【 Supporting Medical Technology in Developing Countries 】

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【International contribution based on my own experience 】

As a Biomedical laboratory scientist, I'd like to contribute to the spreading and developing of laboratory technology in areas where healthcare is yet advanced. The first reason is based on my experience in Jakarta, where I lived when I was in high school. There is severe wealth inequality in Indonesia. Because health care in Indonesia is undeveloped, wealthy people visit neighboring countries like Malaysia and Singapore for medical treatment and health checkups. In addition, the latest medical facilities are concentrated in the capital city, Jakarta, and equal medical care cannot be provided. Recently in Indonesia lifestyle diseases such as diabetes and cardiovascular diseases are increasing, in addition to infectious diseases. Therefore, the improvement of clinical examination techniques and education for the early detection of diseases should also be emphasized. The second reason is my experience of interacting with Laotian students in the international exchange program "Virtual Café" held at TMDU. I heard that in Laos, pathological examinations are not widespread, and enough types of examination equipment and kits are not provided. In addition, I learned that examination and treatment are not conducted equally in rural areas due to inadequate infrastructure construction. For these reasons, I would like to strive to educate and improve laboratory techniques in developing countries.

【Issues to consider when providing support】

However, there are some problems relating to the education of medical technology. The first is the difference in national characters. We are required to seek the best way to educate staff. So, they can understand how accurate results are important to help patients in a way specialized for local people. For example, in Indonesia, I have felt that the public health perspective in poor areas is not the same as in Japan. When I volunteered to teach English to children in rural areas, I saw many children throwing garbage of stacks away into waterways. Therefore, for the development of medical technology, it is important to broaden the idea of public health, such as hygiene management, environmental hygiene, and infection control. The second problem is that the environments differ greatly between urban and rural areas, and development in urban areas alone will not lead to improvements in medical technology in rural areas. Moreover, it is necessary not only to spread clinical testing technology but also to secure infrastructure and manage equipment so that equipment and reagents can be purchased.

【Prospects for the future and what we can do 】

Continuing education without understanding differences in national character will not lead to future development. It is necessary to improve the situation by thinking together with the local staff. In Indonesia, there are many islands where people have different languages, cultures, and administrations. So, it is crucial to understand the backgrounds and to expand the range of knowledge in different fields such as political science and economics. To contribute to developing countries, it is important to find my own field of expertise, refine my skills and accumulate knowledge as a Biomedical laboratory scientist. Even if I don't go to other countries, I can make efforts for international cooperation in Japan. When I communicated with Taiwanese students at the "Virtual Café", I heard that they want to study Japanese technology as exchange students. I believe that I can help accept overseas trainees and disseminate the technology while working as a Biomedical laboratory scientist. As a sophomore, what I can do is use English in a practical way. Also, it's important to understand the current situation of the country through communication. For future medical development, it is necessary to collaborate with experts in other fields. Therefore, I'm willing to interact with people in various situations and broaden my perspectives.

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【　　発展途上国での検査技術の支援のために　　】

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【自身の経験を生かした国際的な貢献】

私は、臨床検査技師として、医療が未発達の地域における検査技術の普及および発展に貢献したいと考えている。その理由は二つある。一つ目は高校のころ住んでいたジャカルタでの経験である。インドネシアは貧富の差が激しく、裕福な人たちインドネシアの医療が不十分なため、マレーシアやシンガポールへ治療や検査を受けに行く。また、最新医療設備も首都のジャカルタに集中してしまい、平等な医療を提供することができていない現状がある。インドネシアでは、発展途上国に見られる、感染性疾患だけではなく、経済発展に伴った糖尿病や循環器疾患などの非感染性疾患の患者も増加傾向にある。そのため、臨床検査の技術の向上および疾患の早期発見のための教育も重要視されている。また、東京医科歯科大学医学部保健衛生学科検査技術学専攻の学生向けに開催された国際交流プログラム「Virtual Café」でラオスの学生と交流した際の経験が二つ目の理由である。ラオスでは、病理検査の普及が乏しく、検査機器やキットも種類が乏しいという話を聞いた。また、地方ではインフラ整備も十分でないため、平等に検査および治療が行われているわけではない現状を知った。これらの理由から、発展途上国における検査技術の教育および向上に努めたいと考えている。

