ROTAVIRUS
SURVEILLANCE IN AFRICA

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7th Rotavirus Symposium, Lisbon (12th-13th June 06)
Rotavirus Activities in Africa

- Laboratory – based ARN
- Rotavirus epidemiology/Burden of Disease in Africa
- Preparing to implement sentinel, Hospital-based AFR RSN, 2006
“Rotavirus Vaccines for Immunization of Children in Developing Countries”

WHO Workshop, Geneva, 1997

• Vaccine trials in Africa & Asia
  – Immunogenicity, efficacy and safety
• Surveillance of rotavirus strains in Africa and Asia
• Establishment of surveillance networks
African Regional Rotavirus network (ARN)

- Laboratory - ARN was established in 1998 (with financial Support from WHO to MEDUNSA)

Objectives

1. Carry out rotavirus strain surveillance in Africa

2. To enhance capacity to support the introduction of a safe and effective rotavirus vaccine in the region

3. Encourage rotavirus research, collaboration & training in Africa
African Rotavirus Network

- Funded by WHO
- > 40 participants trained
- > 40,000 stool samples
- 19 African countries
- 4 Rotavirus Symposia
African Rotavirus Network

- Laboratories /hospitals doing rotavirus diarrhoeal research, 1998  
- Epidemiology of rotavirus
- VP7 serotype characterization
Summary: Prevalence of Rotavirus serotypes in Kenya

1996-1999
- G1 (27.0%), G4 (16.0%), G2 (11.0%), NT (26.0%), G3 rarely detected

2000-2002
- G1 predominant, followed by G2, then G8, G3 and G4 rarely detected

2003-2004
- G1 predominant (26%), followed by G9 (20%), then G8 (1%). G2, G3 and G4 rarely detected

2005
- G9 (37.1%), G8 (34.3%), G1 (25.1%), G8 + G9 (2.9%); G2, G3 and G4 rarely detected.
  Common serotypes (G1, G8 and G9)

Gatheru & Nyango, Mwenda et al
Summary: Circulating genotypes in Ghana

G. Armah et al

- Most common Genotypes detected
  - G2
  - G3
  - G9
- High incidence of unusual genotypes
- Severe disease was attributable to rotavirus genotypes G2, G3 and G9 strains
- G4 strains not detected
- Emergence of Rotavirus G10 strains in 2004
Summary: Rotavirus Strains in Africa

- **G serotypes**
  - G1 strains most common: about 50%
  - G3 strains very common: about 30%
  - G2 strains occur in “waves” every 3/4 years
  - G4 and G8 strains isolated sporadically
  - G9 strains emerging across continent
  - mixed serotype profiles are very common

- **P genotypes**
  - P[6] genotype most common: 50-60%
  - P[8] genotype common: 35-40%
  - unusual VP4 profiles detected

*(Steele et al, Vaccine 2003)*
Rotavirus Incidence in Ghana

- 40% infection rate
- Peak shedding in cool dry months of Dec to April

G. Armah et al.
Seasonal Variation of RV infections and Non RV GE in Kenya

Frequency: Total No of cases/Total No of subjects X 1000 in indicated months
Age Distribution of Rotavirus Disease Burden in Kenya

Gatheru et al.
Summary: Epidemiology of Rotavirus in Africa

- Rotavirus infection occurs in 25-40% of children hospitalized with diarrhoeal illness
- More common in hospitalized children than in outpatients
- Rotavirus infection/disease occurs in:
  - 17% of infants less than 6 months of age
  - 75% of infants less than 12 months of age
  - 83% of children under 18 months of age
- Seasonal distribution with peak in cool, dry months

Cunliffe et al, Bull WHO 1998 76(5) 525-537
Steele et al, Vaccine 2003 21(1) 354-360
Burden of Rotavirus Disease in Africa

• Guinea Bissau\textsuperscript{1}
  – 3.4 rotavirus deaths / 1000 infants per year

• Sub-Saharan Africa\textsuperscript{2}
  – 110-155 000 rotavirus-related deaths per year

• Country-specific mortality\textsuperscript{3,4}
  – Nigeria  80-90 deaths per day
  – Cameroon  50-60 deaths per day
  – South Africa  10-12 deaths per day

\textsuperscript{1}Mølbak et al, Vaccine 2000 19 393-395; \textsuperscript{2}Miller & McCann, Health Econ 2000 9 19-35
\textsuperscript{3}Parashar et al, Emerg Infect Dis 2003
\textsuperscript{4}Steele et al, Vaccine 2003 21(1) 354-360; Afr Health Sc J 2002 9(4) 103-107
Available → laboratory based data from representative African countries

Weaknesses of the ARN

- Physicians, policy makers/health care managers - unaware of the rotavirus in their countries
- Most Min. of health facilities did not have capacity for rotavirus diagnosis
- Rotavirus – not a priority
- Potential benefit of rotavirus vaccine – not appreciated.
Future Directions for Rotavirus Research in Developing Countries

WHO Workshop, Geneva, 2000

• Rapid development of new rotavirus vaccines
• Parallel vaccine trials in developing countries
• Burden of disease studies in developing countries
• Epidemiology of intussusception
• Support of National Regulatory Authorities
• Laboratory surveillance of rotavirus strains, especially in Africa and Asia

- Hospital burden of disease
- Health services utilization
- Cost economics of diarrhoea
- Strain Surveillance
- Vaccine trial sites
AFRICAN ROTAVIRUS SURVEILLANCE NETWORK (AFR RSN)

• WHO/AFRO - Planning meeting Accra, May 2005

• Objective > Explore opportunities for establishing AFR RSN and integrating RSN -surveillance networks (polio, measles, Hib-PBM) in Africa

• Key feature : Sentinel, hospital-based surveillance involving WHO/AFRO and MOH
African Rotavirus Surveillance Network

Activities co-ordinated by WHO/AFRO

- 5 countries submitted country plans/proposals (Cameroon, Ghana, Kenya, Uganda and Zambia)
- Internal (WHO/AFRO) and external (CDC) review of country plans/proposals has been finalized and funding approved.
- Disbursement of funds - May 06
- Use of similar rotavirus diagnostic assay- ELISA and WHO generic protocol
Newly established hospital based Rotavirus Surveillance in Africa

- Surveillance in 5- initial countries to start, June/July 06

- Two functional Regional Reference Laboratories (Ghana and SA) – with capacity to support training and support activities of AFR RSN

- 4- additional countries (Ethiopia, Tanzania, Senegal, Zimbabwe) to join the AFR RSN; DR Congo, Mali*

- Integrated with existing AFR networks (eg. PBM, measles, polio etc)

Laboratories / hospitals planning routine rotavirus surveillance

- Hospital burden of disease
- Strain Surveillance
EXPECTATIONS OF AFR RSN

• Routine surveillance of rotavirus strains/BOD in Africa -- critical part of public health
• Create awareness of rotavirus infection and BOD in the region
• Provide data for making informed decisions – value of introd. and assessment of impact of new vaccines
• Knowledge base for opinion leaders/policy makers (EPI managers, MOH etc)

Rotavirus vaccines are no longer vaccines of the future but will be used in routine EPI schedules
Thank you