Pan American Health Organization

Regional Office of the World Health Organization

Introduction

Noma, also known as cancrum oris, is an aggressive gangrenous infection that rapidly destroys the orofacial tissues of its victims. It is a disease that claims the lives of innocent children born into conditions of abject poverty and injustice. Those that are fortunate to survive are left with grotesque facial deformities that often lead to a lifetime of social alienation. Very few have the resources to undergo the years of surgery and post-operative care needed to rectify their facial scar and restore functions of speech and eating. Although more attention has been given in recent years to providing reconstructive surgery to the few children that survive noma, surprisingly little has been done to prevent this deadly disease that kills 70-90 percent of its victims. It is time to build global awareness and employ prevention strategies to eliminate this disease.

Noma is no longer encountered as a public health problem in the developed world, but continues to be found in the world's poorest countries—particularly in communities characterized by chronic malnutrition, lack of sanitation systems, high indices of infectious disease, especially malaria and measles, and poor access to healthcare. Although it is most prevalent in Sub-Saharan Africa, with cases estimated by some experts as over 140,000 annually, noma has recently been documented in Haiti. The urgency of addressing the problem of noma in Haiti has been compounded by the January 12, 2010 earthquake, which has further destabilized a precarious environment where the risk factors for noma were already prevalent. Widespread social and economic volatility, added stresses on the water and sanitation systems and increased vulnerability of women and children have synergistically put the health of Haitian people in jeopardy.

It is our hope that this training module will not only build awareness of noma among Haitian families and the health community, but also empower them to engage in practices that will significantly improve maternal and child health, and thereby prevent a potential noma outbreak.

The materials in this module were developed by Dr. Priscilla Benner, director of MAMA Project Inc., and adapted by Abraham Itty, PAHO intern from Harvard School of Dental Medicine (HSDM). We would like to thank the Hesperian Foundation, whose materials were excellent resources, as well as Ms. Anna Scharfen, Coordinator of the Caries Free Communities Initiative, and Dr. Bruce Donoff, Dean of HSDM, for their contributions and support. A special acknowledgement of appreciation goes to Dr. Cyril Enwonwu from the University of Maryland Dental School. Dr. Enwonwu, the world's premier noma expert, generously allowed us to use many of his photos and was an enthusiastic collaborator in the development of these materials. His research into the etiology and prevention of noma has formed the theoretical foundation of this work. It is truly his unwavering commitment to the understanding of this disease that has inspired many of us to join forces and fight for the prevention and elimination of noma.

Dr. Saskia Estupinan-Day

Noma-*The Face of Poverty*

- **Noma:** in Greek,

"to devour"

- **Cancrum Oris:** in Latin,

"gangrene of the mouth"

- **Ciwon Iska:** in Hausa,

"the wind disease"

C.O.Enwonwu, Archs of Oral Biol, 1972

Noma

- Destroys the soft tissues and bones of the face
- Starts as an ulcer in the mouth
- RAPIDLY spreads through orofacial tissues
- Has a mortality rate of **70-90%**
- Claims **140,000** children per year

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Cause of Noma

Complex Interaction between:

- **Malnutrition**
- **Intraoral infections**
- **Compromised Immunity**

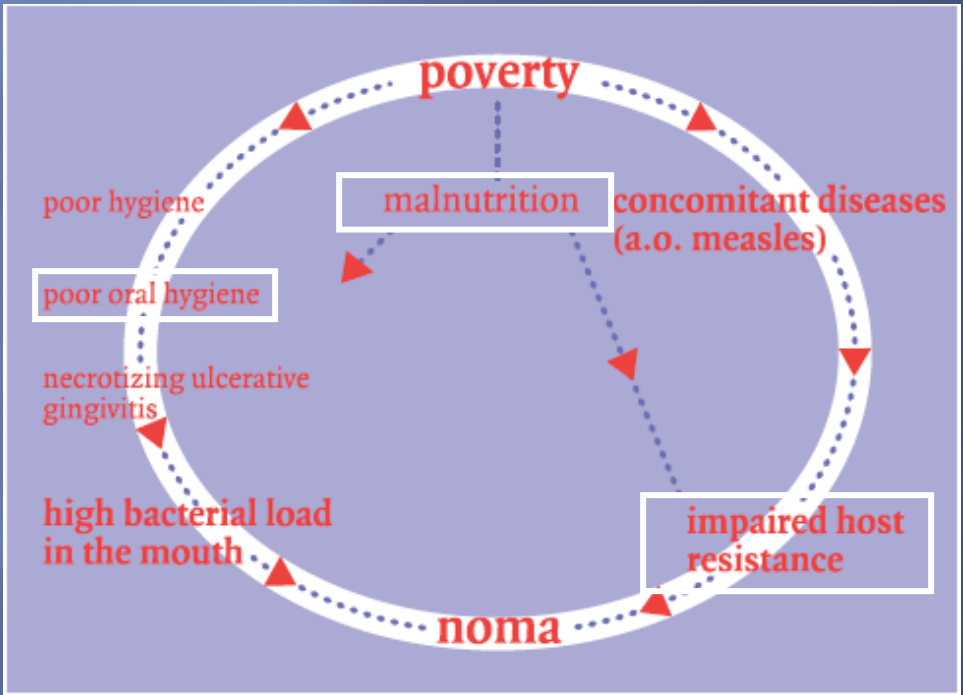


FIGURE 1.4 *Schematic representation of the factors responsible for the development of noma.* The Surgical Treatment of Noma (2006)

KEY MESSAGE

Noma is NOT Contagious

Healthy Children do NOT develop noma

KEY MESSAGE

4 Major Risk Factors

Malnutrition

Poor Hygiene and Sanitation

Extreme Poverty

Lack of Access to Medical Care

Recent Immuno-suppressive Infection

Risk Factor #1
Malnutrition

- Both Severe and Moderately malnourished children are at risk

Lack of essential micronutrients

Nutritionally Acquired Immune Deficiency Syndrome (Nutritional AIDS)

Growth Stunting

Risk Factor #2
Poor Hygiene and Sanitation

- Contamination of food & water with human and animal waste
- Poor personal cleanliness
  - Lack of brushing teeth, bathing regularly, and washing hands and face
- Custom of bringing livestock into family living quarters

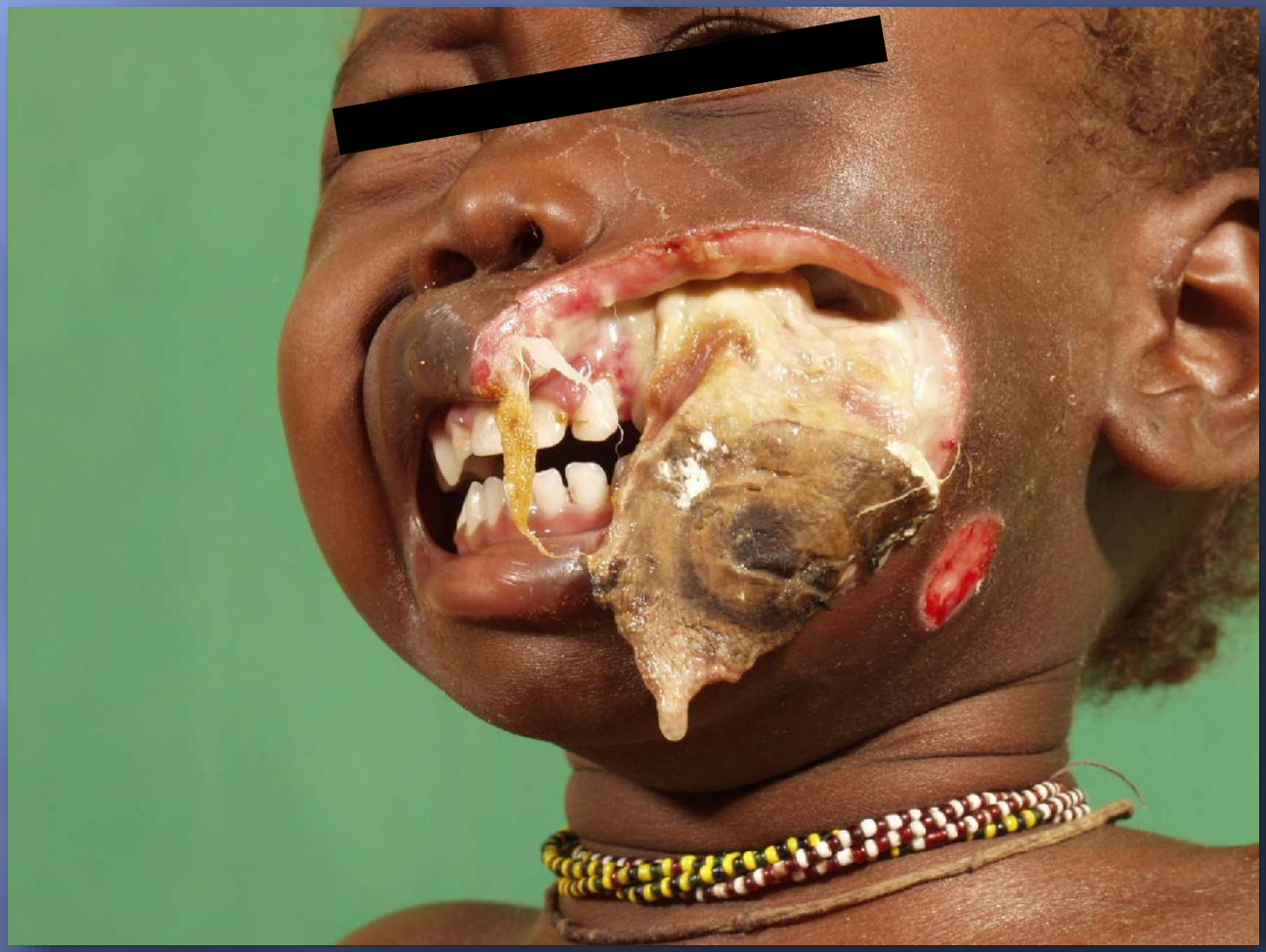
Risk Factor #3
Recent Immuno-suppressive Infection