【支援をする上で考慮すべき問題点】

支援する上での問題点の一つ目は、国民性の違いである。いかに正確性のある結果が患者を助けるために重要なのかを理解してもらえるよう現地の方に適した教育を行う必要がある。例えば、インドネシアでは貧困地域における公衆衛生的な観点が乏しいと感じる経験が何度かあった。貧困地域の子供たちに英語を教えるボランティアをした際に、スナック菓子のゴミを当たり前のように水路に捨てていた様子を見た際に、環境衛生に対する考えの違いを認識した。したがって、医療の発展のためには、衛生管理、環境衛生、感染対策など公衆衛生の考えを普及することも重要となる。発展途上国は問題が一つではないため、検査技術の発展のためには根気強く、できるところから少しずつ行動することが求められる。二つ目の問題点としては、発展途上国でも都市部と地方で環境が大きく違い、都市部だけの発展では、地方の検査技術の向上には繋がらない。ラオスでの検査機器やキット自体の獲得が難しいという話から、臨床検査技術の普及だけではなく、機器や試薬を購入できるような運営、インフラの確保などが必要となると考える。

【将来への展望と今できること】

国民性の違いを意識せず、教育を続けることは、将来的な発展に繋がらない。先進国の立場から教育をするのではなく、現地の人の価値観を意識したうえで、現地の人と一緒に考えながら改善していく必要がある。国の中でも地域によって言語、文化、行政が大きく異なる場合もあるため、それらの背景の理解も必要となる。そのため、医学的知識だけではなく、政治学、経済学などの他分野の知識の幅も広げていく必要がある。自分自身の専門分野を見つけ、臨床検査技師として実務経験を積み、技術を磨き、知識を蓄えることが最優先である。また、日本国内だけではなく、他の先進国における技術の研究を学ぶことも大切であり、常に様々な研究や考え方にアンテナを張っていきたいと考える。そして、他の国に行かなくても、国内で国際活動をすることはできる。「Virtual Café」で台湾の学生と交流した際に、日本で留学生として日本の技術を学びたい、という話を聞いた。そのため、臨床検査技師として働く中でも海外の研修生の受け入れに協力し、技術の普及を行うことができると考える。その上では、英語の実践的な学びが必要となる。学部 2 年生の私が現在できることは、海外研修プロジェクトなどで英語を実用できる環境に身を置くことであると考える。また、交流などを通じて、その国の現状を理解し、常に自分は何ができるのかを考えていくことが重要である。今後の発展のためには、他分野の専門家と連携することが求められる。そのため、学生の内から、様々な立場の人と交流をし、価値観を広げていきたいと考える。

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【What biomedical laboratory scientists can do for achieving the goals of SDGs】

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【SDGs and biomedical laboratory scientists】

We had an active discussion on "what we can do internationally as biomedical laboratory scientists (BLSs)". Then, we concluded that we would like to contribute to solving international problems. In particular, we focused on Sustainable Development Goals (SDGs), which aim to realize a sustainable world by 2030. SDGs set 17 goals,[1] and various efforts are being made around the world to achieve them. The Goal 12 of SDGs, "Ensure sustainable consumption and production patterns", promotes development of eco-friendly products and reduction of wastes.[2] In this manuscript, we describe the survey results about environmental problems caused by medical wastes and how to improve them. In addition, we discuss how BLSs can contribute to achieving the goals of SDGs.

【What is eco-friendly laboratory science】

Medical wastes include infectious and non-infectious wastes, both of which are commonly found in biomedical laboratories. Generally, infectious wastes are specially discarded as industrial wastes, while non-infectious wastes are disposed as general wastes. We thought it particularly desirable to reduce the use and disposal of non-infectious wastes.

Microplastics (MP) are examples of the negative environmental impact of non-infectious wastes. MP are plastics with a diameter of 5 mm or less, which cause marine pollution. In addition, fish sometimes accidentally take MP into their body, and humans are indirectly exposed to MP by eating them. It has been pointed out that endocrine disruptors in MP may inhibit the biosynthesis of adhesion proteins in mucosal cells.[3] Thus, environmental pollution disturbs not only plants and animals but also our health. This is a particularly important issue for achieving Goal 12.

To solve the problem of medical wastes including MP, we should reduce the wastes themselves. At present, most disposable instruments used in biomedical laboratories are wrapped in plastics, and their disposal leads to generation of MP. As a countermeasure, it's effective to substitute paper packaging for these instruments. Another good approach is setting up recycling boxes in biomedical laboratories. This will not only to enable the recycling of wastes, but also to improve the awareness of BLSs toward environmental protection. In the future, we would like to take an active role in such efforts in biomedical laboratories and contribute to the international communities.

