Pre-Medicine Internship Program

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The Universal Language of Medicine: Lessons from My Internship in Kenya

The official national languages of the Republic of Kenya, as per the Kenyan Constitution, are Swahili and English. However, I believe there is a third language commonly spoken within the Republic, that supersedes national borders or regional dialects: the language of medicine. In a country where healthcare literacy is increasingly essential, but tragically uncommon, this language connects every human at the most basic level, as medicine is inherently objective. This point was solidified for me on one of my first days, while rotating in the Comprehensive Care Centre (CCC). I remarked, noticeably surprised, that lavender topped-tubes have the same anticoagulant at Coast General Teaching and Referral Hospital (CGTRH) as they do in US hospitals. A Kenyan clinician replied immediately, very matter of factly, that of course that is the case. To paraphrase, he stated in order for delivery of healthcare to be optimal, providers must have an understanding of equipment and associated physiology regardless of location. While astoundingly simple to grasp, hearing this early on in my internship allowed me to confidently merge my existing clinical knowledge with the invaluable lessons I'd be taught over the next four weeks.

While the language of medicine is universal, interpretations and effectuations certainly change between states, nations, and continents. My first day of shadowing with a primary care physician in the CCC would be the first and last time I saw the electronic medical record (EMR) software used at CGTRH. Perhaps naively so, I was initially relieved when I saw the EMR wasn't very different from others I've grown accustomed to in my own career. Each patient is attached to a ten-digit number indicating the hospital code and a unique medical reference number. However, this relief would turn to confusion the next day. While shadowing the phlebotomist, Peter, I watched patients file into his office and hand him booklets that looked like they were hit by several vehicles on Links Road, Mombasa.

On the front cover, their names, unique identity numbers, and presenting conditions were handwritten in the respective sections. Peter explained that patients were responsible for keeping track of their own health records. I asked what happens if patients lose these books and he shrugged, stating that loss of records is a problem that can, and does, impact continuity of care. While in the coming weeks, I'd become more skilled at reading these books to understand patient cases, it nonetheless is still something that bothers me on a deep level. The paper system places an unfair burden on a population that already struggles with healthcare literacy, as the paper records, which they must keep track of, become their only means of communicating what plagues them.

The differences in delivery between Western and Kenyan public hospitals are not only disadvantageous to the latter, however. Given that resources are more scarce, on both the provider and the patient level,

it has forced providers to develop more effective patient care and education strategies than even in many clinics stateside. For example, when explaining complex disease processes such as hypertension to their patients, doctors pull up images on their computers or phones of, say the vascular anatomy of the brain, and show how hypertension can cause ischemic or hemorrhagic strokes, with pictures for reference.

Further, in the outpatient surgical clinic, I witnessed a doctor take a history for a known patient, listen to her symptoms, and calmly write the title of a Youtube video on a prescription pad detailing how to stretch out a muscle that was bothering her. At first, I thought this was a bit dismissive, but upon further reflection, the pseudo-prescription became more ingenious than I had initially thought. In the US, a presentation like this would likely involve costly physical therapy or surgery; this solution was far more cost effective, conserving time and resources. A large majority of patients have access to the internet, and as any student can attest to, the internet is full of free, readily available information. Nonetheless, he knew she would return if her condition worsened, and had an understanding of her as a returning patient.

In Mombasa, it is common for workers to be paid at the end of each workday. Compounded with low wages generally, this means failure to show up to work on a given day means for that day, the family will not have any money. This paycheck-to-paycheck lifestyle is not specific to Mombasa, as even in the US where wages are much higher proportionally, as many as 57% of people live paycheck-to-paycheck (MarketWatch, n.d.). Unfortunately though, this day-by-day model means workers will ignore medical ailments until absolutely necessary, because unlike in the US, sick days are not readily available. As a consequence, patients won't seek out medical treatment until unbearable, if at all. On my second day in the ER, a patient presented with a history of crushing chest pain for five days. Upon reading the ECG, it was the most profound ST segment elevation that I had ever seen outside of a textbook. This patient had likely been having a STEMI (ST Segment Elevated Myocardial Infarction) for five straight days and only came when it became intolerable. This is in stark contrast to my experience in the US as a pre-hospital firefighter/EMT, where people will call emergency services the second they feel slightly abnormal.

