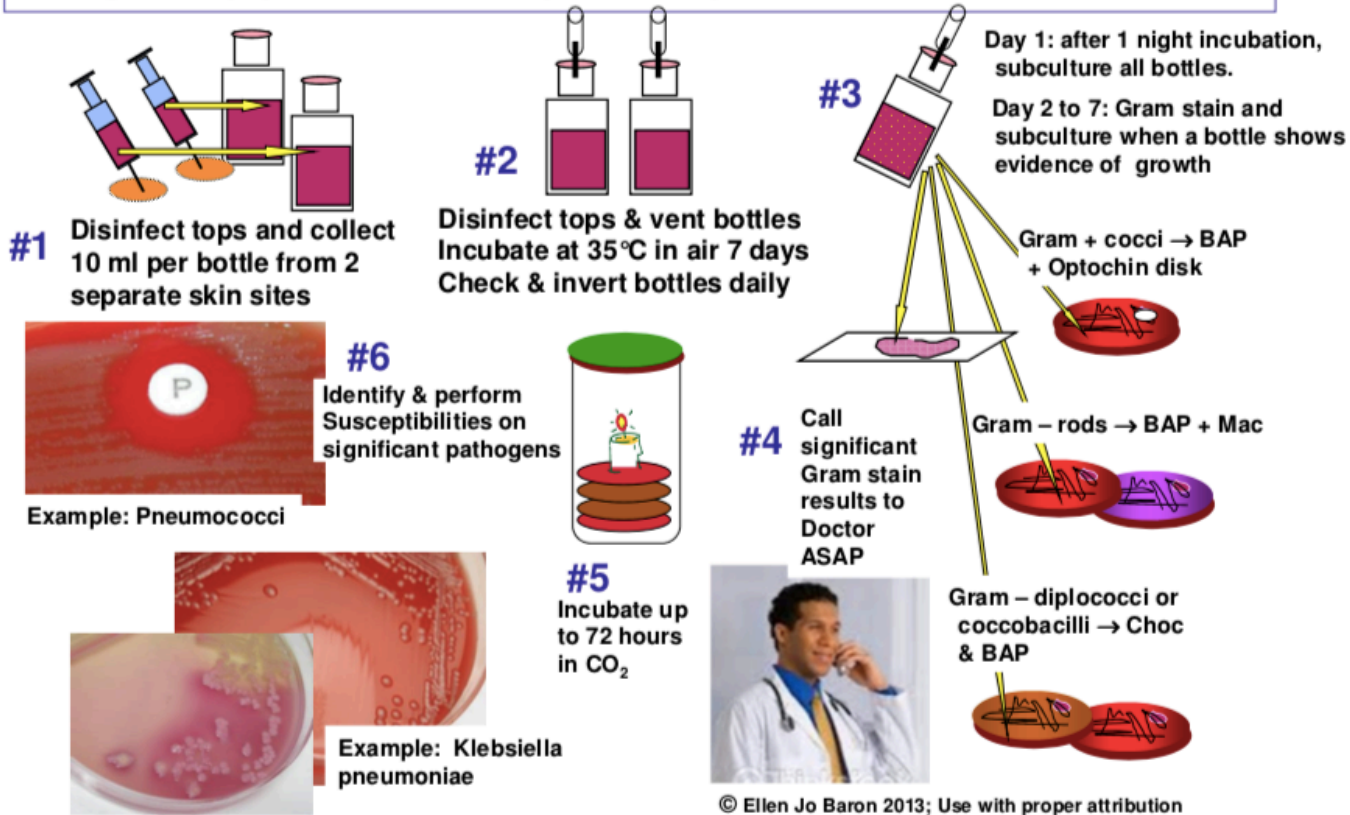


Method

Blood culture processing

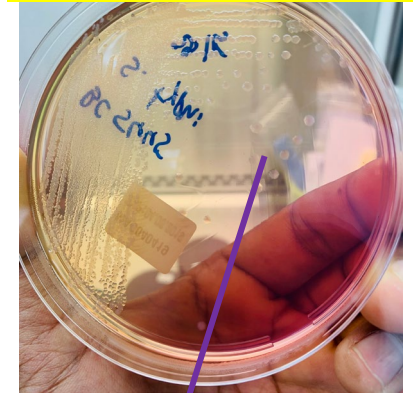
Blood Culture

Primary pathogens: Salmonella, Brucella, Other Gram – rods, Staphylococcus aureus, Streptococcus pneumoniae, Haemophilus influenzae, Burkholderia pseudomallei
NOT pathogens unless recovered from >1 separate blood culture: Bacillus sp., coagulase negative staphylococci, viridans streptococci, coryneform Gram + rods