In order for BLSs to contribute to SDGs, it is also important to improve existing laboratory methods. For example, it has been reported that the use of recycled solvents in papanicolaou staining was almost equivalent to the conventional performance.[4] Since such studies would lead to a significant reduction in the disposal of various solvents, it is desirable to improve existing methods in other fields of biomedical laboratory science. In the future, we'd like to contribute to SDGs by developing eco-friendly laboratory methods and reagent recycling methods.

【Conclusion】

We concluded that BLSs should reduce medical wastes and revise existing laboratory methods from the perspective of environmental protection. To achieve these aims, we would like to propose the following future improvements.

① Reducing plastic use in medical products
② Setting recycling boxes for discarding of non-infectious wastes in biomedical laboratories
③ Developing the eco-friendly methods of reagent usage and technology in biomedical laboratory science

By addressing these three issues, we would like to contribute to achieving the goals of the SDGs.

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【SDGs の目標達成に向けて臨床検査技師ができること】

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【SDGs と臨床検査技師】

我々は,「自身が臨床検査技師として国際的に行いたいこと」について話し合い, 結果, 国際的な課題の解決に貢献したいという意見に収束した。国際的な課題の中でも, 近年話題の SDGs(持続可能な開発目標)に関する意見が多くみられた。SDGs とは, 2030 年までの達成を目標とした, 持続可能でよりよい世界を目指す国際目標である。環境保全やヒトの QOL 向上を目的とした 17 個の目標が設定されており [1], これらの達成に向け世界中で様々な取り組みがなされている。SDGs の各目標の中でも Goal 12「責任ある消費と生産」では, 環境に配慮した製品開発や, 廃棄物の発生を減らすことが掲げられている [2]。例として, 生分解性プラスチックを用いた製品の開発や, 使い捨てプラスチック製品の利用を減らすことなどが挙げられる。臨床検査室においても, 感染性・非感染性問わず大量の医療廃棄物が出る。本稿において我々は, 医療廃棄物がもたらす環境問題と, その改善方法について調査した結果を記すと共に, SDGs の達成に向けて臨床検査技師がどのような貢献ができるのかを考察する。

【環境に配慮した臨床検査とは】

医療廃棄物には感染性廃棄物と非感染性廃棄物があり, いずれも臨床検査室にて盛んに見られるものである。感染性廃棄物は産業廃棄物として特殊処理されるが, 非感染性廃棄物は一般ごみと同様に処理される。我々は, 特に非感染性廃棄物について, 使用量や廃棄量の削減が望ましいと考えた。

非感染性廃棄物による環境への悪影響の例として, マイクロプラスチック(MP)がある。MP とは直径 5mm 以下のプラスチックを指しており, 海洋汚染の原因の一つである。さらに, 魚が MP を誤って体内に取り込むことで, 食物連鎖を介して間接的にヒトの体内に曝露されることもある。それによって, MP 添加物の内分泌攪乱物質が粘膜細胞の接着タンパク質の生合成を阻害する可能性が指摘されている [3]。このように, 環境汚染はそこに生息する動植物のみならず, やがてヒトにも悪影響を及ぼすのである。このことは Goal 12「責任ある消費と生産」の達成にあたり, 特に重要な課題と考える。

MP を含む医療廃棄物の問題を解決するためには, 廃棄物そのものを減らせば良い。現状, 臨床検査に使用するディスポーサブルの器具の多くはプラスチックで包装されており, これらの大量廃棄は MP 発生に繋がる。対策として, これらをできる限り紙の包装で代用することが有効と考える。また, 臨床検査室にリサイクル BOX を設置するのも, 優れた取り組みといえる。これは, 単に廃棄物のリサイクルができるだけでなく, 臨床検査技師を含めた医療従事者の環境保護への意識の向上に繋がると推測される。我々は将来, このような臨床検査室における環境保護の取り組みを積極的に担い, 国際社会に貢献したいと考える。

臨床検査技師による SDGs への貢献には, 既存の検査法を見直す姿勢も重要である。例えば, 病理検査の染色に使用する薬品には, 毒性が強いものや環境に有害なものがある。リサイクル溶媒を用いたパパニコロウ染色では, 従来法と比べ細胞質の染色性および透過性がやや弱いものの, 染色時間の延長によりほとんど差がなく使用できたとの報告がある [4]。各種溶剤の購入費・使用量・廃棄量の大幅な削減に繋がる結果が示されたことで, 臨床検査の他分野でもこのような既存法の見直しや改良が望まれる。そのためには将来, 環境に配慮した検査方法・製品の開発が重要と考えた。我々も将来, 従来法の代替となる環境に配慮した検査法の開発や, 検査結果に影響がない範囲での試薬類のリサイクル手法の考案に尽力し, SDGs 達成に貢献することを目指したい。