On the topic of EMS, the prehospital medical services of Mombasa's public healthcare system leave a lot to be desired, but still have the echoes of providers doing their best under suboptimal circumstances. I had the opportunity to enter an ambulance during a lull in one of my night shifts in Emergency and Casualty, and what I found in the patient compartment was a single stretcher, a few rolls of gauze, a loose oxygen tank, and some BLS vital-taking equipment. Even so, what the ambulance workers lacked in equipment, they made up for in compassion. Multiple times throughout the several transfer-of-care reports I garnered from the ambulance teams on patient intake, the EMT was holding back tears, shed

for his patient. While every ambulance I've worked on in the US is better equipped than entire departments at Coast General, I've never shed a tear during patient care, as patient death or decompensation occurs after several interventions, and the general sentiment is that we, as providers, gave the patient the best chance of survival. These handoff reports alone elicited a strong emotional response from me, as I could not imagine being put in his position, where he may or may not know what the patient needs, and certainly lacks the equipment. These shortcomings in the hospital systems are not isolated incidents, but rather a reflection of deeper, systemic issues interwoven in the fabric of Kenyan politics.

Since its liberation from British colonial rule in 1963, Kenya has been self-governed via a constitutional republic system of government (Embassy of the Republic of Kenya in Japan, n.d.). While this system of government necessitates frequent elections, there is still a fair amount of civil unrest and political corruption. Just during my brief stay in Mombasa, an afternoon shift was canceled due to riots in the country over an unjust police shooting. This sense of political unrest is not only observed at the macroscopic level, but also weighs heavily on the minds of almost everyone I spoke to about the matter. It was fascinating to talk to patients, providers, and laymen alike and get their input on politics, as even in a country without protected freedom of expression, politics remains in the realm of casual conversation. Specifically pertaining to healthcare, it is essential to first understand how the industry is managed in Kenya.

Kenya healthcare is designed as a mixed system, with both public and privately funded healthcare facilities available to everyone. There are three primary media of healthcare delivery within the nation. Public, which is what I was exposed to primarily, relies on taxpayer funding via the Ministry of Health (MOH) to provide lower cost health services (Africa House Business, 2021). Private healthcare facilities make up the largest percentage of overall facilities available but are more expensive, with the benefit of better patient outcomes. Faith-based organizations (FBOs) are the third type of healthcare delivery system in Kenya. While I had minimal exposure to these during my time in Mombasa, these FBOs provide 30% of healthcare services in Kenya. Interestingly, while they're funded and run by religious organizations, the patient's religious affiliation is not considered by these facilities.

While ideally, all three of these systems would provide an equal quality of care, this sentiment is tragically naive. The exact reasons as to why public healthcare systems continue to lag behind the more progressive private commercial sector are up for debate, but common themes are insufficient funding, political corruption, and exceedingly low provider-to-patient ratios. Whether the funding is insufficient due to low allocation or governmental embezzlement is also up in the air. The way Peter in the CCC explained the healthcare system funding is that SHA, or Social Health Authority, established a framework for managing health insurance. SHA primarily manages the primary and emergency health

funds, as well as SHIF, which is the newest administration's healthcare insurance initiative. While SHA is relatively new to Kenya, every patient chart has their SHA status on the front cover page.

The funding of Kenya's public healthcare system isn't entirely internal, as an estimated 19% of the capital comes from external funding sources such as UNAIDS, USAID, and the World Bank (Moon & Omole, 2021). On every door of the CCC, for example, the various agencies responsible for funding are listed on a placard, along with the room's function. Even with all of this funding, both endogenous and exogenous, many providers still feel that the funding each department receives isn't aligned with their patient load, causing routine supply shortages. When things as simple as disposable tourniquets aren't even readily available for phlebotomy, it requires the whole system to be examined.