- Common immuno-suppressive infections that are precursors of noma include:
  - Measles
  - Malaria
  - Tuberculosis
  - HIV

Risk Factor #4 Lack of Access to Medical Care

- Barriers
  - Distance to community health clinic
  - Rapid progression of noma allows for limited intervention time

Our GOAL is to



prevent this tragedy!

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KEY MESSAGE

Learn to recognize the **Noma Context**:

- Impoverished family
- Poor sanitation
- Chronically malnourished child
- Compromised immunity
- Recent severe infection such as measles or malaria

Recognizing Clinical Stages of Noma in a Child at Risk

Stage 1

Mucosal Lesion

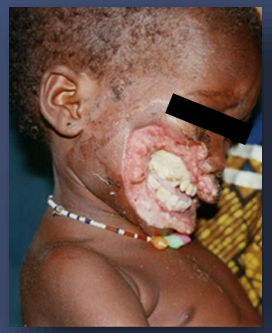
Stage 2

Facial Swelling

Stage 3

Gangrenous Plaque

Stage 4



Scar Tissue

Reversible

Irreversible

MATTER OF WEEKS

All Pictures Courtesy of:
C.O.Enwonwu
Archs of Oral Biol, 1972

Stage 1: Mucosal Lesion

- Acute Necrotizing Ulcerative Gingivitis
- Associated with:
  - Swollen, sore gums
  - Gums bleed when eating or when teeth are cleaned
  - Bad breath, drooling, spits a lot
  - Does not want to eat
  - Loses weight quickly

Examples of Acute Necrotizing Ulcerative Gingivitis

All Images courtesy of: Martin S. Spiller, D.M.D

Stage 2: Facial Swelling

If the immune system is sufficiently weakened the soft tissue against the gingival lesions start swelling.

Examples of Facial Swelling

C.O.Enwonwu, The Lancet, 2006

Stage 3: Gangrenous Plaque

In a few days, in the absence of any intervention, there is formation of a gangrenous plaque which indicates the area of future loss of tissue.

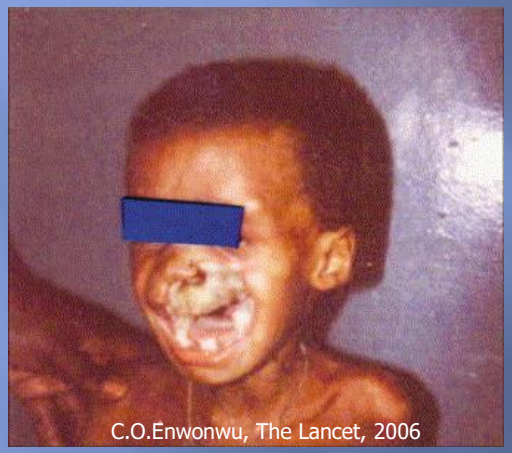
Examples of Gangrenous Plaque

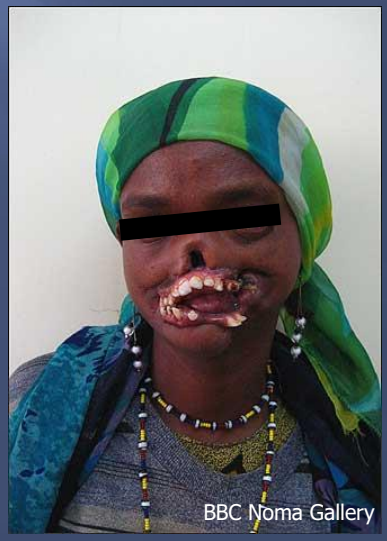
All Images Courtesy of:
C.O.Enwonwu, The Lancet, 2006

Stage 4: Scar Tissue

- If noma victim survives, child is left with:
  - Large scar tissue
  - Facial disfigurement
  - Speech impairment
  - Feeding problems
  - Social rejection

Examples of Scar Tissue





BUT…

If the infection is treated early it will not progress to deep tissue loss

KEY MESSAGE

Stage 1

Mucosal Lesion

AND

Stage 2

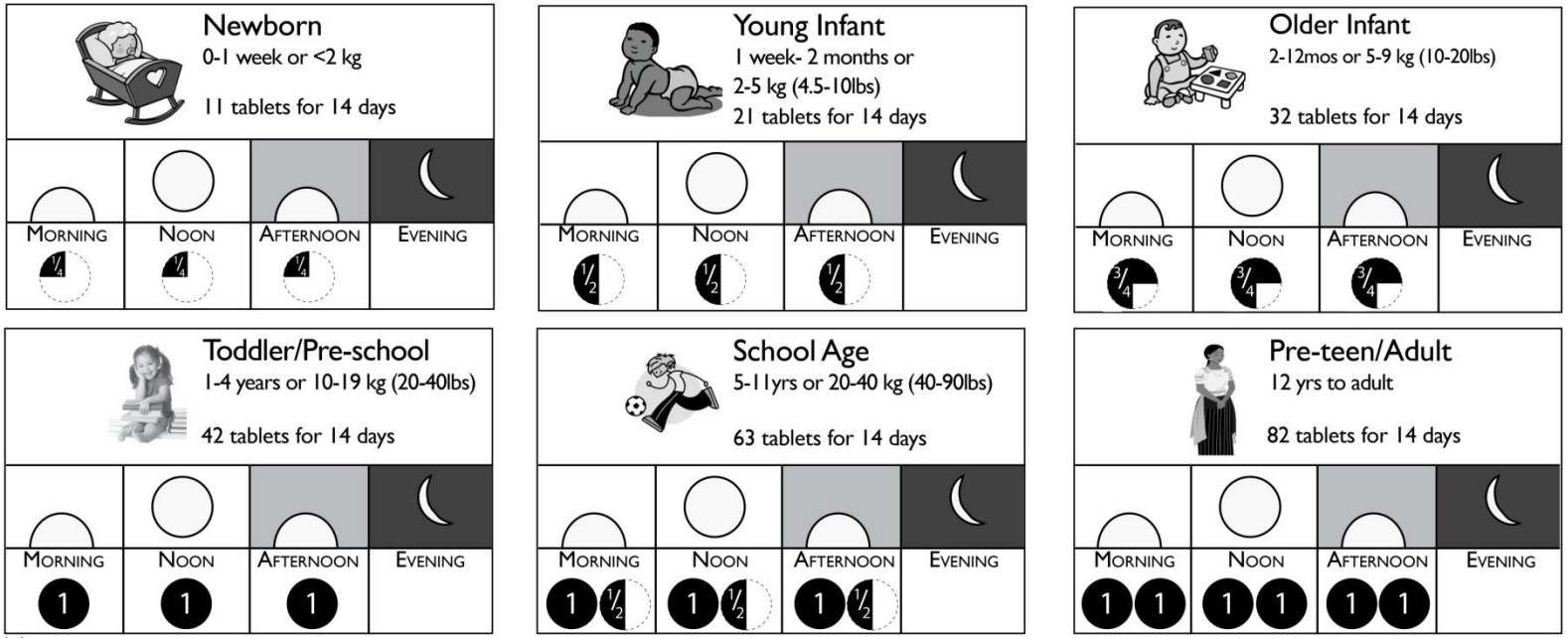
Facial Swelling

Early Intervention Treatment

- Treatment Protocol
  - Oral Hygiene: Disinfect mouth and gingiva with warm salt water
  - Start oral amoxicillin or metronidazole IMMEDIATELY (See charts for doses)
  - All STAGE 2 cases should receive an urgent medical referral
  - Provide nutritional rehabilitation including supplying essential micronutrients and Vitamin A