【結論】

我々が住む地球を守るために臨床検査技師としてできることは, 医療廃棄物の削減に貢献することに加え, 環境保護の観点から既存の臨床検査法を見直すことであると結論づけた。そのために将来, 私達が取り組みたい具体的な事項は以下である。

① 医療用品におけるプラスチック使用の削減
② 非感染性ごみ用の検査室内リサイクル BOX の設置
③ 環境に配慮した試薬利用法や検査法の考案

これら 3 項目を行うことで, 国際的な課題である SDGs の目標達成に寄与していきたい。

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【Toward a country where foreign residents can receive home medical care】

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【Introduction】
In recent years, the number of foreign residents in Japan has been increasing. It is suggested that the number of foreign residents is likely to continue increasing. The biggest problem foreigners have in hospitals is the language problem. The second problem is the issue of hospital selection. Foreign language support is also the most common issue for hospitals. In this situation, I think that this will be solved if foreigners can receive home medical care. Furthermore, I would like to enhance the quality of home medical care through the participation of Biomedical Laboratory Scientists (BLS) and the introduction of remote access. This paper will discuss these in detail.

【The participation of BLS in home health care】
Currently, participation of BLS in home health care is low. Doctors and nurses are at the heart of home health care. I think that the participation of BLS in this process will help us to provide better medical care. BLS are able to synthesize examination data and also fully understand the data of each patient. In addition, BLS are also able to provide accurate test results from specimen collection and processing, such as blood sampling. Therefore, BLS are considered suitable personnel for home health care. And I believe that BLS should participate more than they do now in the field of home health care.

【Home health care using remote】
The Coronavirus pandemic has changed the way of work. The most common tool used in during the Coronavirus pandemic is ICT remote. I think that working remotely with ICT can be useful for home health care to develop the potential of personalized care for patients. The telework allows BLS to closely collaborate with physicians and other healthcare professionals in the hospital with accurate test results provided by them. I think that the remote system will enable various medical professionals to work as a team to provide home medical care to patients.

【Language problem】
Preparation of language support is possible by using application information made by the patient. This allows us to facilitate testing and explanation. For example, we can prepare how to speak and explain in a foreign language and provide clear explanations with illustrations. In addition, knowing cultural differences will allow medical care to be tailored to the needs of the patient. Furthermore, I think that foreign patients will be able to receive medical care with peace of mind. Knowing the language used and preparing in advance is difficult for outpatient care. For this reason, the challenge of addressing language issues in hospitals still remains unresolved. Therefore, home health care would provide more comprehensive care, compared with outpatient care.

【The problem of hospital selection】
I think that accepting foreign residents for home medical care will solve not only the language problem but also the problem of hospital selection. In my proposal, the local government contacted by foreign residents would request the hospital to send out a BLS to their residence. The BLS then uses the test results obtained at their home in order to give the right diagnosis and effective treatment. This system of home healthcare will release foreign patients from worries about which hospital they themselves should visit. Therefore, I think that the problem of choosing hospitals can be solved when foreigners receive home medical care.

【Conclusion】
I would like to provide fulfilling medical care by BLS participating in-home medical care more frequently than they do now, and by readily accepting foreign residents. I would also like to use ICT and other modern technologies to improve the efficiency of medical care in the home. Therefore, in the future, I would like to make health care better and more useful for both providers and recipients.

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【外国人住民も在宅医療が受けられる国へ】

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【はじめに】

近年、日本では外国人住民が増加している。さらに、これからも外国人住民が増加するということが示唆されている。そんな中で、外国人が日本の医療に対して抱える問題には、一番に言語の問題、次に病院選びである。また、病院側においても外国語への対応が未だに最も多い課題とされている。

この現状から、私は外国人住民が在宅医療を受けることができるようにすることで、この課題を解決できるのではないかと考える。さらに臨床検査技師の参画やリモートの導入を進め、在宅医療を今以上に充実化していきたい。この論文では、これらについて詳しく述べていく。

【在宅医療へ臨床検査技師の参画】

現在、臨床検査技師の在宅医療への参画は少ないのが現状である。今の在宅医療の中心となっているのは、医師や看護師である。私は、この中に臨床検査技師も参画することで、より充実した在宅医療を提供できるのではないかと考える。