The dissolution of USAID was an issue not only heavy on the minds of the clinicians. Patients in the CCC would often pose questions to the doctors about how their treatment plan would change in the coming months and years. These questions were impossible to answer, as not a single concrete answer was available to anyone. These patients could've asked the US government directly the same question and been met with the same uncertainty, albeit a more apathetic response. HIV is not an illness that can be put on the backburner while politicians figure out how many people they're comfortable with killing to save a few dollars.

One nightshift in Emergency and Casualty, there were two patients that exemplified the shortcomings and corruption of the public healthcare system. The first patient was a bariatric diabetic who was escorted by two bodyguards. After about a ten-minute stay at the patient intake in the ER, this patient was immediately transferred up to ICU without proper indications because she had known the right people to make her stay superior to the common man. We transported her up in the elevator, and as I tried to assist her to the intensive care bed, she was able to move herself over. This wouldn't have been so shocking if the patient in the bed next to her didn't have an SpO_2 in the 70s, with a GCS of 3.

A couple hours after the first patient was transferred, a second patient arrived via ambulance. The patient presented as a pleasant 20s male with a unilateral radial fracture. His other arm had been amputated in another hospital about three days before contact, which according to his history, was indicated due to an RTA (road-traffic accident). Despite this, all his vitals were within normal ranges, and I walked him to a bed shortly after finishing his triage. He was transferred into the bed, after which the man the patient had arrived with, his father, handed me a folder full of scans and a box. He was speaking Swahili, but when I asked the ambulance worker who was with us to translate, he stated inside the box was the patient's amputated arm, marked for disposal at the hospital. I placed the box underneath the patient's bed, and reported to the MO with the scans. Upon observing the scans, which were plentiful, there were no obvious abnormalities aside from the arm. Despite this, the patient had a

full battery of tests, which was completely unheard of for any patient I had encountered in the hospital, much less a subacute patient such as this one.

After further investigation, it became apparent that the reason for the transfer from a private sector hospital to CGTRH was to allow the patient to be closer to home. The father of the patient continued to follow the Medical Officers around, even while they were checking on other patients. Even when I would go to cycle the patient's NiBP or pulse oximetry, he'd approach me and ask questions, with a rather authoritarian undertone, about what we were going to do with the patient.

At approximately 04:00 that morning, the interns were invited to accompany the doctors to the street just outside the hospital for some bananas and coffee. While we were all delighted to experience a wholesome outing amidst a chaotic night shift, we still had questions pertaining to what those two patients meant about the system as a whole. Upon returning to the ER, the doctor sat us down and explained what had happened. The first patient, the diabetic, had been transferred because she was a politician's mistress, and therefore an order from the top mandated the transfer. He elaborated that it wasn't a clinical transfer indicated by presenting conditions authorized by Medical Officers on the floor, but rather came from an unknown overseer. The second patient, the man with his arm in a box, was the son of a military power, and was afforded higher quality testing and personalized care than typically offered because of his father's standing. He continued to vocalize his discontent with the system, and voiced frustrations that would be too specific to put into writing, due to privacy concerns. In the middle of this passionate political conversation, however, another patient arrived and we had to divert attention to the next patient.

One day in internal medicine, after rounds, a medical officer asked me if there were any more cases I'd like to see that I wouldn't at home. At this point, I'd seen more tuberculosis, meningitis, malaria, and dengue fever cases than I thought I'd see my entire career, but after some thought, I replied with "Kwashiorkor's." The MO paused for a moment, then replied that Kwashiorkor's is "a thing of the past" for Africa, and that cardiovascular disease is now a much more pressing issue for Kenya. While stating hypoproteinemia cases are a thing of the past is a bit hyperbolic, his comment still reflects the actual disease burden felt by the clinicians and the Mombasa community as a whole.