Colony morphology on MAC, HE and biochemical media

MacConkey agar (MAC)

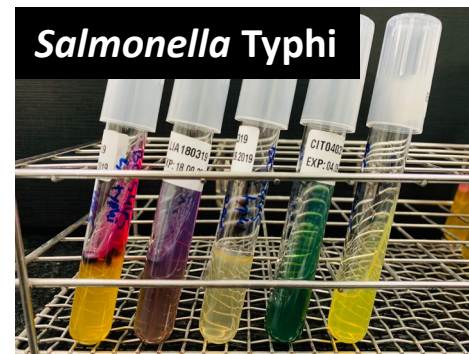


Non-lactose fermenting colonies

Green colonies

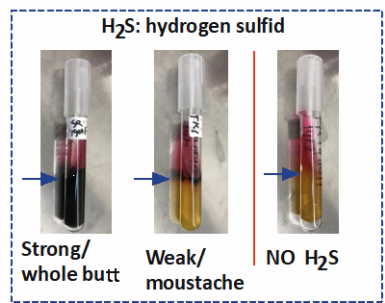


Hektoen Enteric agar (HE)



Method

Presumptive identification

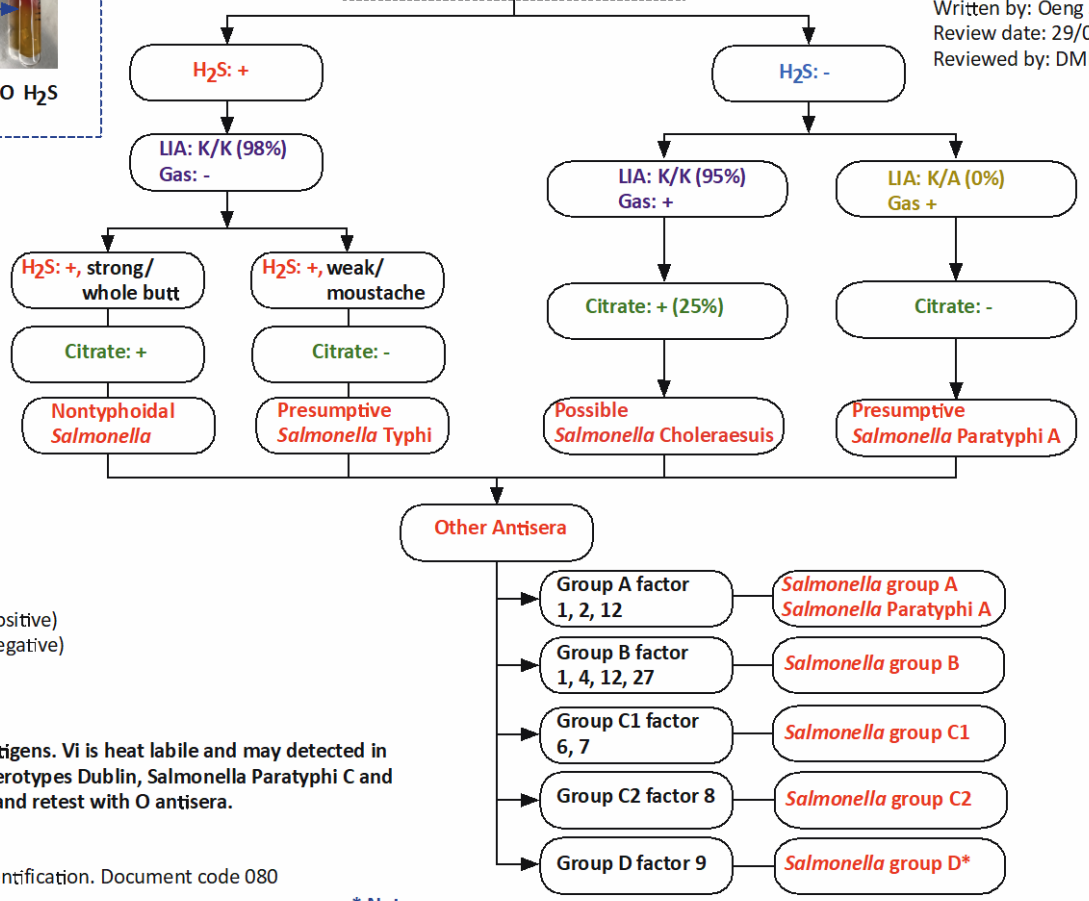


Urea: -
 Oxidase: -, Indole: -
 Motility: +
 KIA: K/A
 Salmonella O Polyvalent Antisera : +
 PYR (optional) : -