臨床検査技師は、様々な検査データを総合的に考え、各患者のデータ推移や経過までも理解できる。また、採血などの検体採取や処理から、正確な検査結果を出すことができる。このようなことから、臨床検査技師は在宅医療に適した人材であると言えるだろう。そして、在宅医療の現場において今以上に参画していくべきだと考える。

【リモートを用いた在宅医療】

コロナ禍により、私たちの働き方は大きく変化した。コロナ禍で、最も多く用いられたものとして、リモート（遠隔）が挙げられる。私は、このリモート化を在宅医療に用いることで、より患者に合わせた医療の提供を行えると考える。

臨床検査技師が出した正確な検査結果から、リモートを用いることにより、病院にいる医師や様々な医療従事者と円滑に連携を取ることができる。在宅医療を受ける患者に対しても、様々な医療職がチームとなり医療を提供することが、リモート化によりできるようになると考える。

【言語問題について】

患者が行う申請情報から、事前に外国語対応の準備を行うことが可能である。これにより、検査や結果の説明を円滑に行うことができると考える。例えば、外国語での話し方や説明の仕方、イラストを用いた分かりやすい説明などを準備することができる。他には、文化の違いも事前に知ることができ、患者に合わせた医療提供ができると考える。さらに、外国人患者も安心して診療を受けられると考えられる。

使用言語を知り事前準備を行うことは、外来の場合難しい。この理由から、未だに病院での言語問題への課題が解決されていないのではないかと考える。そのため、在宅医療では外来受け入れに比べて、より充実した診療を外国人住民に対して行うことができるだろう。

【病院選びの問題】

在宅医療で外国人住民の受け入れを可能にすることで、外国人住民が抱える言語問題だけでなく、病院選びの問題も解決できると考える。

私が考える案では、外国人住民から連絡を受けた自治体が臨床検査技師の派遣を病院へ要請する。そして、臨床検査技師が在宅での検査結果をもとに、必要な診断、治療へ繋げる。この在宅医療のシステムにより、外国人の患者自身がどこの病院に行くべきなのかを考える必要が無くなる。したがって、外国人が在宅医療を受けることにより、病院選びの問題が解決できると考える。

【終わりに】

在宅医療に臨床検査技師が今以上に参画し、外国人住民の受け入れを考えていくことにより、充実した医療提供を目指したい。また、リモートなどの現代発達しているテクノロジーを在宅医療の現場でも用い、診療の効率化を図りたい。そして、医療を提供する側、受ける側どちらにも不自由のない医療現場にしていきたい。

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【What you can do as Biomedical Laboratory Scientists（BLS） to create a world where you can receive equal medical care regardless of where you are born】

Anna Karashima
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【Background】I want to create a world where people all over the world can receive medical care equally. In developing countries, inadequate medical care is killing young children. It was when I was in junior high school that I became interested in medical care in developing countries. In English class, I learned about the experience of Dr. Nukdo Tomoko of MEDECINS SANS FRONTIERES. The last medical oxygen cylinder was particularly impressive. A child was brought, but unfortunately it was too late. We gave the child oxygen, but it did not get better. And since that cylinder was her last one, she decided to stop using it for someone in need. If we had more medical equipment, we might have been able to give the best to the child. It's too cruel to not be able to save lives that should have been saved because they were born in different places.

【Purpose】In the future, I would like to participate in the Japan Overseas Cooperation Volunteers (JOCV) and contribute to the improvement of medical care in developing countries. I have an older sister who is a nurse, and she also wants to join the Japan Overseas Cooperation Volunteers. You can hear from the nurse's older sister about her role as a nurse and her opinions. Additionally, as a Biomedical Laboratory Scientist (BLS), I can share my role and her views with her older sister. I would like to collaborate with other professions to improve the quality of medical care in developing countries as well.

【Method】I suggest two methods. The first is what we can do as BLS to overcome the current situation where young lives are lost in developing countries. Infectious diseases such as acquired immunodeficiency syndrome, pneumonia, tuberculosis, and malaria are common causes of death in developing countries. In developing countries, maternal mortality is also high, including infectious diseases. Many cases could have been saved with appropriate treatment, but due to the overwhelming shortage of doctors, it is difficult to improve the current situation. However, we believe that BLS can prioritize patients by conducting tests. If so, we believe we can save more lives with limited equipment and personnel. In addition, in order to prevent the spread of infectious diseases, we propose to establish a system in which BLS regularly conduct infectious disease tests. We aim to improve the medical care itself in developing countries by training local BLS, rather than just visiting and implementing them. The second is a proposal for a solution to financial problems. My proposal requires a huge amount of money. By using SNS such as Instagram and Twitter and spreading apps, we hope to be able to communicate the current state of medical disparities in an easy-to-understand manner to young people like us. We think that building a system that leads to support not only by donating, but also by liking, spreading the word, and watching videos will increase the number of people who are interested and cooperate with fundraising.