Amoxicillin 250 mg - Moderate Dose

Early Intervention Regimen for Moderate Infections

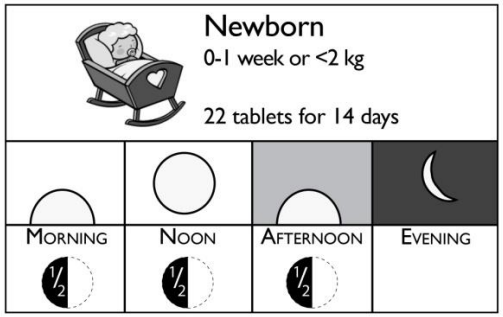


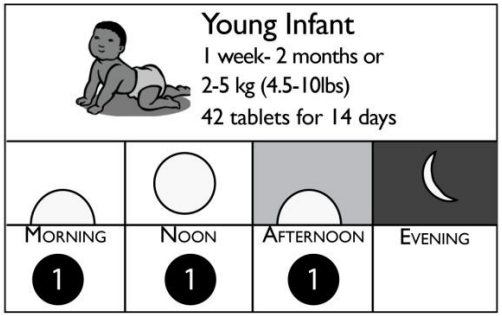
Notes:

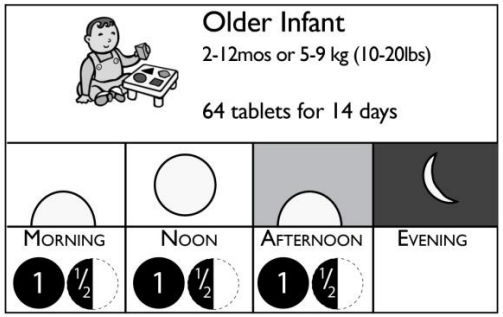
- Duration of therapy - 14 days for noma, 3 days for non-severe pneumonia, 5 days for acute ear infections, 10 days for tonsilitis.
- If care is delayed, and the child presents a swollen cheek use the double dose: Save patient's life and limit permanent damage to the face.
- Maintain AMOXICILLIN 250 mg Emergency Stock in Child Survival Kit in each village to avoid treatment delays.
- Treat gingiva-stomatitis following measles or malaria in a malnourished child to prevent progress to noma. Also include essential micronutrient supplements, Vitamin A triple dose, Dentifrice, and improved nutrition (ie. eggs and oil).
- Metronidazole with Amoxicillin recommended if both are available. Amoxicillin/clavulanate is another excellent option with or without metronidazole.
- Seek consultation as soon as possible. Continue treatments while traveling to the clinic or hospital. When child comes to attention, dispense full number of doses so that treatment can continue in event of further delay.
- If Amoxicillin is in capsule: Open and divide powdered contents. Tablets may be crushed and mixed with breast milk, food, liquid or sugar and fed to children with spoon.
- Taking with food is not necessary but can help if stomach is upset.
- Amoxicillin used for tonsillitis, ear infections, sinusitis, lung infections (pneumonia), eye infection after measles, soft tissue, skin, umbilical (navel) and urinary infections. Use double dose for critical illness and delayed treatment. (See page 8 in IMCI booklet.)
- Critically ill malnourished child may not express signs of infections. Therefore, it may be life-saving to begin a course of broad spectrum oral antibiotics such as cotrimoxazole and/or metronidazole and amoxicillin while referring to a higher level of care.
- Category B: Safe in Pregnancy

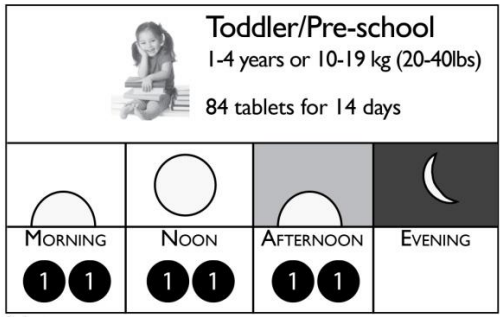
Amoxicillin 250 mg - High Dose

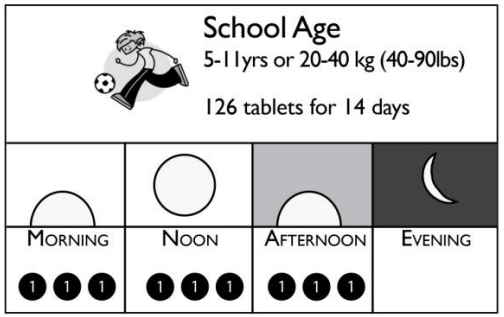
Emergency Early Intervention Regimen for Noma, Severe Pneumonia, and other Serious Infections

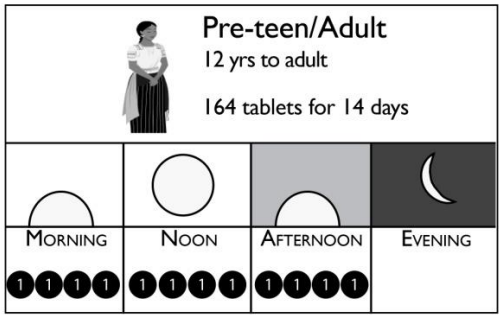












Notes:

- At first sign of early noma, begin AMOXICILLIN 250mg/tablet. Continue 14 days.
- If care is delayed, and the child presents a swollen cheek use the double dose: Save patient's life and limit permanent damage to the face.
- Maintain AMOXICILLIN 250 mg Emergency Stock in Child Survival Kit in each village to avoid treatment delays.
- Treat nerotizing gingiva-stomatitis following measles or malaria in a malnourished child to prevent progress to noma. Also include essential micronutrient supplements, Vitamin A triple dose, Dentifrice, and improved nutrition (ie. eggs and oil).
- Metronidazole with Amoxicillin recommended if both are available. Amoxicillin/clavulanate is another excellent option with or without metronidazole.
- Seek consultation as soon as possible. Continue treatments while traveling to the clinic or hospital. When child comes to attention, dispense full number of doses so that treatment can continue in event of further delay.
- If Amoxicillin is in capsule: Open and divide powdered contents. Tablets may be crushed and mixed with breast milk, food, liquid or sugar and fed to children with spoon.
- Taking with food is not necessary but can help if stomach is upset.
- Amoxicillin used for tonsillitis, ear infections, sinusitis, lung infections (pneumonia), eye infection after measles, skin, soft tissue, umbilical (navel) and urinary infections. Use double dose for critical illness and delayed treatment.
- Critically ill malnourished child may not express signs of infections. Therefore, it may be life-saving to begin a course of broad spectrum oral antibiotics such as cotrimoxazole and/or metronidazole and amoxicillin while referring to a higher level of care.
- Category B: Safe in Pregnancy

Metronidazole 250 mg

Emergency Early Intervention for Noma and Suspected Pre-Noma Lesions, and other Infections

Newborn

0-1 week or <2 kg

7 tablets for 14 days

Morning	Noon	Afternoon	Evening
15 mg/kg		15 mg/kg	

Young Infant

1 week- 2 months or
2-5 kg (4.5-10lbs)
7 tablets for 14 days

Morning	Noon	Afternoon	Evening
¼		¼	

Older Infant

2-12mos or 5-9 kg (10-20lbs)

14 tablets for 14 days

Morning	Noon	Afternoon	Evening
¼	¼	¼	¼

Toddler/Pre-school

1-4 years or 10-19 kg (20-40lbs)

