

Report on Cluster of Cases of Group B Streptococcus Infections at the Victoria Jubilee Hospital

October 13, 2016

Background & Summary

On 27 September 2016, the Medical Officer in the Surveillance Unit of the Kingston and St. Andrew Health Department (KSAHD) received an email from the Microbiologist at the National Public Health Laboratory (NPHL). It concerned a verbal report from Victoria Jubilee Hospital (VJH) which made mention of the occurrence of four cases of *Group B Streptococcus* Bacteraemia at the Special Care Nursery (SCN)/Neonatal Care Unit (NCU), VJH, with resultant neonatal deaths in September 2016. A preliminary investigation was initiated.

The four (4) infants who demised were newborns delivered at the VJH, Labour Ward (LW). One was born premature and was admitted directly from LW to the Special Care Nursery (SCN)/Neonatal Care Unit (NCU). One term neonate was also admitted directly from LW. The other 2 term neonates spent a few hours with their mothers on the Postnatal Ward, VJH (4th Floor) before being admitted to the SCN/NCU. Investigations revealed there was also a fifth case which survived.

A timeline for the babies' diagnosis is outlined in Table 1 and Table 2 summarizes the antibiotic sensitivity patterns for the isolated organism. The Streptococcus was isolated from the blood cultures of the neonates.

On October 8, 2016, an email was received from the Microbiologist at the National Public Health Laboratory (NPHL) which outlined the results of the **35 Environmental Swabs** taken from the Labour Ward and Neonatal Nursery on September 28, 2016.

NO Group B Streptococcus (GBS) was isolated from the swabs submitted from the units in question.

There have also been no further reports of GBS related deaths or infections.

Epidemiology of the Outbreak

The K.S.A.H.D. received an informal email report about the cases on September 27, 2016. Subsequently, formal reports were received from the Infection Control Nurse and one of the Paediatricians who was involved in management of three (3) of the cases. The cases had favorable sensitivity patterns. All the cases have admission to NCU in common.

All infant deaths (four of five cases) in the month of September 2016 occurred within 2 days of birth (range 7 hours - 2 days); the surviving infant was diagnosed following results of the blood culture investigation initiated within first 24 hours of life. These findings are in keeping with early onset *Group B Streptococcus* infection in which ***the transmission mode is from Mother to Infant as opposed to being a health care facility associated infection.***

Actions Taken by Health Department

- The Environmental Health Team of the KSAHD conducted a rapid assessment of the Special Care Nursery of the Victoria Jubilee Hospital on September 28, 2016 with the intent to identify any significant infection control deficiencies.
- The CMO, The National Epidemiology Unit and Regional Technical Team were notified on September 28, 2016.
- Dialogue was had between the SMO (H) and Acting SMO, VJH about cases and the established mechanism for notification in the event of suspected outbreak or unusual public health occurrence.
- The Health Records of the all infants with infection were reviewed.
- Dialogue with SMO, VJH to obtain data requested by National Epidemiologist at the MOH

Other Interventions

- Staff re-sensitization was conducted on Infection control measures
- Swabbing of cots, monitors and delivery beds within the Nursery and the Labour Ward was done on September 28, 2016.
- Deep cleaning of the delivery room in the Labour Ward and a room in the Nursery, inclusive of all high surfaces e.g. window ledges was done on September 28, 2016.
- Meetings were held by Management team at Victoria Jubilee Hospital.

Results of Swabbing

Results from swabs of the facilities did not identify Group B Strep, however other organisms were identified:

a. *Alcaligenes spp* isolated from: 1. Sundry Tray [Rm #1] Nursery, "Neo-Puff" Machine [Rm #1] Nursery, Patient Monitor #2 [Rm #1] Nursery

b. *Acinetobacter spp* was isolated from: Surface Area of Cot B,

"Neo-Puff" Machine #2 [Rm #1] Nursery, Suction Machine #1 [Rm #1] Nursery, Patient Monitor #1 [Rm #1] Nursery, Patient Monitor #2 [Rm #1] Nursery.

The aforementioned deep cleaning would have addressed the two organisms found.

