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Ministry of Health  Malalaysia

30 Disember 2022

Development of an Online Electronic Health Record System User Training Modules

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# **Acknowledgements**

Thank you to the Teleprimary Care and Health Information Sector, Family Health Development Division, Ministry of Health Malaysia for the access to the current training documents and training environment for the Teleprimary Care – Oral Health Clinical Information System (TPC-OHCIS). Many thanks to Dr Fairus Zana Binti Mohd Rathi, the Sector Lead for supporting and approving this project. Special thanks to Rohaya binti Ahmad for her advice, expert opinion and support on the development of the secured online website for this project.

# **Executive Summary**

Teleprimary Care – Oral Health Clinical Information System (TPC-OHCIS) is Malaysia’s Electronic Health Record (EHR) system in its 102 government health clinics. Its users are end-to-end of the primary healthcare service which include multiple categories of healthcare workers with each of them having their own specific set of functions. Currently, the average percentage of usage of the TPC-OHCIS in states only between 50% to 80%. The user training for TPC-OHCIS is a lengthy three full-day, twice-a-year training classes organized on specific dates. This poses a problem as Malaysian government health clinics are very busy and has frequent staff turnover which cannot afford many of its staff going out for training at the same time causing poor coverage of TPC-OHCIS user training. Thus, there is a need for an accessible, shorter module-by-module and all year round delivery of training for the staff.

This project aims to increase percentage of usage of the TPC-OHCIS in Malaysian government health clinics. The specific objectives of this project are: 1) To list TPC-OHCIS components tailored to each healthcare worker; 2) To list out education materials and its description; 3) To develop education materials listed within six months; and 4) To develop a secure online training modules tailored to healthcare worker’s designations. This project will be divided into two phases which will start with the Planning Phase and subsequently the Development Phase. The Planning Phase consist of a two-day workshop and the Development Phase is divided into 1) development of the education materials and 2) development to the training website that will be done over a six-month period. All the activities of this project are within the operations of MOH Malaysia, using ispring application by subscription and do not involve the hiring of vendors.

This project will improve the coverage of the user training of TPC-OHCIS that will improve the percentage of usage of TPC-OHCIS to deliver efficient primary healthcare to patients. Proper use of TPC-OHCIS is also a prerequisite for the functioning of the report generation from TPC-OHCIS. This will give more time for the healthcare worker to focus on delivering quality healthcare services and overall improve the image of MOH Malaysia.

# **Introduction**

Electronic Health Record (EHR) is an electronic record of healthcare information of an individual that conforms to the recommended interoperability standards for health and that are created, managed, and consulted by authorized healthcare staff across multiple healthcare facilities. (Jacob, 2020). The Malaysian government has digitalized in its health clinics through its EHR named Teleprimary Care system in 2005 and upgraded to Teleprimary Care – Oral Health Clinical Information System (TPC-OHCIS) in 2017. Currently, 102 government health clinics has TPC-OHCIS. It is a cloud-based system with a centralized database. Its users are end-to-end of the primary healthcare service which includes multiple categories of healthcare workers with each of them having their specific set of functions (Annex 1). Currently, the average percentage of usage of the TPC-OHCIS in states is between 50% to 80%.

# **Rationale**

Change management for EHR has multiple barriers (Shoolin, 2010). Lack of EHR user training is a known change management barrier for the acceptance of EHR by the healthcare workers (Jha et al., 2009; Ludwick & Doucette, 2009; Meade, Buckley & Boland, 2009). Poor user training can cause poor usage of the EHR which can cause wastage of the high cost of the EHR. Other studies has recommended an ongoing and module-by-module basis training as steps to address the poor training coverage of EHR (Boonstra & Broekhuis, 2010). Currently, the user training for TPC-OHCIS is a lengthy three full-day, twice-a-year organized on specific dates training classes. This poses a problem as Malaysian government health clinics are very busy and have frequent staff turnover which cannot afford many of its staff going out for training at the same time causing poor coverage of TPC-OHCIS user training. Thus, there is a need for an accessible, shorter module-by-module and all year round delivery of training of the EHR system in Malaysian government health clinics

# **Goal and Objectives**

The goal of this project is to increase percentage of usage of the TPC-OHCIS in Malaysian government health clinics. The specific objectives of this project are: 1) to list TPC-OHCIS components tailored to each healthcare worker; 2) To list out education materials and its description; 3) To develop education materials listed within six months; and 4) To develop a secure online training modules tailored to healthcare workers’ designations.