28 tablets for 14 days

Morning	Noon	Afternoon	Evening
½	½	½	½

School Age

5-11yrs or 20-40 kg (40-90lbs)

56 tablets for 14 days

Morning	Noon	Afternoon	Evening
1	1	1	1

Pre-teen/Adult

12 yrs to adult

112 tablets for 14 days

Morning	Noon	Afternoon	Evening
1 1	1 1	1 1	1 1

Notes:

- At first sign of early noma, begin METRONIDAZOLE 250mg/tablet. Continue 14 days.
- Maintain METRONIDAZOLE 250 mg Emergency Stock in Child Survival Kit in each village to avoid treatment delays.
- Treat nerotizing gingiva-stomatitis following measles or malaria in a malnourished child to prevent progress to noma. Also include essential micronutrient supplements, Vitamin A triple dose, Dentifrice, and improved nutrition (ie. eggs and oil).
- Metronidazole with Amoxicillin recommended if both are available. Amoxicillin/clavulanate is another excellent option with or without metronidazole.
- Seek consultation as soon as possible. Continue treatments while traveling to the clinic or hospital. When child comes to attention, dispense full number of doses so that treatment can continue in event of further delay.
- If METRONIDAZOLE is in capsule: Open and divide powdered contents. Tablets may be crushed and mixed with breast milk, food, liquid or sugar and fed to children with spoon.
- Taking with food is not necessary but can help if stomach is upset.
- Also use for eye infection after measles, with Amoxillin.
- Metronidazole is also used for trichomoniasis, bacterial vaginosis, amebic liver abscess, intestinal amebiasis, pelvic and abdominal infections (with other antibiotics), giardiasis, c.difficile diarrhea.
- Critically ill malnourished child may not express signs of infections. Therefore, it may be life-saving to give a course of broad spectrum antibiotics such as cotrimoxazole and/or metronidazole and amoxicillin while referring to a higher level of care.
- Category B: Safe in Pregnancy

Oral Disinfectant Mouth Wash

- Start by gently cleaning the gums and teeth with a damp cloth soaked in clean, warm water
- Rinse mouth with warm salt water or any available oral disinfectant
  - Note: If using hydrogen peroxide, mix 1 part hydrogen peroxide with 5 parts water
- Use 4 cups each day until the bleeding stops Rinse and spit. Do not drink the salt water!
- When well, clean mouth and rinse with water or salt water at least daily to keep the gums strong.

Specific Nutritional Deficiencies Associated with Noma:

- **Vitamin A**
- **Zinc**
- **Selenium**
- **Protein**
- **Other minerals and vitamins, including B's C, D, and more**

Late Intervention Treatment

Stage 3

Gangrenous Plaque

- Treatment Protocol
  - **Provide Early Intervention Treatment**
  - **Bring the child to a specialist as soon as possible. If unable follow these steps:**

1) Gently pull away dead skin with tweezers, being careful not to remove adherent gangrenous plaque
2) Wash the inside of the sore with hydrogen peroxide diluted one part hydrogen peroxide to five parts cooled boiled water. (Be sure you measure the hydrogen peroxide carefully. Too strong a solution will cause further tissue damage) You can also clean the wound with an iodine solution.)
3) Prepare a dressing by:
   - Soaking cotton gauze in salt water.
   - Squeezing out the extra water so that it is damp
4) Place dressing in the wound and cover it with a dry bandage.
5) Every day, remove the bandage, wash the wound with dilute (1:5) hydrogen peroxide, and put in a new dressing. Do this until the wound does not smell anymore and there is not more dark dead skin.

Late Intervention Treatment

Stage 4

Scar Tissue

- **Treatment Protocol:**
  - **Surgery** to release the scar, and close the wound
  - **Dental care**, including possibly jaw wiring to hold the mouth in a function position during healing
  - **Physical therapy and speech therapy** to restore function
  - **Counseling**, especially if the family believes that noma is a curse

Treat the illness that provoked the occurrence of Noma

- If child has malaria treat with anti-malarial drugs.
- Look for any other illness, especially measles and tuberculosis, and treat appropriately

These Oral Diseases can allow a Portal of Entry for Noma:

Thrush, Yeast, Candida

Acute nectrotizing ulcerative gingivitis

Chicken Pox

Herpes on Hard Palate or Lips

Koplik Spots
(Early Sign of Measles)

Measles

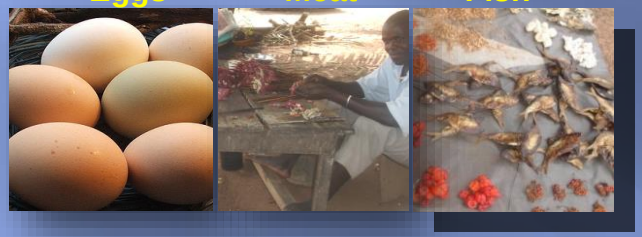
Treatment is Good

BUT

PREVENTION is BETTER

Prevention #1: Teach Good Nutrition

Eggs **Meat** **Fish**



Rich in protein, builds strong tissues, repairs damage from trauma

Fruits and Vegetables

Rich in Vitamins to strengthen the immune system and gums

Good Nutrition

Oil from:

Palm Nut Ground Nuts Coconut

Supplies energy, helps vitamins get absorbed, helps brain development in young kids

Amaranth Tops **Spinach** **Beet & Carrot**

Vitamin Rich Vegetables help prevent cavities and sore gums

Peas and Beans

Provides proteins to prevent cavities and sore gums

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Prevention #2:

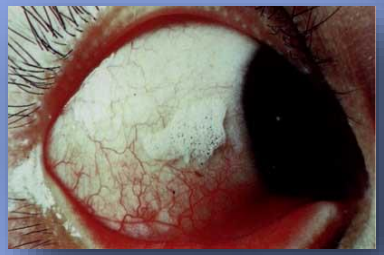
Administer Vitamin A

Focus on Vitamin A

- Functions
  - Improves Immunity
  - Vision (night, day, color)
  - Skeletal Growth
  - Fetal Development
  - Fertility

- Vitamin A Prevents Infections and Improves Growth

Vitamin A can also Prevent Nutritional Blindness



Xerophthalmia
Dry Eye

Bitot Spots

Hazy dry cornea poor quality — Keratomalacia

Gelatinous cornea, bulging, about ready to rupture. If that happens, the eye will be permanently blind.

Same eye, healed by timely Vitamin A capsules. Scar remains, but vision is good.

Vitamin A Mega-Dose Capsules

200,000 International Units/Capsule

Prevention & Treatment Doses

Repeat this dose as recommended for emergency indications

Age:	UNITS /Dose	Capsule	Notes:
Infants less than 6 months: Non-breast-fed, or breast-fed if mother has not received supplemental vitamin A	50,000	¼ (2 drops)	Breast milk provides Vitamin A
Infants 6 to 12 months: Every 4-6 months	100,000	½ (4 drops)	Give eggs, milk, greens, fruits, colored vegetables
Children over 12 months: Every 4-6 months	200,000	1	Not safe for girls or women who may become pregnant!
Mothers within 6 weeks after delivery	200,000	1	

Recommendations for Vitamin A Administration (2002 IVACG)

Population	Amount of Vitamin A to be administered	Time of Administration
Infants 0-5 months	3 doses of 50,000 IU each with at least 1 month interval between doses	At each DTP contact (6,10, and 14 weeks) otherwise at other opportunities
Infants 6-11 months	100,000 IU as a single dose every 4-6 months	At any opportunity (e.g., measles immunization)
Children 12 months and older	200,000 IU as a single dose every 4-6 months	At any opportunity
Postpartum Women	2 doses of 200,000 IU at least 1 day apart	As soon after delivery as possible and not more than 6 weeks later.