Descriptive Epidemiology

Baby	Sex	GA	DOB	DOA	Age at Onset	Clinical Interventions	DO Death or Discharge	Age at Death or Discharge
1	F	37+4/40	11-09-16	13-09-16	Day 2	ETCPAP, IPPV	13-09-16	2/7
2	M	34/40	12-09-16	12-09-16	Day 1	ETCPAP, IPPV	12-9-16	7 hours
3	F	40+2/40	15-09-16	16-09-16	Day 2	Intubation, NCPAP	19-09-16	4/7
4	F	37/40	19-9-16	20-9-16	Day 2	facemask oxygen, saline nebulizations, ETCPAP and IPPV	21-9-16	2/7

5	M	39+5/40	20-9-16	20-9-16	Day 1	NCPAP, ETCPAP, NGT, gastric lavage, FFP	21-9-16	1/7
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*All infants were Spontaneous Vaginal Deliveries

Table 2 Streptococcus Antibiotic Sensitivity Pattern

<i>Name</i>	<i>Antibiotic Sensitivity Pattern</i>				
	<i>Ampicillin</i>	<i>Vancomycin</i>	<i>Erythromycin</i>	<i>Clindamycin</i>	<i>Penicillin</i>
1	S	S	S		
2	S	S	S	S	
3	S		S	S	
4	S	S	S		S
5	S	S	S	S	S

GROUP B STREPTOCOCCUS INFECTION

Streptococcus is a gram positive bacterium which appears as chains on gram staining. Group B streptococcus is a serologically distinct species of Streptococcus.

Group B streptococcus can colonize the vagina and rectum of up to 30% of pregnant mother and has been isolated from 45-63% of their male partners. This therefore suggests that sexual transmission may be possible.

Overall 3-12 % of newborn babies are colonized and it has also been recognized that about 40-70% of babies born to colonized mothers will become colonized.

Group B has been recognized to be an important causative agent in neonatal infections (infections in infants in the first 28 days of life). The incidence of Group B streptococcal infection was reported to be 1.3 -1.8/1000 live births in the United States, but with clinical interventions have fallen to about 0.3/1000 births.

Two (2) types of infections have been recognized:

- (1) Early onset – occurring in the first 7 days of life
- (2) Late onset- occurring between days 7 of life and 3 months.

Early onset disease can lead to sepsis (infection of the blood), pneumonia and meningitis. Similar illnesses are associated with late onset disease with meningitis being more common in late onset than early onset disease.

Early onset disease is usually acquired from the mother. All the cases that occurred on the Nursery at Victoria Jubilee Hospital in September 2016 fell in this category.

Late onset disease can be passed on from the mother to child (vertical transmission), but can come from other sources (horizontal transmission). Horizontal transmission can occur from an infected environment.

Risk factors for early onset disease

- Group B streptococcus detected on routine screening
- Group B Streptococcus detected in the mother's urine during pregnancy
- Labour occurring before 37 weeks (Preterm labour)
- Prolonged rupture of membranes (long time between water breaking and delivery (18 hours or greater.
- Mother having a baby previously with early onset disease
- Mother having a fever during labour

The risk factors for late onset disease are unknown.

Strategies used to prevent transmission from mother to child

- Identifying at risk mothers
- Routine screening at 35-37 weeks, only done in the United States.
- Administration of antibiotics during labour in at risk mothers.
- The use of a vaccine is being investigated.

THE CASES

Since the start of 2016 eight positive cultures reported in neonates at the Victoria Jubilee Hospital; 7 with Group B streptococcus and one with Beta- haemolytic Streptococcus (which can be presumed to be Group B streptococcus). These positive cultures were reported in the months of April, August and September 2016.

One (1) neonate had positive culture in April 2016 and two (2) infants had positive cultures reported in August 2016.

Regarding the neonates in August, one had a positive blood culture and the other had a positive urine culture. These two infants were successfully treated and were discharged and are being followed in the clinic.

Of the five (5) neonates who had positive cultures in September 2016, four (4) infants demised and the fifth (5th) was successfully treated and discharged.

Of the 8 infants; 6 were born at term (greater than 37 weeks), and 1 was preterm, for 1 the data is unavailable.

None of the mothers had prolonged rupture of membranes, the longest interval between rupture and delivery was 17 hours.

One mother was noted to have a vaginal discharge during pregnancy and was prescribed treatment.