According to the WHO, a third of the Kenyan population has hypertension, a serious risk factor for developing cardiovascular abnormalities such as atherosclerosis, ischemic/hemorrhagic strokes, and even myocardial infarction (World Health Organization [WHO], n.d.). With that, 12.4% of the Kenyan population qualifies as clinically obese. However, according to the CDC, this number trends much higher in the urban regions of Kenya, with some models showing obesity in these regions as high as 60% (CDC, 2018). A 2021 NIH study found this percentage to be closer to 40% in Mombasa

specifically (Mkuu et al., 2021). Even without the concrete data, any hospitalist will attest to the fact that hypertension, diabetes, and obesity are a major public health concern at CGTRH.

While the high prevalence of nutrition mediated cardiovascular issues could be manageable on its own, these pre-existing conditions are more likely to become comorbidities in the Kenyan population, worsening the patient outcomes for communicable and infectious diseases, namely Dengue and Tuberculosis (Onyango et al., 2015). Furthermore, the three leading causes of mortality in Kenya are Tuberculosis, HIV/AIDS, and respiratory infections (WHO, n.d.). The high mortality rates for these three diagnoses are not solely attributable to the pathogenicity and immune processes specific to each disease, but ultimately, cultural and socioeconomic factors play an unfortunate role in solidifying these diseases as death sentences (Barua et al., 2018).

Tuberculosis was a disease I sadly grew all too familiar with by the end of my internship. From visiting the microbiology lab to discuss diagnoses and epidemiology with the lab lead, to writing a rounds-style patient report on a 28-year old male with recurrent tuberculosis, to assisting with a full physical exam on TB patients, I was privileged to learn as much as I could about all forms of tuberculosis. Mycobacterium tuberculosis, the causative agent of tuberculosis, is an aerobic non-motile bacteria that originates in the alveoli of the lungs causing PTB (pulmonary tuberculosis). If left untreated, PTB can result in systemic tuberculosis if access to the bloodstream is obtained (Chakraborty & Rhee, 2018). While TB has been mostly eradicated in the Western world, it remains the most fatal disease in Kenya due to poor healthcare literacy and access, economical factors, and a 35% rate of patient noncompliance in the antibiotic regiment (Muture et al., 2011).

Kenya utilizes the live-attenuated BCG vaccine as a part of its routine immunization schedule for tuberculosis (Lönnroth et al., 2015). While it's a positive that there is a cost-effective and widespread vaccine in place, this limits the assays available for diagnosis. Immunologically, a weakened form of tuberculosis is acquired via the live-attenuated vaccine, the pathogen is then phagocytosized, and IgG antibodies memorize the pathogen for future destruction. An unintended side-effect of the BCG vaccine is the PPD, or pure protein derivative, being falsely positive, as the IgG antibodies mentioned are still present.

Treatment of tuberculosis also remains an issue due to the socioeconomic and cultural variations of Kenya (Abebe et al., 2011). Not only is a three-to twelve-month antibiotic regiment expensive and difficult to adhere to, it also may seem pointless after a few weeks. As any microbiologist will attest to, while the patient may feel better when the bacterial load drops below a threshold, the antibiotic course must be continued until a predetermined date, as bacteria is able to reproduce, even in dwindling numbers (American Lung Association, n.d.). This initial "feeling better" may cause patients to discontinue the medication before indicated, causing recurrent infection (Barua et al., 2018). Further,

due to the highly infectious nature of tuberculosis, the patient may begin sharing their medication with family and friends suffering from the same-- or similar-- diseases (Kipruto et al., 2024).

This trend of medication sharing is tragically not unique to tuberculosis regiments. In the CCC, providers recount stories of HIV/AIDS patients sharing their antiretrovirals with family and friends. This act of sharing, while reflective of an impoverished and medically illiterate patient population, also represents the cultural stigma around the treatment and prevention of HIV/AIDS. This disease, referred to as RVD (retroviral disease) by those within the CCC to avoid alarming patients, presents with flu-like-symptoms, dermatological abnormalities, and if left untreated, neurological impairments. It is transmitted by transfusion, which often means sexual contact, which is why many Kenyans see it as a consequence of poor morals. Mechanistically, HIV binds to CD4+ receptors and co-receptors (CCR5 or CXCR4) on T-helper cells, allowing viral entry and destruction of these cells, thereby impairing cell-mediated immunity (CMI). Once CD4+ T cell counts fall below 200 cells/μL, HIV is classified as full-blown AIDS.