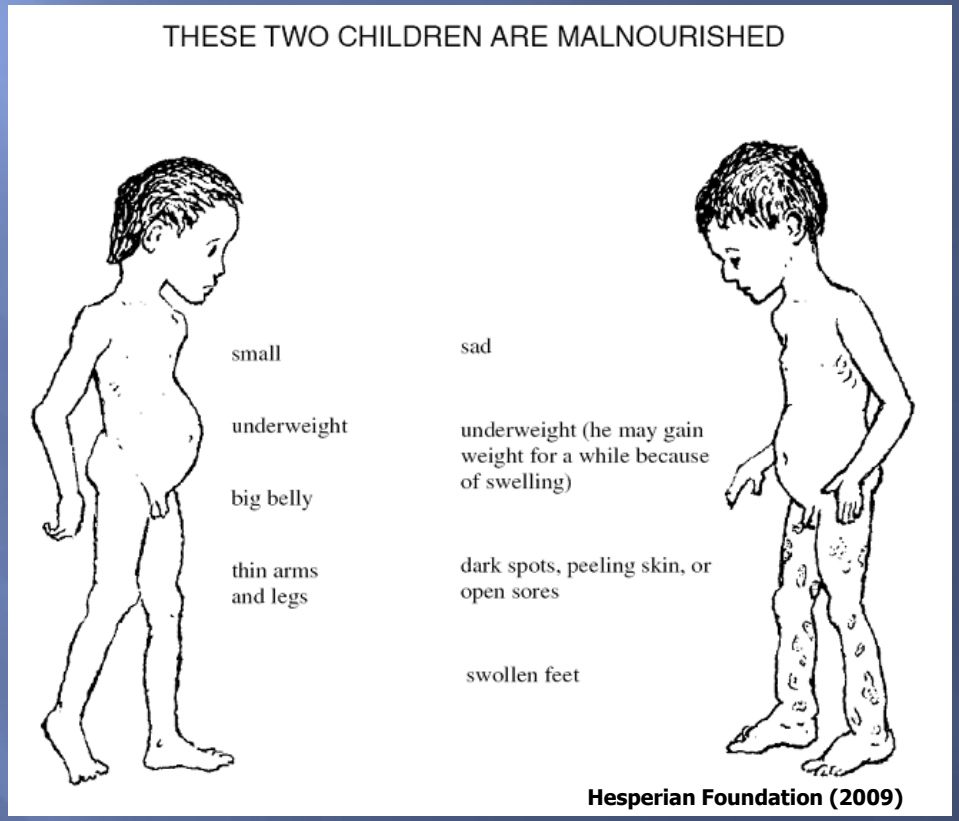
Prevention #3:

Micronutrients

Micronutrients

- Government mandated food fortification
  - Flour * Sugar * Salt * Milk * Margarine
- Focused supplements for women and children
- Multivitamins and mineral tablets
- Home food fortification with micronutrient powders

Recognizing Malnutrition



- Acute Marasmus
- Wasting
- Too Thin
- Can be Moderate or Severe

- Kwashiorkor
- Protein Deficient
- Swollen
- Always Severe

Chronically Malnourished Children

- May not look as ill as wasted or swollen children
- Growth Stunting
- “Hidden Hunger”

Prevention #4:

Improved diet for pregnant and nursing mothers

Prevention #5:

Breastfeeding

Breast Milk is PERFECT Food!

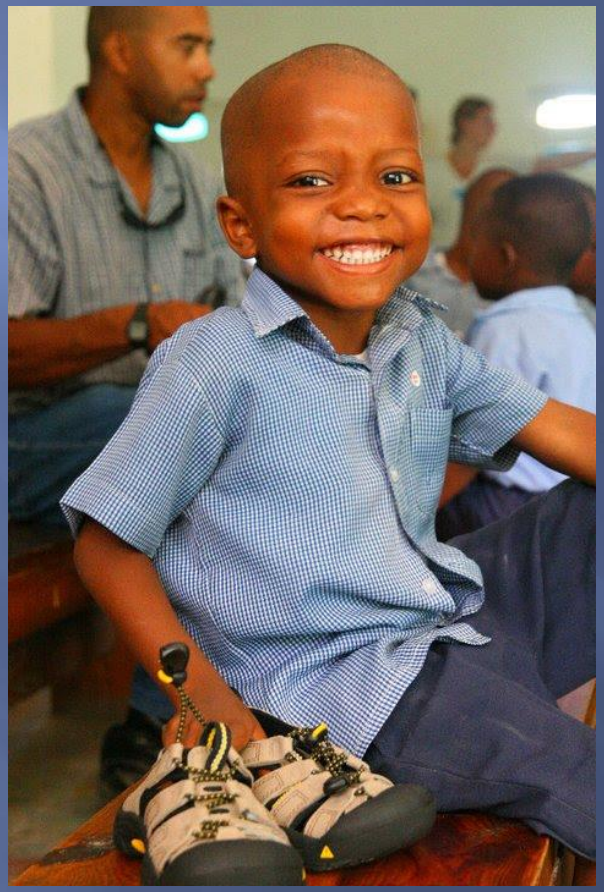
- It is clean, convenient, and FREE!
- Helps the womb stop bleeding following birth
- Protects baby from infections or illnesses by passing on the mother's defenses against disease through her milk

KEY MESSAGE

Breastfeeding Saves Lives

- Start Breastfeeding within the **FIRST HOUR** of birth
- **Exclusive breast feeding** for first 6 months
- **Continue breast feeding** for at least two years
- Wean slowly
  - Start with easily digested foods
  - Every few days add something new:
    - Mashed fruits, vegetables, eggs, meats, and fats

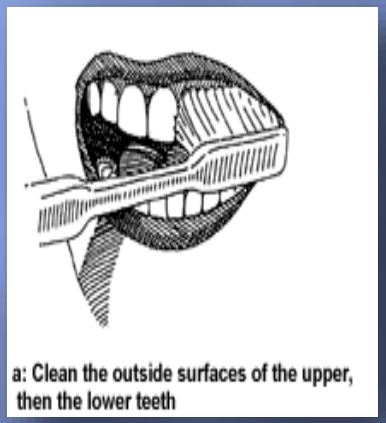
Prevention #6:



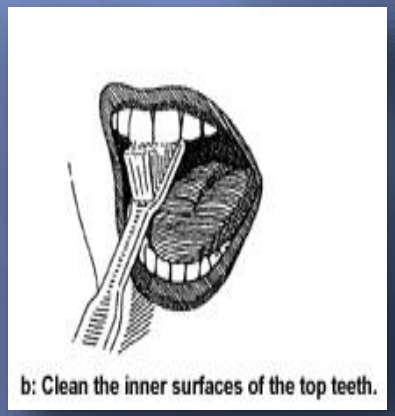
Personal Hygiene

Oral Hygiene

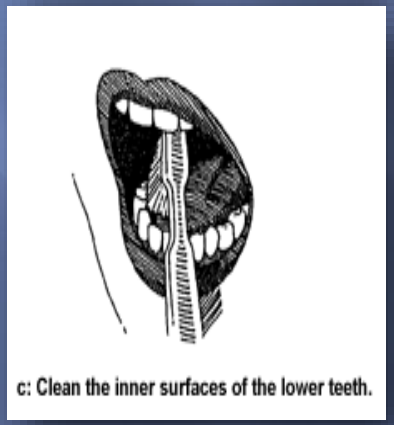
Proper Brushing Technique



a: Clean the outside surfaces of the upper, then the lower teeth



b: Clean the inner surfaces of the top teeth.



c: Clean the inner surfaces of the lower teeth.

d: Finally, clean the chewing surfaces of the upper, then the lower teeth.

Keep Mouth Clean Starting at Infancy

- Clean baby's gums after each feeding using a clean soft cloth
- Clean baby's teeth using a small soft bristled toothbrush
- Avoid feeding bottles to prevent tooth decay and gum disease
- Rinse child's mouth after every meal

Personal Hygiene

- Wash your hands and child's hands and face before and after each feeding with CLEAN water

- Bathe Regularly

Prevention #7:

Community Wide Infection Control

Infection Control Interventions

Immunizations
(Especially MEASLES) → Limits the frequency and spread of common infectious diseases like measles, tuberculosis, and tetanus

Deworming → Control Intestinal Parasites

Insecticide Treated Bed Nets → Prevent Malaria spread by Mosquitoes

Prevention #8:

Sanitation

Clean Water and Food

- Keep community water sources free of contamination
- Water must be boiled and covered to prevent contamination in the home
- Wash and dry dish and spoon before and after use and cover utensils with a clean cloth
- Germs grow quickly in food that is not consumed immediately, so store after no more than 2 hours

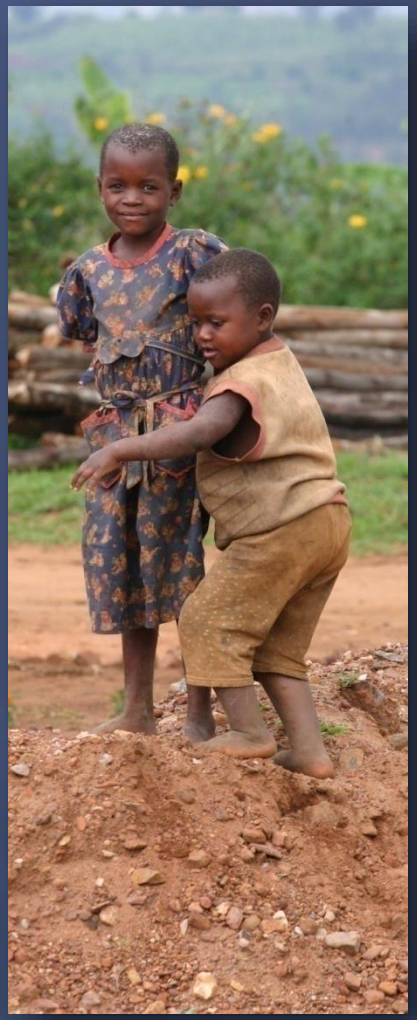
Waste Disposal

Dispose properly of all human waste to stop the spread of diseases.