References

Nosocomial Transmission of Group B Streptococci Proven by Positive Environmental Culture; Amal Al-Maani et al; Oman Medical J. 2014 Sep 29: 376 - 379

Group B Streptococcus for Clinicians; Centre for Disease Control; Content source: National Center for Immunization and Respiratory Diseases, Division of Bacterial Diseases

RECOMMENDATIONS FOR HOSPITALS WITH MATERNAL SERVICES

1. That the protocol be established which speaks to all patients in premature labour, and fever in labour to be swabbed and antibiotic treatment appropriately given.
2. That the protocol for administering antibiotic prophylaxis to patients with prolonged rupture of membrane for greater than 18 hours be changed to 12 hours.
3. The infection control team should monitor to ensure the MoH Infection control audit instrument as a check list / monitoring tool on a monthly basis.
4. To establish an infection control nursing post at all our hospitals across the island.
5. Procedures for routine cleaning must be strictly adhered to.
6. Ensure that the protocol for counseling and psychological support for mothers with neonatal deaths be adhered to.

Cost to implement screening for all pregnant women in Jamaica

- We would estimate a total of 80,000 swabs per year and an additional 12000 antibiotic courses (Assuming 40,000 deliveries per year).
- 80,000 swabs @ J\$1,500 = \$120M
- 12,000 courses of antibiotics @ J\$4,000 = \$48M

It must be noted that in the UK without screening the incidence of early onset GBS 0.5/1000 is similar to USA and Canada where routine screening is practiced. The mortality rate in all these jurisdictions is 50%.

Epidemiological Assessment of the Deaths at the Victoria Jubilee Hospital

The objective of the assessment is to determine if the neonatal deaths occurring in 2016 at the Victoria Jubilee Hospital is greater than normally seen. The neonatal deaths is considered normal if it falls within two standard deviations (SD) of the mean. An epidemic or outbreak is an increase in the neonatal deaths clearly beyond what is considered normal for a geographical area or facility. Hospital Monthly Summary Report (HMSR) produced by the Ministry of Health was used to obtain the births and deaths. The 5-year period of 2011 to 2015 was used to determine the normal values for the neonatal deaths.

