

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



Cause of Noma

Complex Interaction between:

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

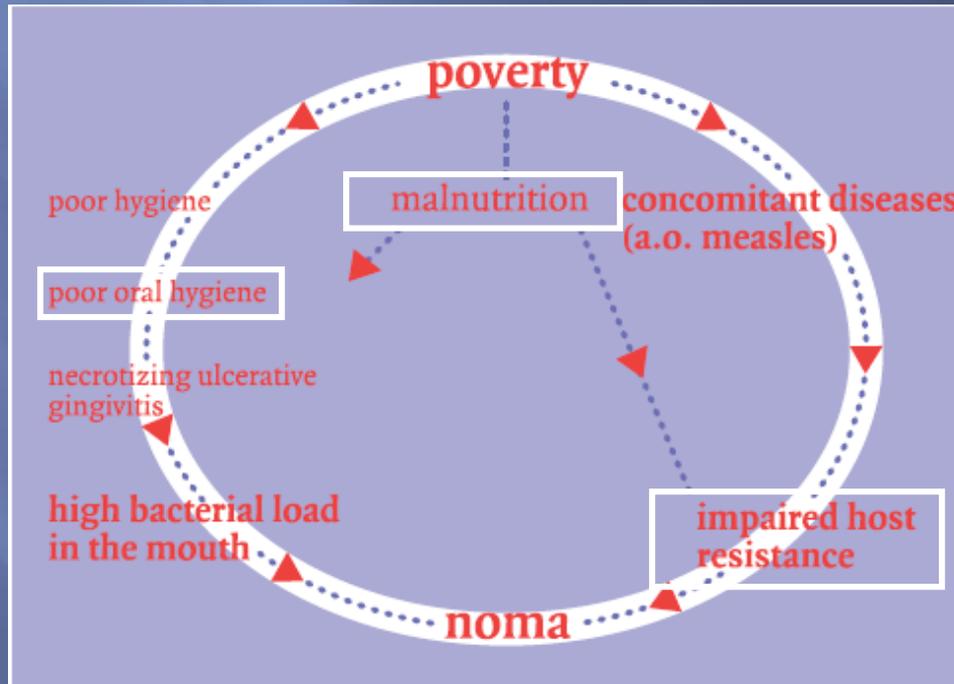


FIGURE 1.4 Schematic representation of the factors responsible for the development of noma. The Surgical Treatment of Noma (2006)

KEY MESSAGE

Noma is
NOT
Contagious



Courtesy of Melissa Phillips

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 Immunosuppressive 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!

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



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.

C O Enwonwu, Archs of Oral Biol, 1972

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

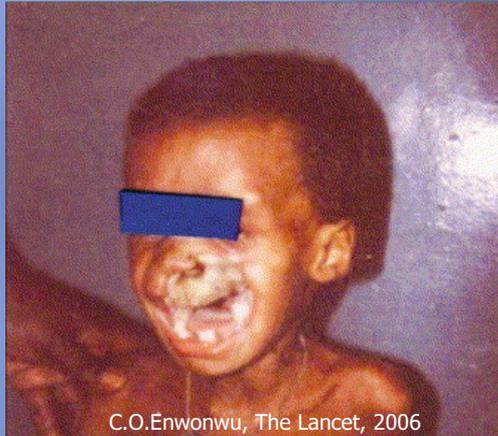
Stage 4: Scar Tissue



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

- ▣ 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

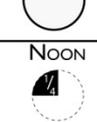
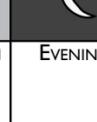
- Oral Hygiene: Disinfect mouth and gingiva with **warm salt water**
- Start oral amoxicillin or metronidazole **IMMEDIATELY** (See charts for doses)
- **All STAGE 2 cases should begin appropriate treatments without delay while arranging URGENT MEDICAL REFERRAL**
- Provide nutritional rehabilitation including supplying essential micronutrients and Vitamin A

Amoxicillin 250 mg - Moderate Dose

Early Intervention Regimen for Moderate Infections

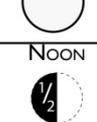
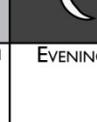
Newborn
0-1 week or <2 kg
11 tablets for 14 days