Keep Livestock out of Home

Do not allow animals in areas where children sit, play or sleep.

Build Fences!



With Prevention and Control of Noma in Communities:

- Many other common disease that lead to death will be prevented
- The lives of many women and children will be saved
- School performance will improve
- A healthier environment will lead to a higher quality of life

Teacher's Notes: Recognition and Control of Noma Training

Module 8: Recognition and Control of Noma

Time: 90 minutes

Learning Objective:

Control noma in your geographical area by:

1. **Building awareness of the disease in the community**
2. **Identifying and treating affected individuals**
3. **Promoting prevention strategies**

Additional Materials Needed:

- Flipchart and markers
- PowerPoint presentation
- PowerPoint handout
- Annex handouts
- AEIPI module

Brainstorming Session and Discussion:

Questions to Consider:

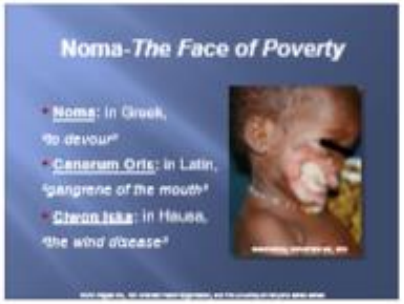
1. When you think of promoting oral health, do you even consider that you might be saving a child's life?

2. Do you know of any oral diseases that are life-threatening?

3. Have any of you heard of a disease known as noma? Have you seen it? Would you be able to recognize early warning signs of the disease?

Begin PowerPoint presentation.

Slide 1



Noma, also called Cancrum Oris

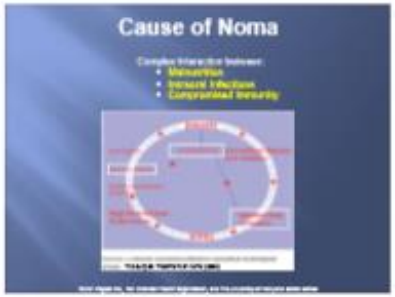
If you have never heard of noma, our hope is that after this workshop, you'll never forget it. Noma is one of the most tragic and disfiguring infectious diseases worldwide. It marks its victims with a facial deformity that is impossible to disregard and targets children who live in conditions of extreme poverty. Thus, it makes sense that noma is often referred to as the "Face of Poverty". It has many names whose meanings emphasize the degree of the deformity and its rapid development. **(Explain names on slide)**

Slide 2

What is Noma?

Noma is an infectious disease that destroys the soft tissues and bones of the face. Initially, the lesion starts as an ulcer in the mouth. But if left untreated, the ulcer RAPIDLY spreads through orofacial tissues and often perforates the lip or cheek. Approximately, 70-90% of individuals inflicted by noma die due to complications such as pneumonia, sepsis, and/or diarrhea. Across the world, an estimated 140,000 people die per year, primarily in Sub-Saharan Africa.

Slide 3



Cause of Noma

Unlike many other deadly childhood diseases such as measles, noma is not caused by a single pathogen (germ). Instead many different bacteria acting together in a vulnerable child seize the opportunity to overcome the child's weakened immune defense system. Studies have found that noma is the result of 3 crucial factors: malnutrition, intraoral infections, and compromised immunity. Children living in extreme poverty often suffer from all three of these conditions and are at high risk of developing the disease.

Slide 4

Key Message

Healthy children who are well nourished and do not live in poverty are NOT at risk of developing noma, even if they come in contact with the same causal bacteria.

Noma is not a contagious disease!

Slide 5

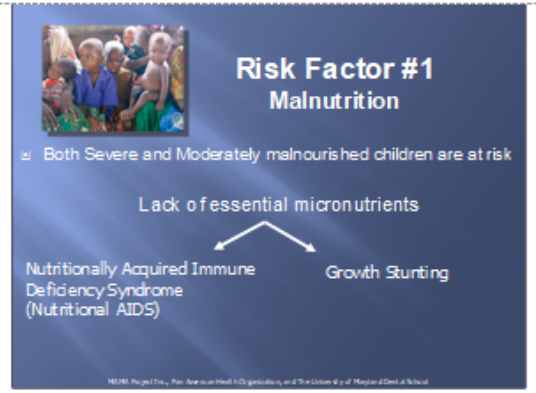
Risk Factors

Noma is not a tropical disease, nor is it a disease of developing countries. Noma is a disease of poverty. It primarily infects children ages 1-6 who live in areas that are socioeconomically deprived. Pervasive poverty is the key risk factor that gives rise to four other primary risk factors:

1) severe malnutrition
2) poor hygiene and sanitation practices
3) limited access to good healthcare
4) recent severe infections such as measles or malaria, that further knock down a child's already weakened immune system

We will now discuss each of these risk factors in further detail.

Slide 6



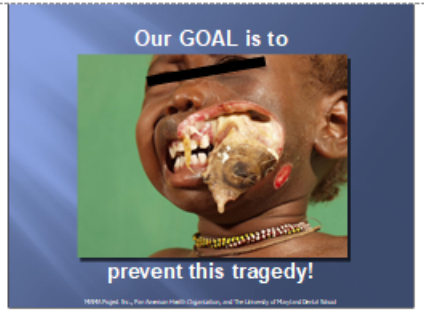
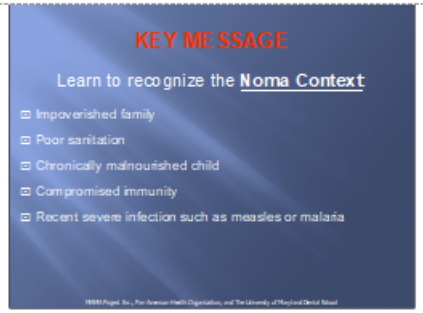
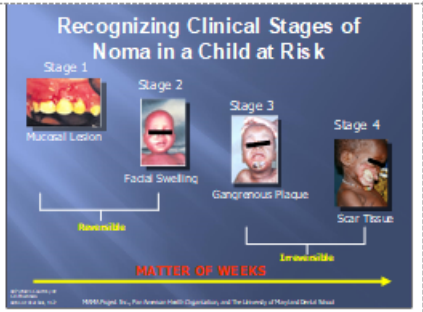
Risk Factor #1= Malnutrition

Undernourished children are prone to suffer from serious infections. All children need the proper amounts of quality foods that include enough carbohydrates, fats, proteins, vitamins and minerals, beginning even before birth.

Unfortunately, many children begin life with a weakened immune system because their mother was malnourished during pregnancy. Children deprived of these nutrients during early development are at risk of acquiring **Nutritionally Acquired Immune Deficiency Syndrome** which increases susceptibility to infections. Nutritionally Acquired Immune Deficiency Syndrome is similar to HIV Acquired Immune Deficiency Syndrome in that both allow opportunistic infections to flourish in their victims.

Surprisingly, many of these children may not look very sick, but a clue to their micronutrient deficiency and "Hidden Hunger" is the slowing of growth early in life. Growth stunting is a marker for a child at risk of developing noma.