Findings and Inferences

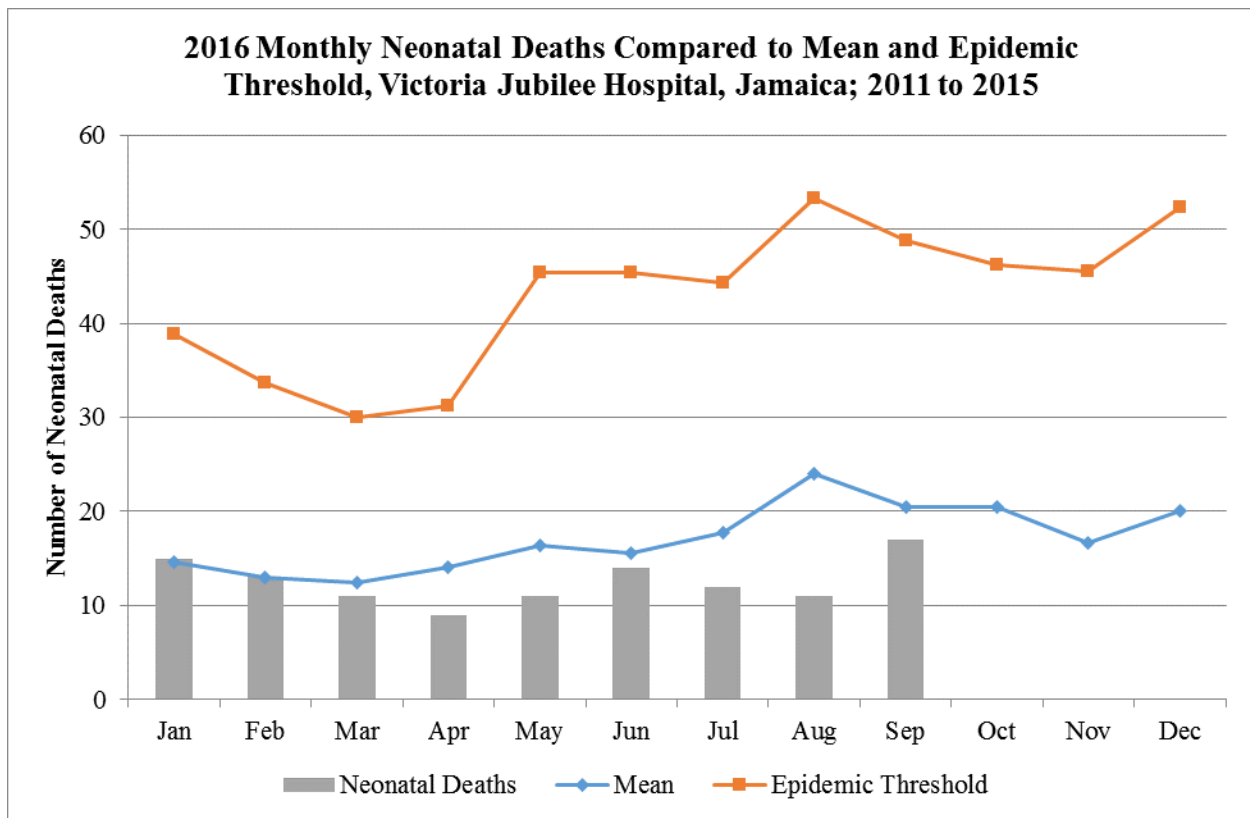


Figure 1: 2016 Monthly Neonatal Deaths Compared to Mean and Epidemic Threshold, Victoria Jubilee Hospital, Jamaica; 2011 to 2015

The number of neonatal deaths and neonatal death ratio for 2016 for the Victoria Jubilee Hospital were within two standard deviation of the mean (figures 1 and 2). Indeed, it fell below the mean.

Inference: The neonatal deaths in 2016 is normal and there is no outbreak of neonatal deaths from January to September 2016 at the Victoria Jubilee Hospital.

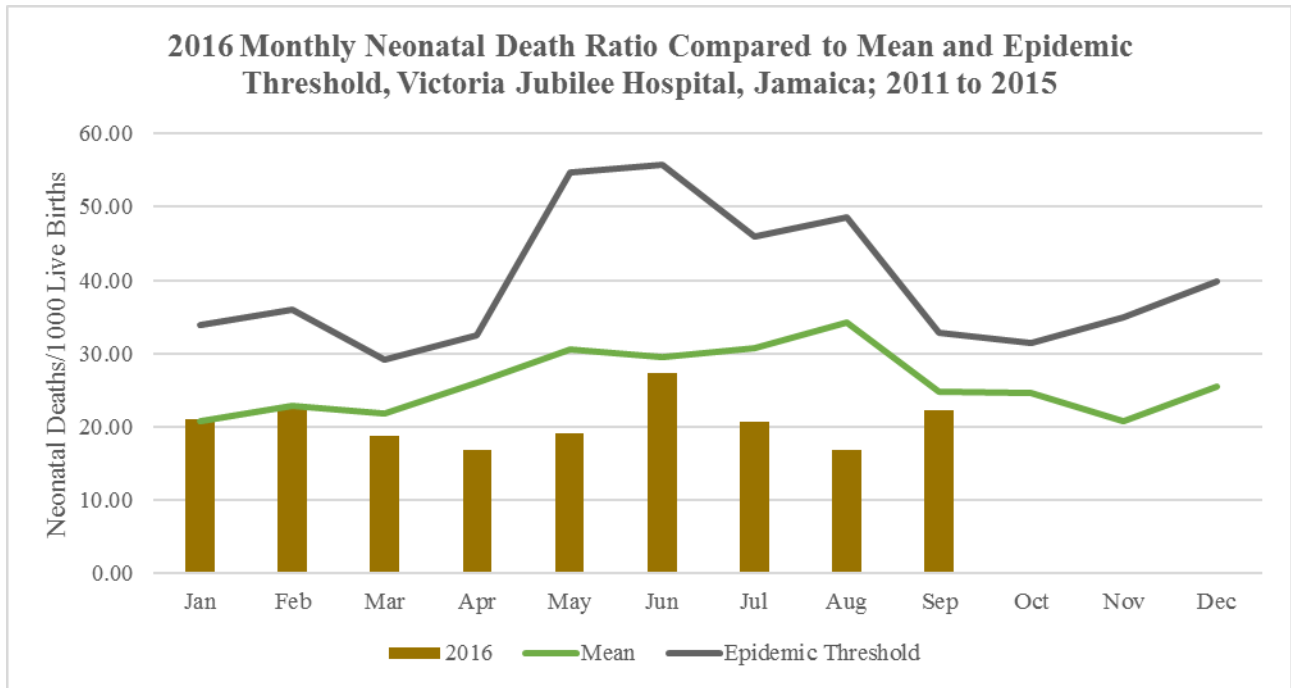


Figure 2: 2016 Monthly Neonatal Death Ratio Compared to Mean and Epidemic Threshold, Victoria Jubilee Hospital, Jamaica; 2011 to 2015