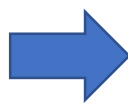
Job aid: Presumptive Identification *Salmonella* (blood isolate)



Document code: 221
 Version: 002
 Effective date: 18/02/19
 Written by: Oeng Sopheap
 Review date: 29/04/19
 Reviewed by: DMDP



Isolates were sent to referral labs (NPHL and NAMRU-2) For confirmation



NPHL: National Public Health Laboratory
 NAMRU-2: Naval Medical Research Unit 2

Keywords:
 KIA: Kligler Iron agar
 K/A: glucose fermentor
 LIA: Lysine Iron agar
 LIA: K/K (Lysine decarboxylase positive)
 LIA: K/A (Lysine decarboxylase negative)
 K: alkaline, A: acid

Note: Vi antigen can mask O antigens. Vi is heat labile and may detected in Salmonella Typhi, Salmonella serotypes Dublin, Salmonella Paratyphi C and some Citrobacter strains. Heat and retest with O antisera.

Reference:
 - Job aid, Enterobacteriaceae Identification. Document code 080
 - Gary W. Procop et al. Koneman's color atlas and textbook of Diagnostic Microbiology, 7 ed, 2017

*** Note:**
 If biochemical tubes do NOT match Salmonella Typhi, Report Salmonella group D-not Typhi
 If biochemical tubes match Salmonella Typhi, Report Presumptive Salmonella Typhi

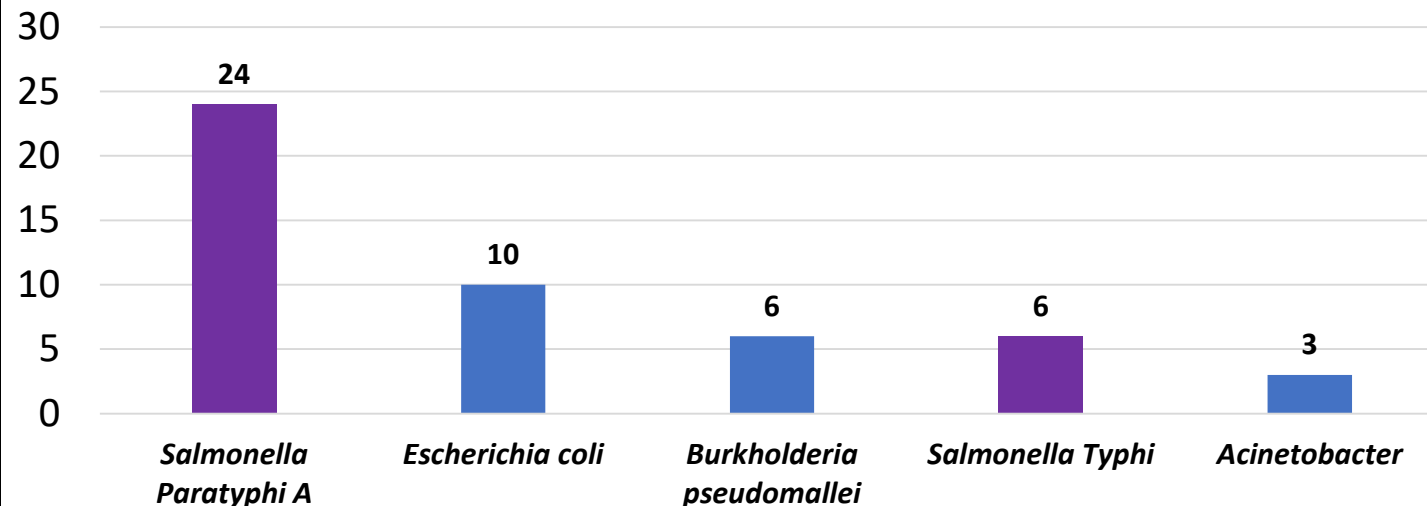
Results

Total Blood culture January to May 2019

Total number of blood culture patient requests	1097
Blood stream Infection-Clinically Significant Organisms	72
Total blood culture bottles with contamination	45