【Outlook】After obtaining a license as BLS, I hope to gain more than three years of field experience in Japan and participate in the Japan Overseas Cooperation Volunteers in the future. I want to contribute to the improvement of medical care in developing countries. Furthermore, I would like to become a person who can disseminate to the world the realities of developing countries that I have learned as BLS, as well as think and implement measures to improve the current situation. My big goal is to create a world where everyone can receive medical care equally. In order to achieve that goal, I am not good at English and I am nervous about standing in front of people, but I wanted to change myself, so I applied for this forum. Through the student forum, I would like to interact with many people, make connections, and take a step towards achieving my goals.

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【どこに生まれても平等な医療が受けられる世界にするために臨床検査技師としてできる事】

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【背景】私は世界中の人々が平等に医療を受けられる世界にしたいと思っている。発展途上国では十分な医療が行き届かず、幼い子供たちの命が失われている現状にある。私が発展途上国の医療について興味を持ったのは中学生の時である。英語の授業の中で「国境なき医師団」の存在を知ったのがきっかけである。「国境なき医師団」とは 1971 年に設立した民間で非営利の医療・人道援助団体であり、紛争や自然災害、貧困などにより命の危機に瀕する人びとに医療を届けている。英語の授業で扱ったのは 1993 年に国境なき医師団に加わった貫戸朋子博士の経験談である。その中で特に印象に残っているのが最後の酸素のボンベの話である。明らかに手遅れの子供が運ばれてきた時に、酸素を吸入させたが良くならず、それが最後の酸素タンクだったため、酸素があれば救える人のためにボンベを止めると彼女は自身で決断したのだ。もしもっと医療機器が充実していたらその子供に最後まで最善を尽くすことができたし、もしかしたら助かっていたかもしれない。生まれた場所が違うだけで命の長さに大きな差が出てしまうのはあまりにも残酷である。

【目的】私は将来「青年海外協力隊」に参加し、発展途上国の医療の向上に貢献したい。私には看護師の姉がおり、同じように「青年海外協力隊」の参加を希望している。看護師の姉がいることで看護師の役割や意見を聞くことができ、さらに臨床検査技師としての役割や意見を姉に伝えることができるため、看護師と臨床検査技師との連携を考えて業務にあたることの重要性を感じている。他職種とも連携しながら医療の質の向上を目指す。

【方法】　私は 2 つの方法を提案する。1 つ目は発展途上国で幼い命が奪われる現状を打開するために、臨床検査技師としてできる事である。発展途上国での死亡原因は、後天性免疫不全症候群、肺炎、結核、マラリアなどの感染症が多い。感染症の 95%は発展途上国で起きている。また、5 歳未満の死亡数は、全体の半分近くまでに上り、5 歳未満の 3 大死亡原因においても、感染症が多くを占めている。発展途上国では、妊婦の死亡率も高く、感染症も含まれる。適切な処置があれば助かったケースが多いことから、近年は医療従事者のもとで出産が行われるよう、積極的な働きかけが行われているが、圧倒的な医師不足により、改善することは難しい現状にある。しかし、臨床検査技師が検査を実施することで、患者さんの優先順位を瞬時に見極めることで、限られた設備や人員でより多くの命を救うことができると考える。また、感染症の蔓延を防ぐために、臨床検査技師が定期的に感染症検査を実施するシステムを構築することを提案する。私たちが現地へ赴き実施するだけではなく、現地の臨床検査技師の育成をすることで、発展途上国の医療自体の向上を目指したい。

2 つ目は、金銭問題の解決策の提案である。私の提案には、莫大な費用が必要である。現在行われている取り組みとして、ユニセフの CM はとても効果的だと感じている。募金によって支援できる制度を作っている組織はいくつかあるが、一つにまとめインスタや Twitter の SNS を利用することや、アプリを普及させることで、私たちのような若い世代にも医療格差の現状を分かりやすく発信でき、かつ気軽に支援できると考える。募金だけではなく、”いいね”や拡散、動画視聴をするだけで支援になるシステムを構築することでより興味を持つ人が増え、募金に協力する人たちが増えることにつながると考える。