# **Methodology**

This project will be divided into two phases, starting with the Planning Phase and subsequently the Development Phase. Six months after completion of this Online User Training Modules, the percentage of usage of the TPC-OHCIS will be calculated within the TPC-OHCIS system by dividing the Usage Clinical Documentation Summary of General Outpatient Service by the Total Visit by Clinic.

Planning Phase

In the Planning Phase, we will conduct a two-day workshop to 1) determine healthcare worker users with their TPC-OHCIS components tailored to their specific set of functions; 2) list out education materials and its description; 3) provide training to develop infographics and video tutorials; and 4) design a six-month action plan to develop the education materials listed and website development. This workshop will be conducted physically at the Ministry of Health Malaysia’s headquarters’ office in Putrajaya in February 2023 (Annex 1). All the softcopy output of this workshop will be uploaded into a dedicated folder on the MOH Malaysia owned cloud DataBox. The location of the workshop must have good internet wifi connection. Participants of the workshop are from the groups listed below, all within the MOH, Malaysia:

* Teleprimary Care (TPC) Sector, Family Health Development Division
* Health education officer, Health Literacy Unit, Family Health Development Division
* Health education officers, Health Promotion Division
* Information technology (IT) officers, Information Management Division
* TPC-OHCIS champions from 7 states covering all types of healthcare workers

Specific participants will be identified from the above groups and subsequently a letter of invitation will be distributed via email. The total number of participants for this workshop is 30. The cost of accommodation and mileage of the participants will be covered by their respective departments.

The workshop starts by listing out the current 23 modules and 145 submodules in TPC-OHCIS. Participants will be divided into three groups, 10 participants each, according to the three sections of a government health clinic: 1) Outpatient group; 2) Maternal and Child Health group; and 3) Allied Health group. Each group will list out the healthcare workers in their section then identify the related TPC-OHCIS modules and submodules for each healthcare worker. Structure of the tailored modules according to healthcare worker designation (Annex 2).

Development Phase

The Development Phase is divided into 1) development of the education materials and 2) development to the training website. In this phase, we will execute the six-month action plan from March to August 2023 developed in the Planning Phase of this project. Development of the education materials and the training website will be done concurrently. Sessions will be conducted within the MOH Malaysia’s facilities to save cost. These session are conducted to develop the education materials identified and steps will be taken to get needed permission and to develop a secure training website for this project. The website will be a subdomain of the MOH Malaysia website at [www.moh.gov.my](http://www.moh.gov.my). After the completion of the website, Teleprimary Care Section, Family Health Development Division will be in change to manage and update the website. Participants in the Development Phase are as below:

* Champions from all 7 states which have TPC-OHCIS
* Health Education Officers
* Allied health workers
* IT officers

# **Background**

EHRs are defined as digitally stored healthcare information throughout an individual’s lifetime with the purpose of supporting continuity of care, education, and research. The EHRs may include such things as; observations, laboratory tests, medical images, treatments, therapies, drugs administered, patient identifying information, legal permissions, and so on (Ajami and ArabChadegani, 2013). EHR is known to facilitate integration of patient health history for planning a safe and proper treatment that ultimately improve patient care (Kohli and SSL Tan, 2016). Recent studies have also shown that EHR have the ability to lead to best-practices and more screenings (Tindol et al., 2015; Ahmad et al., 2021). Federal efforts and local initiatives to increase adoption and use of EHR continues (Kruse et al., 2016) for its known benefits of reduce medical errors, provide more effective methods of communicating and sharing information among clinicians, lower national health care costs, better manage patient medical records, and improve coordination of care and health care quality (Ajami and Bagheri-Tadi, 2013; Grinspan et al., 2013)

The Malaysian government introduced digitalization in its government health clinics through EHR which is named Teleprimary Care (TPC) system in 2005 and in dental clinics known as Oral Health Clinical Information System (OHCIS) in 2009. These two systems were later combined to become the Teleprimary Care – Oral Health Clinical Information System (TPC-OHCIS) in 2017 with the goal of increasing the efficiency of healthcare delivery and ensuring continuity of care from “womb to tomb”. Out of 1069, 102 government health clinics in Malaysia have EHR. TPC-OHCIS is a cloud-based EHR system that allows any provider in its 102 government health clinics using the system to access patient records via a centralized database. Its expansion to more government health clinics is part of MOH Malaysia Digitalization Strategic Plan 2021-2025 towards the development of a Lifetime Health Record for Malaysians (Ghani et al., 2008; Ministry of Health Malaysia, 2021). The users of TPC-OHCIS are end-to-end of the primary healthcare service in the government health clinics which include multiple categories of healthcare workers: paramedics at the triage counter and at the procedure rooms, clerks at the registration counter, nurses in the nurses’ stations, paramedics, doctors in consultation rooms, and medical lab technicians in the laboratory with each healthcare worker having their specific set of functions.