Due to the high death rate of this disease (WHO, n.d.), compounded by the dominant social stigma of this being a disease of morality, patients may travel hundreds of kilometers from home to get treatment, so as not to face social repercussions from being seen at the HIV treatment center. Because of this large diagnosis and treatment barrier, every patient who arrives at the Emergency and Casualty department is tested for RVD despite symptomology. Unfortunately, until cultural stigma moves in a more progressive direction, HIV/AIDS will continue to worsen. Even for existing patients in the CCC, treatment isn't guaranteed; as a part of the Trump administration's budget cuts, USAID funding has been halted altogether with no meaningful prospective replacements (Baker & Crowley, 2025).

Respiratory tract infections account for 37.6 per 100,000 deaths in Kenya (WHO, n.d.), solidifying it as the third leading cause of death in the country. Because of this, throughout the course of my four rotations, specifically in emergency and internal medicine, I saw many lung X-rays positive for pneumonia. Often, if the lung x-ray was ordered and showed no abnormalities, it meant the patient likely had another disease process in the lower respiratory tract, only prolonging his/her stay in the hospital. While on their own, respiratory infections, particularly those of the lower respiratory tract, are difficult to manage, it's often not the only patient illness.

COPD is a pervasive, chronic burden to public health in Mombasa. While the disease is mostly attributed to smoking in the Western world -- as well as in Mombasa, with smoking rates of up to 20%-- it is also worsened by the use of in-house firepits to keep warm and cook food (Statistics Kenya, n.d.). Many houses lack appropriate ventilation, and therefore it's not uncommon for the entire home to be filled with smoke. I experienced this first hand, while on an International Medical Aid safari to the Masai Mara. A tribesman invited me into his home to see the living arrangement. Immediately upon

entry, my first instinct, as a trained firefighter, was to crouch down. Nevertheless, I followed him into the main room, where I saw the origin of the smoke: a small fire pit maintained by the burning of biomass such as grass and wood. He'd periodically stoke it, only worsening the air quality. Next to the pit was a makeshift kitchen and a bed. While this was a rural community, doctors assured me these living conditions are just as pervasive in the urban areas of Mombasa.

It goes without saying that prolonged exposure to smoke predisposes someone to chronic obstructive pulmonary disease, but this chronic exposure also means the immune system is not as capable to fight infections, specifically pertaining to the respiratory tract. While disease statistics can certainly help form a picture of the types of healthcare challenges in Mombasa, one patient I encountered embodied the consequences of systemic shortcomings and their humanitarian consequences.

While awaiting the next patient in Emergency & Casualty, I saw a man wheel an empty stretcher rather hastily towards the ambulance bay. Having a background in emergency medical services, I knew this meant a patient had arrived that was, at the very least, unable to ambulate. I helped him steer the stretcher and walked outside to find that there was not an ambulance in sight, but rather a single red tuktuk with a man standing by the rear trying to pull someone out of the back seat. I walked over and looked inside to assess the patient's condition, finding a 40s male, unconscious. I checked his carotid artery for a pulse, which thankfully was present. With the help of the man he arrived with, I lifted him from the car and placed him on the stretcher to wheel him into the emergency department. There were not any open beds or available Medical Officers, so I placed the stretcher he was already in against the wall and began a primary assessment.

The patient was placed on his side in the recovery position due to presence of secretions and vomit. His Glasgow coma scale (GCS) I evaluated as 5, due to unresponsive dilated pupils, no vocalizations, and decorticate posturing. Pulse and oxygen saturation were within normal ranges, but his blood pressure exceeded the machine's capability of approximately 240 mmHg systolic.

While gathering vitals, I was talking to the man the patient came in with to obtain a semblance of a history. The man spoke very little English, as did I Swahili, but after acting it out I came to the understanding that the man had fallen straight backwards spontaneously from a standing position, striking his head on the ground. No seizure activity or convulsions were reported prior to or after the fall. Upon physical examination, a soft spot was noted on his rear cranium, proximal to his scalp, suspected to be a contusion. Abdominal examination was unremarkable, as was the musculoskeletal system. Upon auscultation of his lungs, they were observed to be clear and equal bilaterally, with equal chest rise and fall.