【展望】私は臨床検査技師の資格取得後、日本での 3 年以上の現場経験を積み、将来「青年海外協力隊」に参加し、発展途上国の医療の向上に貢献したい。さらに、臨床検査技師として現場に立って知りえた発展途上国の実情をもっと世界に発信するとともに、この現状を改善するための対策を考え実行できる人間になりたい。この国際学生フォーラムの応募も、「誰もが平等に医療を受けることができる世界にしたい」という大きな目標のために、英語が苦手で、人前に立って発表することも緊張する自分自身を変えたいという思いからである。強い思いを実現するために、行動力のある人になりたい。学生フォーラムを通し、多くの人と関わり、人脈を作り、自分の目標をかなえる一歩としたい。今回の応募をきっかけに、学生のうちに医療に関する幅広い知識や経験、人脈、行動力、対応力、アイディアなど、今の私にはないものをしっかりと身につけるため努力したい。

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WACE Facilitates Taiwan Laboratory Medicine to World Ace

What I would like to do internationally as a Biomedical Laboratory Scientist.

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Abstract:

Laboratory medicine has an important role in clinical practice. All medical decisions including diagnostics, treatments, monitoring, and outcome prediction should be based on testing results from medical laboratories, so that physicians and payers can get precise, fast, helpful clinical reports. Not only the implementation of quality systems in routine practice but also facing changes in the future of laboratory medicine, we should act internationally as laboratory scientists.

Based on trends in laboratory medicine worldwide including efficient automation, collaborative sharing, POCT (point-of-care test) diagnostics, and AI (artificial intelligence) application. I think "W-ACE" is a guide for inspiring us to face challenges. W-ACE is "Wisdom", "Accredited", "Companion", and "Evidence-based" diagnostics. The goal of what I'd like to do is to create a wisdom healthcare diagnostic that everyone can be satisfied with testing results from not only in the hospitals, but also at home and in society for needs in therapy, bring up care, and prevention. Moreover, Wisdom diagnosis can support health insurance and medical policy for the government. Also, what we do must be matched by an accreditation system to make sure the reliability of results from LDTs (Lab Developed Tests), big data, and remote devices. Therefore, we can import more and more LDTs or other new methods into our laboratories to satisfy more and more requests from the clinical.

Furthermore, companion diagnostics should be considered for clinical utility. Patients or users with testing results can both benefit from treatment and avoid adverse side effects, also predict their regimens more precisely. Therefore, evidence-based medicine can validate any test target in its clinical utilities.

Also, after doing "W-ACE", there are still some issues we must dig into. First, when it comes to efficient automation, although it can tackle manpower shortage and increase productivity, we need to solve "Safety" issues in the automated testing process; Second, not all people nowadays are reliable on wisdom devices, thus, we have to make our wisdom devices more acceptable to the public; Third, we have to make sure that our daily health cares can not only have clinical utilities but also improve recipients' life quality; Fourth, we have to ensure that patients' right and privacy would not be violated by our testing.

In conclusion, what would I like to do internationally as a biomedical laboratory scientist? I will identify evidence-based test targets for companion diagnosis and combine big data with artificial intelligence to create a wisdom future in laboratory medicine. Also, I will make sure the testing quality and polish accreditation system nowadays for Laboratory medicine in Taiwan. After what I do, I hope Laboratory medicine in Taiwan can be seen worldwide, and facilitate Laboratory medicine in Taiwan to World Ace.

Keywords: Wisdom, Accredited, Companion, Evidence-based, Laboratory medicine, healthcare

Developing an AI Model to Predict Pandemic
The AI model that can predict pandemics based on the big data of infectious diseases occurring around the world

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Our clinical pathologist, as MT, is working with MD and other health care workers to conquer diseases and social health of mankind. Clinical pathologists are in charge of quite a lot of tasks, from collecting samples such as saliva, blood, and cerebrospinal fluid to each kind (various) tests, pathological tests, and physiological functional tests. Among them, the growth of PCR and diagnosis has accelerated in relation to COVID-19. In addition, as the world fights against COVID-19, the importance of preparing for the new virus was greatly emphasized. During the COVID-19 pandemic, the number of big data and AI modules developed far exceeds 100. Like this, we should also concentrate on big data technology that can cope with new viruses. A whole new virus is not suddenly born. A new virus is the virus caused by mutation in the existing virus. Previously, countless viruses and their genetic information, even mutated information were very big tasks until collecting and managing them. However, as technology advances, technology that can handle big data has developed. Furthermore, AI will be used to predict the next mutation and its probability. It will be much easier to prepare for this, if we create a tool that can predict pandemics based on the number of figures, reports and genetic information of infectious diseases occurring around the world. I want to contribute to the management of infectious diseases around the world by collaborating with big data experts or acquiring big data technology directly.