Slide 7	 **Risk Factor #2** **Poor Hygiene and Sanitation** ▪ Contamination of food & water with human and animal waste ▪ Poor personal cleanliness ▪ Lack of brushing teeth, bathing regularly, and washing hands and face ▪ Custom of bringing livestock into family living quarters	**Risk Factor #2 Poor Hygiene and Sanitation** (Read Slide)
Slide 8	 **Risk Factor #3** **Recent Immuno-suppressive Infection** ▪ Common immuno-suppressive infections that are precursors of noma include: ▪ Measles ▪ Malaria ▪ Tuberculosis ▪ HIV	**Risk Factor #3 Recent Immuno-suppressive Infection** (Read Slide) These diseases severely weaken the immune system, making it difficult for the body to fight against bacteria that are normally not strong enough to cause disease. Children who present with noma often have one of these infections or have suffered from one of them in their recent past.
Slide 9	 **Risk Factor #4 Lack of Access to Medical Care** ▪ Barriers ▪ Distance to community health clinic ▪ Rapid progression of noma allows for limited intervention time	**Risk Factor #4 Lack of Access to Medical Care** Because many children infected by noma live in rural communities far away from a health clinic, they are not able to receive the appropriate medical care. In addition, since noma can quickly progress from a small oral ulcer to a large area of facial gangrene in a span of weeks, there is very little time available to medically intervene.

Slide 10		
Slide 11		**Recognize the Noma Context** Remember, noma is not seen among healthy children. Instead, it is most commonly identified in children who are malnourished, immune deficient, and have recently suffered from an infection. (Read Slide) Whenever you encounter a child in this context, a thorough oral screening should be preformed to look for early signs of noma.
Slide 12		**Clinical Stages of Noma** There are 4 clinical stages of noma. It is very important that we learn to recognize the early signs of disease. If noma is not identified and treated in the early and advancing stages, gangrene can permanently destroy the structures of the face. (Explain Slide)

Slide 13

Stage 1: Mucosal Lesion

Noma often starts with gum disease. Gums that are weak from poor nutrition are not able to resist the infection. Mild gum disease can progress to Acute Necrotizing Ulcerative Gingivitis (ANUG), which is an intra-oral lesion that has the potential to become an entry point for noma to advance into the gangrenous phase. ANUG is often accompanied by the following symptoms…(read slide) Suspect noma in children with mouth sores or ANUG, ESPECIALLY if malnourished with recent illness such as measles or malaria

Slide 14

Examples of Acute Necrotizing Ulcerative Gingivitis (ANUG)

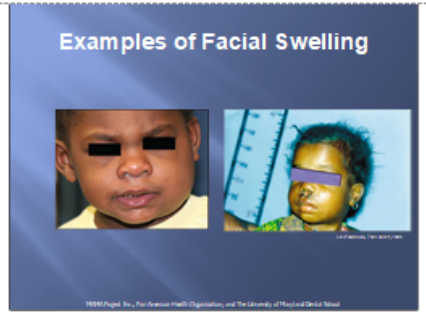
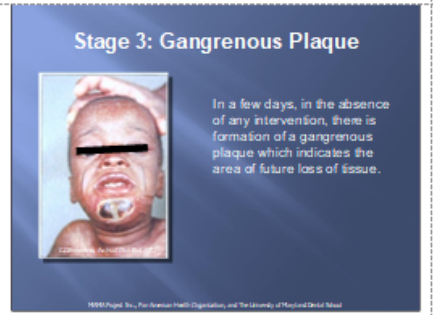
ANUG is also commonly referred to as "Trench mouth". This is a painful bacterial infection that involves inflammation (swelling) and ulcers in the gums.

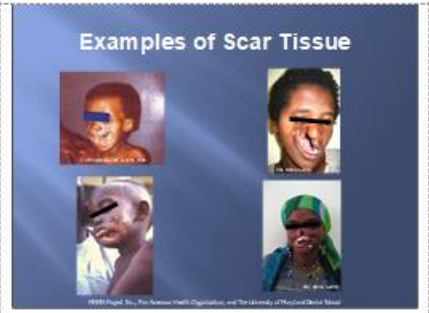
Slide 15

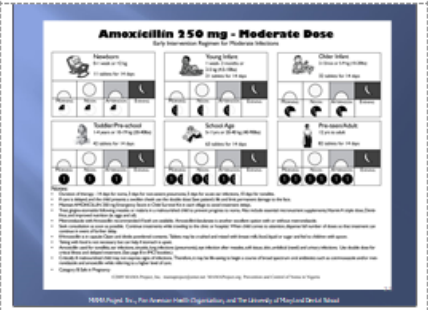
Stage 2: Facial Swelling

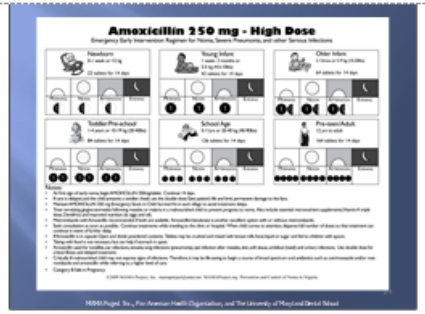
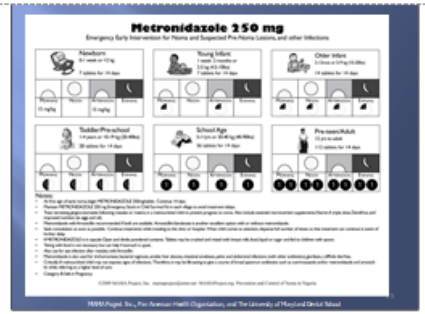
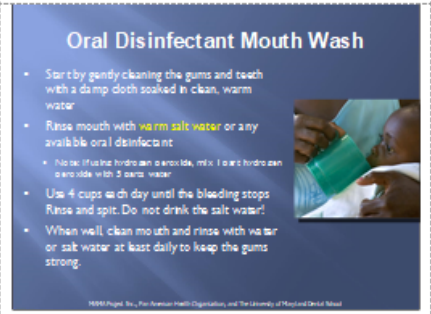
Stage 2 is characterized by the swelling of the cheek, chin, or lips. The swelling is often accompanied with fever, pain, drooling, and foul breath.

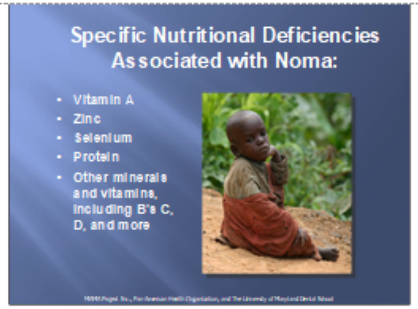
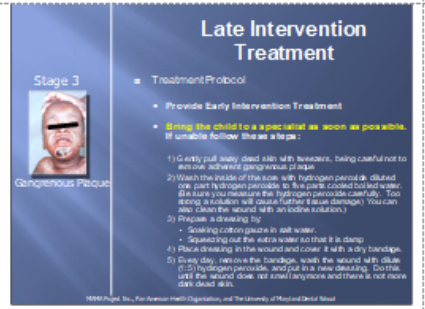
Antibiotics can still save this child's face and life.

Slide 16		**Examples of Facial Swelling** Often times, the swelling is unilateral, meaning the swelling is on one side of the face
Slide 17		**Stage 3: Gangrenous Plaque** Noma does not stop in the soft tissues of the face. It destroys flesh and bone. During this stage look for: 1) Tight skin with dark red swelling 2) Black spot (gangrene/necrosis) on the face breaks open, revealing the extent of the permanent tissue loss 3) A clear line that separates dead tissue from healthy tissue 4) Loose teeth 5) Dead pieces of bone around the teeth Noma breaks through to the surface of the face, usually the cheek, but it can also involve the eyes, lips, and nose.