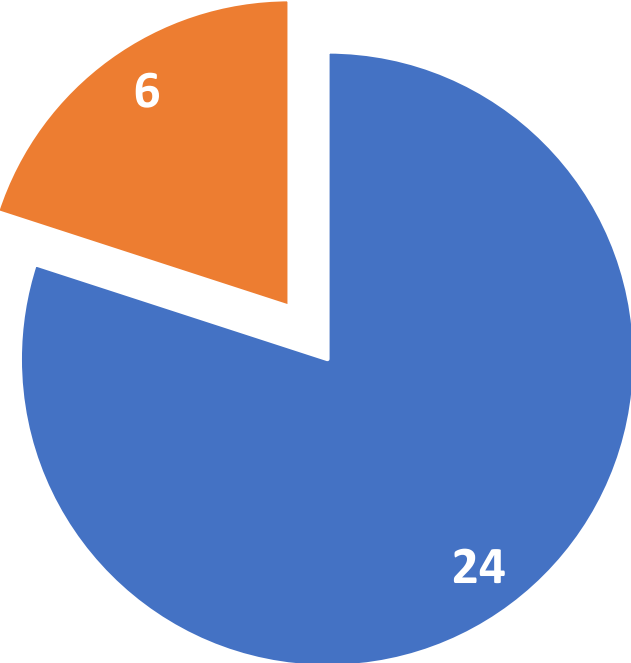
Top Five Blood stream Infection-Clinically Significant Organisms From January to May 2019

n = 49



Results

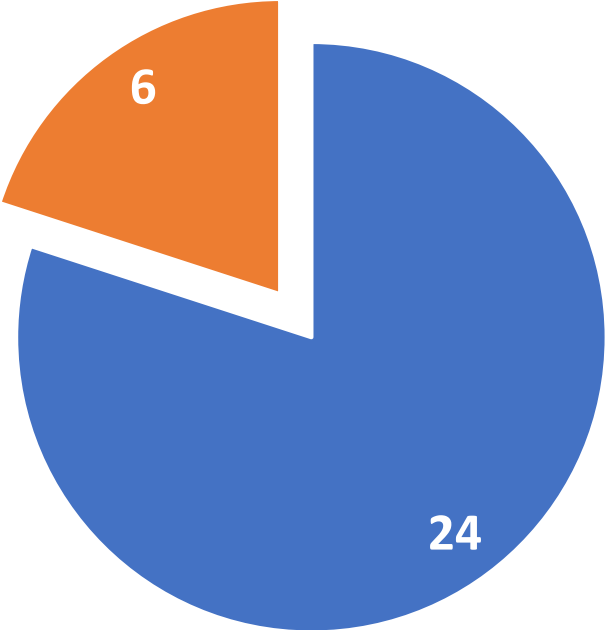
Presumptive Identification
Salmonella
n = 30



No result discrepancies were found, indicating a **100%** accuracy identification and AST



Isolates were sent to referral labs
(NPHL and NAMRU-2) for
confirmation
n = 30



■ *Salmonella Paratyphi A* ■ *Salmonella Typhi*

■ *Salmonella Paratyphi A* ■ *Salmonella Typhi*

Conclusion

- ❖ Presumptive identification of the *Salmonella* by the Takeo microbiology laboratory matched result confirmation by NPHL and NAMRU-2.
- ❖ Presumptive Identification allowed :
 - Rapid reporting to clinician
 - Timely notification to Cambodia CDC

ប្រសិនបើអ្នករកឃើញមេរោគទាំងនេះ

ទូរស័ព្ទទៅកាន់
នាយកដ្ឋានប្រយុទ្ធនឹងជំងឺឆ្លង

115
012 488 981
089 669 567

រាយការណ៍ករណីទាំងនេះ ជាបន្ទាន់
<i>Vibrio cholerae</i> (សំណាក ឈាម)
<i>Bacillus anthracis</i> (គ្រប់សំណាក)
<i>Yersinia pestis</i> (គ្រប់សំណាក)
<i>Francisella tularensis</i> (គ្រប់សំណាក)
<i>Corynebacterium diphtheriae</i> (យកដោយតំបាវ)
រាយការណ៍ពេលមានករណី ៣ ឬ ច្រើន ក្នុងមួយសប្តាហ៍
<i>Salmonella Typhi</i> (សំណាក ឈាម)
<i>Salmonella Paratyphi</i> (សំណាក ឈាម)
<i>Streptococcus suis</i> (ការបណ្តុះឈាម, ទឹកខ្លាំងខ្លាញ់)
<i>Burkholderia cepacia</i> (សំណាក ឈាម)
<i>Vibrio parahaemolyticus</i> (ឈាម)

Acknowledgement

- ❖ **We gratefully acknowledge the support provided by:**
 - **Ministry of Health (MoH)**
 - **Hospital Management**
 - **Diagnostic Microbiology Development Program (DMDP)**
 - **World Health Organization (WHO)**
 - **Merieux Foundation**



Reference

- **DMDP SOP code 233 and job aid (Presumptive identification *Salmonella*).**
- **Ellen Jo Baron 2013, blood culture flowchart.**
- **Takeo cumulative blood culture data 2019 (excel file).**
- **Confirmation result from referral labs (NPHL and NAMRU-2).**
- **Cambodia CDC notification List.**