INTRODUCTION
During a 14 day mission trip to treat facial deformities in Liberia and Ghana, three surgeons encountered several patients scarred from Noma. The word “noma” is derived from the Greek nome meaning “to devour;” the disease is a gangrenous infectious process causing destruction of the orofacial tissue. Noma continues to disfigure poor, malnourished children in West Africa at an estimated incidence as high as 6.4 per 1000 with a mortality rate up to 80% if untreated, compared to the incidence of cleft lip in West Africa, which is .4 per 1000. Noma most commonly affects children between two and five years of age, who are affected by the triad of malnutrition, poor oral hygiene, and recent debilitating illness. Along with severe facial deformity, Noma causes soft tissue ankylosis of the temporomandibular joint, which leads to trismus. This subsequently limits anaesthetic options when flexible nasal intubation is not available.

METHODS
Description of Noma patients treated in Liberia or Ghana at distinct stages of disease presentation. 1) Treatment of malnutrition and correction of electrolyte disturbances; 2) Treatment of underlying infections with antibiotics and debridement of lesions; 3) Surgical repair of necrotic areas and closure of the open wounds with appropriate anesthetic management; 4) Observation following surgical repair.

RESULTS
Fig. 1 Treatment of malnutrition and correction of electrolyte disturbances: Emmanuel did not receive nutritional or antibiotic treatment until late in the disease process and subsequently suffered from severe trismus and a pathologic mandible fracture. This patient was brought to Phebe hospital and received four months of antibiotics and nasogastric tube feeds while awaiting our treatment team. Noma generally presents with fever, growth failure, leukocytosis, and gingival ulceration. Malnutrition along with other comorbidities leads to immune dysfunction. Correction of electrolyte and nutritional disturbances increase the child’s native immune response and can prevent both disfigurement and trismus.

CONCLUSIONS
In field hospitals physicians need to follow rules when treating patients with Noma. Long and complicated surgeries should be performed at the beginning of a trip so patients can be monitored and, if need be, undergo follow-up surgery by the original surgeon. Free flaps will frequently fail, even when performed by the most accomplished surgeon, because patients always have several comorbidities and field hospitals are not staffed or equipped to care for these patients. Pectoral or deltsoid local flaps do not generally fail but must be monitored by the team. Flexible intubation is generally not available unless brought by the treating team. Tracheostomies must be decannulated before the treating team leaves. Surgeons should only attempt cases requiring multiple operations that can be completed during the duration of their trip.

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Fig. 2: Child suffering from active Noma infection. Families often travel hours or even days from remote areas to bring their children for treatment by visiting doctors. This patient required three months of antibiotics and nasogastric tube feeds at a hospital run by Doctor Without Boarders before surgical repair. Nutrition is paramount to correct the underlying immunologic deficiencies and prevent continued necrosis. This patient was treated with a first generation cephalosporin, though metronidazole and penicillins are also effective.

Fig. 3: Trismus necessitates surgery repair under local anesthetic: This patient survived the acute Noma infection but suffered trismus and facial scarring. The patient was sedated with versed, propofol, and local anesthesia with lidocaine and epinephrine was administered. One difficulty for physicians treating Noma is the lack of modern medical equipment found in the rural field hospitals of Africa. Reconstructive surgery must, by necessity, often be one-stage in nature, for many patients do not return for follow-up treatment, and many resist spending time away from their families for hospitalization. The challenge for modern medicine is to bring effective treatment to areas of consistent poverty because Noma is a disease that, if not fatal, is life-altering.

Fig. 4: Observation Following Surgical Repair: Flexible intubation was not available, so a tracheostomy was placed for the procedure and during post-operative healing. Emmanuel had both a fibular free-flap and a scapular free-flap attempted. After repeated efforts to regain perfusion, both clotted off immediately leading to the failure of both flaps. These subsequently mummified the exposed bone, allowing new tissue to granulate below. Emmanuel’s wound care, antibiotic administration, and NG tube feeds were continued by Doctors Without Borders for the next month and a half.