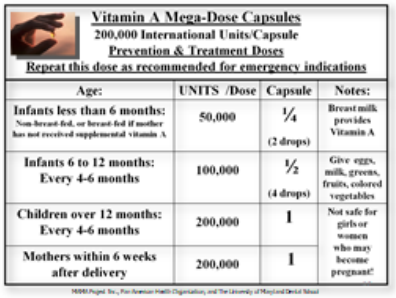
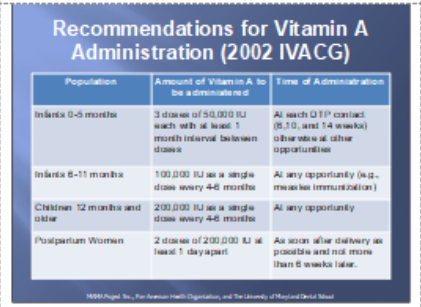
Slide 18		**Examples of Gangrenous Plaque**
Slide 19		**Stage 4: Scar Tissue** Upon healing, large amounts of scar tissue allow for minimal opening of the mouth. Functional as well as aesthetic sequelae (long-term effects) are extremely distressing. In fact, noma may even be perceived as a curse in some communities.
Slide 20		**Examples of Scar Tissue**

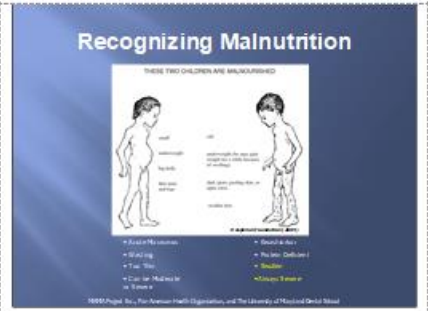
Slide 21		**Noma Treatment** The good news is that if the oral infection is treated properly during the early stages of the disease, we can prevent it from progressing to full blown noma! In order to limit the extent of the damage, you must start treatment for noma as soon as it is recognized. The longer the delay, the lower the survival rate, and the worse the physical and psychological trauma will be for the child.
Slide 22		**Key Message: Early Intervention Treatment** 1. Clean Mouth 2. Administer Antibiotics 3. Refer Stage 2 cases IMMEDIATELY
Slide 23		**Antibiotics: Amoxicillin-Moderate Dose** Educating parents and community leaders on how to use antibiotics EARLY in noma cases can save lives. Illiteracy is a barrier to proper use. Low literacy aids, like the dosage chart on this slide, can help ensure patient compliance. Amoxicillin is a safe oral antibiotic that is effective against most common bacteria encountered in the community. This chart gives doses appropriate for moderate infections.

Slide 24		**Antibiotics: Amoxicillin-High Dose** This chart gives recommendations appropriate for severe infections, including noma.
Slide 25		**Antibiotics: Metronidazole-Moderate Dose** Metronidazole and/or amoxicillin together or separately are effective in stopping early noma.
Slide 26		**Oral Disinfectant Mouth Wash** When you recognize a child who may have noma, it is important to first disinfect his/her mouth. (Read Slide) Salt water rinses (1/2 teaspoon of salt in 1 cup of water) may soothe sore gums. Hydrogen peroxide, used to rinse the gums, is often recommended to remove dead or dying gum tissue.

Slide 27		**Important Vitamins and Minerals** Children with noma have deficient levels of the following vitamins and minerals. Vitamin A is especially important because it boosts immunity and speeds healing. Nutritional therapy should include a full complement of multiple vitamins and minerals as well as nutritious food.
Slide 28		**Stage 3: Late Intervention Treatment Protocol** (Read Slide)
Slide 29		**Stage 4: Late Intervention Treatment Protocol** (Read Slide)

Slide 33		**Prevention #1: Teach Good Nutrition** Undernutrition contributes to more than 1 in 3 child deaths[1]. As mentioned before, malnutrition is one of the primary risk factors of noma. Teaching good nutritional customs that are sustainable with the resources available in the community is essential. (Explain Slide) [1]World Health Organization. Countdown to 2015 Decade Report
Slide 34		**Prevention #2: Administer Vitamin A** One of the highest yield public health prevention interventions that can be preformed in communities with noma is to administer vitamin A to all children.
Slide 35		**Focus on Vitamin A** (Read Slide)

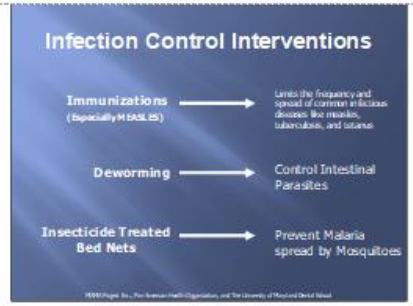
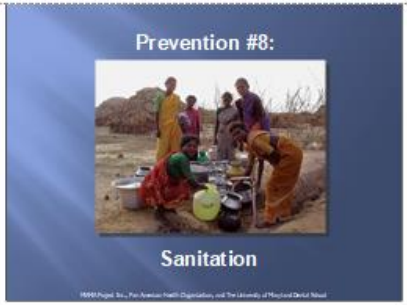
Slide 36		**Vitamin A Prevents Nutritional Blindness** Vitamin A not only promotes and maintains healthy teeth, skeletal and soft tissue, mucous membranes, and skin, but ALSO prevents Nutritional Blindness.
Slide 37		**Administration of Vitamin A Mega-Dose Capsules**
Slide 38		**Recommendations for Vitamin A Administration** Note: This dosage regimen may be too aggressive compared to recommendations made by your Ministry of Health. Vitamin A should be given to all target groups according to the dosage schedules endorsed by your Ministry of Health.

Slide 39		**Prevention #3: Micronutrients**
Slide 40		**Micronutrients** Often these foods are fortified with the following micronutrients: Flour: Iron and Vitamin B Sugar: Vitamin A Salt: Iodine and sometimes Fluoride Milk and Margarine: Vitamin D & A Iron supplements should be provided for children. Folate and Iron supplements should be provided for prenatal women.
Slide 41		**Recognizing Malnutrition** (Explain distinguishing characteristics of each child).

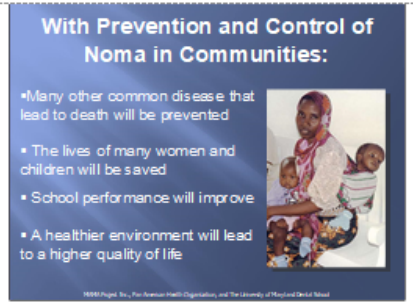
Slide 42		**Chronically Malnourished Children** In communities where malnutrition is a public health problem and food insecurity is the norm: **ALL** women and children need to be given essential micronutrients. This includes: • *visibly malnourished children* (such as in the acute "marasmus" or "kwashiorkor" illustrations), • *chronically malnourished children* (growth stunting/ hidden hunger) • *children who appear healthy* Micronutrients (Vitamins and Minerals) are needed to prevent and treat malnutrition, especially in those at risk.
Slide 43		**Prevention #4: Improved diet for pregnant and nursing mothers** Pregnant and nursing mothers need to eat a healthy, balanced diet to ensure good health from themselves and their children. Maternal short stature and iron deficiency anemia contribute to at least 20% of maternal deaths. In addition, maternal undernutrition increases the chances of low birth weight, which then increases the probability of neonatal deaths due to infection.[1] [1]World Health Organization. Countdown to 2015 Decade Report

Slide 44		**Prevention #5: Breastfeeding** Breastfeeding plays an integral role in the survival and development of a child and also improves the well-being of the mother.
Slide 45		**Breast Milk is PERFECT Food** (Read Slide)
Slide 46		**KEY MESSAGE: Breastfeeding Saves Lives** **(Read Slide)** One of the biggest mistakes that caregivers make is to give infants sugar water or tea starting at birth. This deprives babies of the best antibody-rich breast milk that mothers produce right after delivery.

Slide 47		**Prevention #6: Personal Hygiene** Staying clean is of great importance in the prevention of many kinds of infections.
Slide 48		**Oral Hygiene** A main component of personal hygiene is oral hygiene. (Read Slide)
Slide 49		**Personal Hygiene** Many common infections are spread from person to person simply because people fail to wash their hands with clean water and consequently transmit dangerous germs to one another.

Slide 50		**Prevention #7 Community Wide Infection Control** Community wide infection control includes three main interventions 1. Immunizations 2. Deworming 3. Insecticide Treated Bed Nets
Slide 51		**Infection Control Interventions** (Read Slide)
Slide 52		**Prevention #8: Sanitation**

Slide 53		**Clean Water and Food** (Read Slide) Be vigilant to keep rivers and streams clean upstream from any place where drinking water is taken.
Slide 54		**Waste Disposal** It is important not to defecate or throw garbage near any water source.
Slide 55		**Keep Livestock out of Home** In order to prevent the spread of infectious diseases, it is very important that pigs and other livestock do not come into the house or places where children play.

Slide 56		**With Prevention and Control of Noma in Communities:** (Read Slide)

Discussion:

1) Now that you have been introduced to the disease of noma, have any of you seen early warning signs of noma in the community?

2) Ask for repetition of Key Messages

3) What prevention strategies can you promote in your communities?