Formation of medical service network

What I Want To Do Internationally As A Medical Laboratory Technologist

Gyu ri Kim
AffiliaDaegu Haany University

With the influx of overseas infectious diseases such as MERS and COVID-19, the rapid againg of the world, and the increase in chronic diseases, many changes have occurred in our lives. Due to this, the social need for Medical Laboratory Technologist, who are professional personal who provide essential medical information for diagnosing diseases and determining treatment directions, continues to rise. Therefore, I think that the existence of health care system that guarantees universal access will become more important in the future, so I would like to suggest the improvement of various diseases using Big Data and the strengthening POCT quality control. The biggest purpose of the improvement of various diseases using Big Data and the strengthening POCT quality control is to establish diagnostic standards for common diseases around the world, expand the health safety net, and provide reliable test results. In order to prepare for this, we will continue to cultivate human resources tailored to the future medical business through continuous international cooperation and exchange activities with medical organizations and academic societies, and acquire international certifications such as ASCPi, IAC, RDCS, RDMS, RA strengthen capacity and become a professional medical person. Through this process, we intend to carry out research on the improve common diseases around the world and strengthening POCT quality control. Early diagnosis and prompt treatment are important for all diseases. In particular, cancer and heart disease are diseases with high incidence worldwide and rank first and second as causes of death. Therefore, in addition to IAC, RDCS, RDMS and RA certifications, we will collect information such as various disease symptoms and mortality rates as various big data after acquiring the Big Data Expert Certification and conduct research to increase their early diagnosis rate. Big data refers to large-scale formatted and atypical data characterized by enormous scale, fast delivery/analysis speed, and diverse forms. The demand for big data is increasing for the purpose of using big data to create customer-centric business outcomes and enhance various activities such as crisis management and problem solving. In fact, there are several examples of the use of Big Data in the health care field. As the number of people with flu symptoms increases, the frequency of related vocabulary searches increases. Therefore, Google has set up an early warning system for the spread of influenza called 'GFT(Google Flu Trends)', which is a method of forecasting influenza by displaying the frequency of influenza-related search terms by time and region on a map. As another example, Seoul National University Bundang Hospital in South Korea analyzes medical Big Data to support search and prevents inappropriate drug use in advance by providing information related to drug safety in real time when prescribing and dispensing drugs. Just like this, aims to contribute to the realization of improvement and alleviation of various diseases by combining Big Data used in various ways with medical services and to provide more extensive and strengthened health care services through the formation of national health care service networks based on medical knowledge construction. POCT, which has been highlighted by COVID-19, is an on-site inspection and can perform disease diagnosis at the place where the patient is located without a separate examination room. In the medical field, it is applied to the diagnosis of heart disease and infectious disease and is used in daily life such as blood glucose meters, urine sticks, and COVID-19 self-test kits. POCT's strengths are that it is rapid, inexpensive, has no location restrictions, and enables early diagnosis and rapid treatment. Therefore, new POCT devices are being developed and put into practical use every year, but sensitivity and accuracy are yet low. Quality Control is important for all inspections. However, there is no clear regulation or guideline for POCT at present, and the reagents and equipment introduction decision

methods are all different for each institution, which has the drawback of lowering sensitivity and accuracy. Therefore, I believe that it is necessary to build a POCT system that can manage and operate POCT more efficiently, improve POCT Quality Control, and improve the quality of inspections. Therefore, standardize POCT test items, kits, cartridges, and reagents, steadily implement Quality Control management, and educate non-professionals to maintain the reliability of test results. Improve the safety, satisfaction, and reliability of the subjects by improving accuracy of the results such as sensitivity and specificity of the test by supplementing these limitations by strengthening the quality of POCT through the establishment of the POCT system and studying the diagnostic substances of various diseases. Through the activation of POCT, I try to make diagnosis and treatment possible at a quick, sensitive, and low cost without restriction. After various diseases and the COVID-19 pandemic, interest in and work for Medical Laboratory Technologist are becoming more important, but there are differences in operating systems and job boundaries by country. Therefore, I think it is necessary to form a common medical service network and become more professional medical personal in order to break down these boundaries. This is expected to provide quality medical services, expand the health safety net, contribute more to disease diagnosis and treatment, and provide more reliable test results.