Upon completion of the primary and secondary assessment, I reported my findings to the closest available Medical Officer. He nodded his head and asked what actions I think should be taken next, to which I replied a Head CT and intubation. He agreed with the indications for a head CT, but stated due to the patient's stable SpO_2 procurement of an intensive care unit spot would be difficult. I remained with the patient until the end of my shift, and there he remained for an indeterminate amount of time, as his insurance had to be confirmed before he could be moved to a bed and further evaluated.

I arrived back at the hospital at 20:30 that night for night shift, and immediately upon entering a doctor I had talked to earlier in the week came up to me and asked if I wanted to see an EVD (external ventricular drain). I enthusiastically followed him, pulled back the curtain to enter the bedside, and found my patient still unconscious with a surgeon actively drilling a hole into his head. I referenced the chart, and this anonymous unconscious patient finally had a name: Mohammed. Upon reading the notes and looking at the head CT, it became apparent the reason for the bedside EVD was a massive intracranial hemorrhage, which likely resulted from a hemorrhagic stroke. The EVD was completed without issue, but Mohammed remained vitally unstable and profoundly hypertensive. Mohammed remained in that ER bed for the remainder of my shift, as an ICU bed was unable to be allocated.

On the morning two days after the night shift, I spoke to a doctor I had been shadowing, where he revealed Mohammed had expired. While I have had patients die before in the US, and also understood this was inevitable given history and presenting condition, Mohammed's death still affected me more than any other patient I've ever had. The hospital system failed him. He needed an advanced airway and a bed in the ICU, and that was unable to be obtained.

I visited Mohammed one last time in the mortuary that afternoon. He was still wearing the same clothes he had arrived in, and had the same expression on his face, with the exception of his mouth being secured closed post-mortem. Mohammed had become just another corpse in the morgue, but he will be with me for my entire career in medicine.

Ultimately, aside from the shortcomings and injustices I witnessed during my internship, the lesson that reigns true, regardless of how many confounding variables there may be, is that to be a good clinician, one applies his/her breadth of knowledge to individual patients as effectively as possible. At the end of the day, patient outcome is the only metric that truly matters. If the hospital administrator fails his/her task, money may be lost, but if the hospitalist fails his/her task, people can and will die.

On my final day at CGTRH, after visiting and saying my farewell to all the providers I had the privilege of calling teacher and/or friend for that month, I walked past the morgue. The hauntingly familiar smell of formaldehyde and decaying flesh grazed my nostrils and I decided to do one last walk through. While I did not recognize any of the people laying to rest, I still spent a few minutes in the

building, taking it in one last time. Although I'd be leaving Kenya in the coming days, I had to remind myself that this reality is universal. Whether it be from action, inaction, or unfortunate luck, these people had died in the hospital, and that is something that will always happen, even through no fault of my own. I will always remind myself, before every primary assessment or pharmacological intervention, the consequences of failure, and I think that's a lesson every student entering the industry should take to heart.

Nonetheless, it's still important to understand that, even under ideal conditions, patients will still die. At CGTRH, as well as many other under-resourced healthcare facilities, often clinicians are limited with what they can do because of factors outside their control. Even confronted with these realities, I was inspired to see MOs, COs, nurses, and general staff alike always provide the best care possible with afforded circumstances. No task was beneath anyone, as Medical Officers would routinely adjust the angle of patients' beds for their comfort. There was something about working in an under-funded hospital that inherently increased the empathy required. Unlike US hospitals, there were not many machines with complex algorithms determining dosages or displaying every vital sign and waveform one could ever need. Because of that, patient care wasn't shrouded with the same superiority complex as in the US. Patients often recognized providers were doing the best they could, and providers would see patients as people rather than room numbers and conditions. Ultimately, a good clinician isn't defined by the resources at their disposal, but rather how their fluency in medicine translates to maintaining the patient's humanity and improving their condition.

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