			
MORNING	NOON	AFTERNOON	EVENING

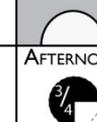
Young Infant
1 week- 2 months or
2-5 kg (4.5-10lbs)
21 tablets for 14 days



			
MORNING	NOON	AFTERNOON	EVENING

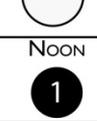
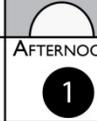
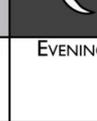
Older Infant
2-12mos or 5-9 kg (10-20lbs)
32 tablets for 14 days



			
MORNING	NOON	AFTERNOON	EVENING

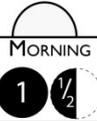
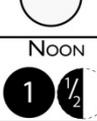
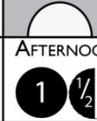
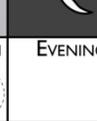
Toddler/Pre-school
1-4 years or 10-19 kg (20-40lbs)
42 tablets for 14 days



			
MORNING	NOON	AFTERNOON	EVENING

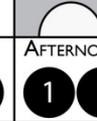
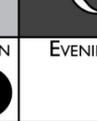
School Age
5-11 yrs or 20-40 kg (40-90lbs)
63 tablets for 14 days



			
MORNING	NOON	AFTERNOON	EVENING

Pre-teen/Adult
12 yrs to adult
82 tablets for 14 days



			
MORNING	NOON	AFTERNOON	EVENING

Notes:

- Duration of therapy - 14 days for noma, 3 days for non-severe pneumonia, 5 days for acute ear infections, 10 days for tonsillitis.
- 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, Denti-frice, 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

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Amoxicillin 250 mg - High Dose

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

Newborn
0-1 week or <2 kg



22 tablets for 14 days

MORNING	NOON	AFTERNOON	EVENING

Young Infant
1 week- 2 months or
2-5 kg (4.5-10lbs)



42 tablets for 14 days

MORNING	NOON	AFTERNOON	EVENING

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



64 tablets for 14 days

MORNING	NOON	AFTERNOON	EVENING

Toddler/Pre-school
1-4 years or 10-19 kg (20-40lbs)



84 tablets for 14 days

MORNING	NOON	AFTERNOON	EVENING

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



126 tablets for 14 days

MORNING	NOON	AFTERNOON	EVENING

Pre-teen/Adult
12 yrs to adult



164 tablets for 14 days

MORNING	NOON	AFTERNOON	EVENING

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 necrotizing 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

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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
			

Older Infant
2-12mos or 5-9 kg (10-20lbs)
14 tablets for 14 days



			
MORNING	NOON	AFTERNOON	EVENING
			

Toddler/Pre-school
1-4 years or 10-19 kg (20-40lbs)
28 tablets for 14 days



			
MORNING	NOON	AFTERNOON	EVENING
			

School Age
5-11 yrs or 20-40 kg (40-90lbs)
56 tablets for 14 days



			
MORNING	NOON	AFTERNOON	EVENING
			

Pre-teen/Adult
12 yrs to adult
112 tablets for 14 days



			
MORNING	NOON	AFTERNOON	EVENING
 	 	 	 

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 necrotizing 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 Amoxicillin.
- 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

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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 necrotizing
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



Fruits and Vegetables



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

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

Prevention #2:



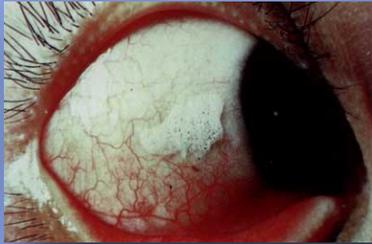
**Administer
Vitamin A**

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	$\frac{1}{4}$ (2 drops)	Breast milk provides Vitamin A
Infants 6 to 12 months: Every 4-6 months	100,000	$\frac{1}{2}$ (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:



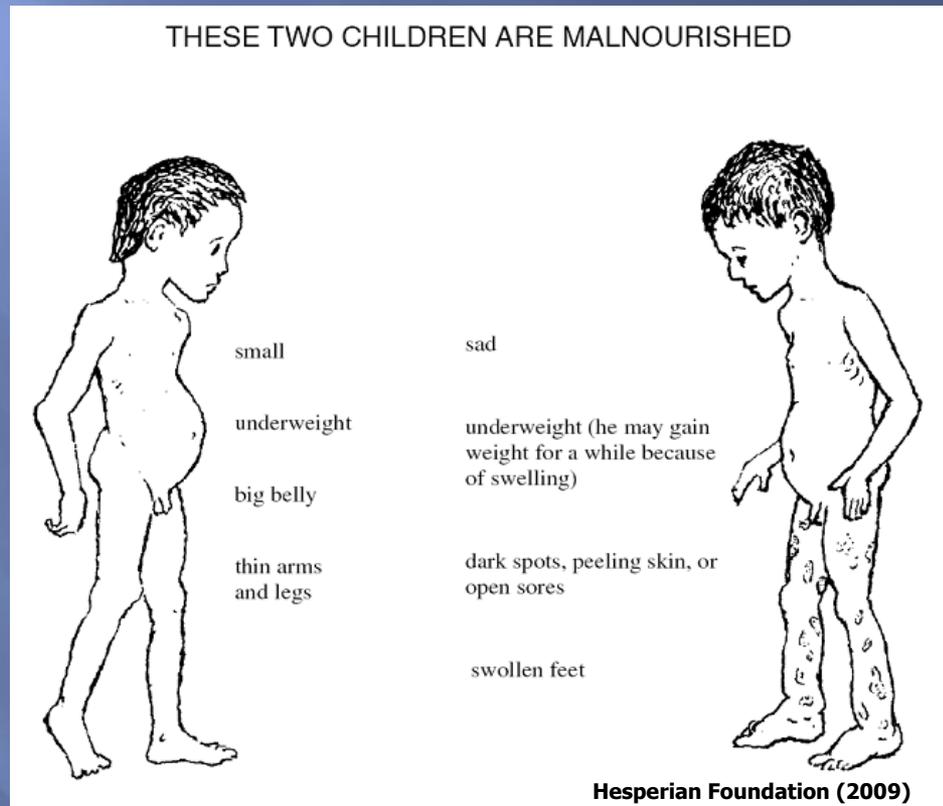
Micronutrients

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



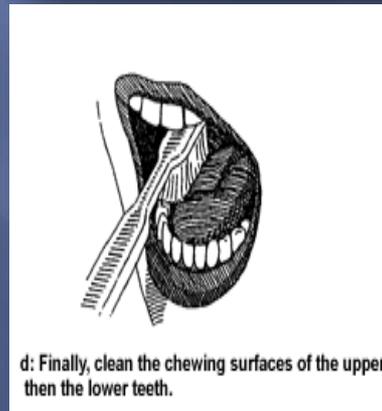
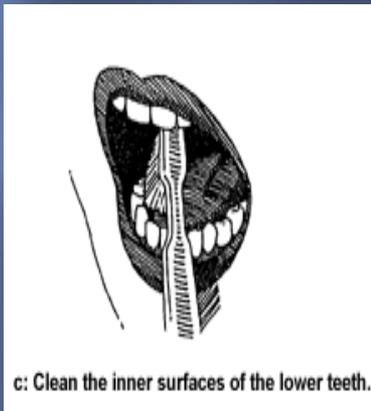
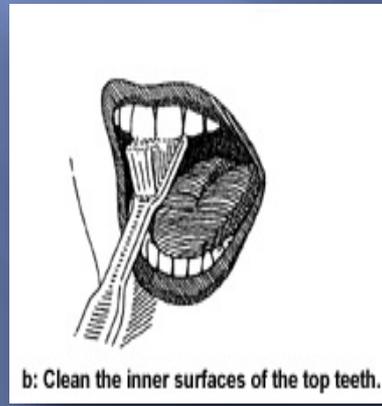
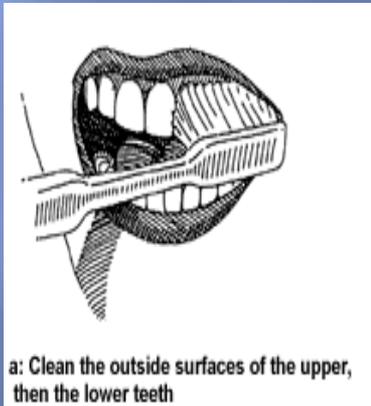
Prevention #6:



Personal Hygiene

Oral Hygiene

Proper Brushing Technique



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 diseases 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