Monitoring of the usage of TPC-OHCIS at the Outpatient Department in government health clinics from 1 April 2022 to 30 September 2022 saw an average of 72.7%. The usage was as low as 4.1% to as high as 98.2%. Thirty out of the 100 of the health clinic monitored achieved less than 70% TPC-OHCIS usage which is the target percentage of usage by MOH Malaysia and this must be improved. There are several reasons for the low usage of TPC-OHCIS such as the lack of hardware with sufficient specifications for the proper usage of this system, unclear policy of Electronic Medical Record system to be used at the clinic, and poor user training coverage.

The current TPC-OHCIS user training is three days, on specific dates classroom-based trainer of trainer (TOT) and cascade approach. In this three days training, all TPC-OHCIS modules are divided by topics. The trainers are called TPC-OHCIS champions who have to cascade the training in a series of echo training to all users of TPC-OHCIS before the go-live date during expansion of this system. Thus far, there is a set of PDF document files by topics showing snapshots on how to use TPC-OHCIS but is not self-explanatory . There are several circulated PowerPoint slides given to champions. To date, there are no video clips and infographics for the TPC-OHCIS user training.

Increasingly, MOH officials are recognizing that historical approaches to training have not resulted in desired changes in provider performance, quality of care, and improved health out-comes. The traditional, classroom-based TOT, cascade approach access to knowledge is limited to a small set of individuals, or master trainers, and the process of bringing individuals off-site, removes health care workers from their workplaces brings logistical inconvenience. Evidence has accumulated that such approaches yield disappointing results (Bluestone et al., 2021). There has been emphasis on workplace-based training combined with mentorship and follow- up. Such approaches have been facilitated through expanded access to digital technology and real-time data to support just-in-time mobile learning and adult learning (Bluestone et al., 2021). Just-in-time training is accepted in medical education as a training method and can be a valuable and effective method to disseminate principles to a large audience of staff members (Knutson et al*.*, 2015). Just-in-time training has altered the training and preparation of workers in industry, and currently has educational implications in all fields. Technological advances have made it possible to match specific knowledge and skills with the worker or learner, literally, when and where they need it (Sambataro, 2000). From the work-based learning perspective, microlearning has been considered as one of the key topics in talent development topics. Policymakers, educators, researchers and participators have the responsibility to explore how to promote, design and use microlearning to help people to learn in the right direction through valid knowledge with ethical consideration (Leong et al., 2021)

# **Root Cause Analysis**

Many studies indicate that the most important factor other than limitations to implementation of EHR is resistance to change (Ajami & ArabChadegani, 2013). A study in the United States on successful implementation of EHR in small ambulatory practice setting perform shows that the EHR implementation experience depends on the technology, training, leadership, the change management process, and the individual character (Lorenzi & Riley, 2000). A systematic review on barriers to EHR adoption found training to appeared 5.6 % of all occurrences of significant barriers that were included in the review (Kruse et al., 2016). Improvement of training is a pragmatic effort to improve TPC-OHCIS usage at this moment and supported by the current MOH headquarters’ management as training support is always requested by the subnational users.

The recent expansion of the TPC-OHCIS system was done in the year 2020 and 2021 during the height of the COVID-19 pandemic. At that time, many of the healthcare workers had to work at COVID-19 assessment centres and vaccination centres that were set-up outside of the health clinic. This high commitment rotation work outside the health clinic setting made much of the healthcare worker miss the designated dates set for the TPC-OHCIS user training. When COVID-19 has reached its endemic phase, the number of patients has increased back to pre-pandemic levels. This, on the other hand, has made the government health clinic administrators unable to release many of their workers for the user training as sufficient healthcare workers are needed to deliver services in their busy clinics. These reasons cause the poor coverage of TPC-OHCIS user training.

Only 102 out of 1069 government health clinics in Malaysia have TPC-OHCIS. Workers turnover is high in primary healthcare much like many other workplaces. Healthcare workers are routinely transferred to other facilities due to requests or promotions all year round. The healthcare workers transferred from a non-TPC-OHCIS workplace need to learn how to use TPC-OHCIS for them to start working as the sistem is end-to-end of the clinic. These healthcare workers need to be trained as soon as possible on the set of functions they have to perform and cannot afford to wait for the next user training classes. Therefore they need a need-related and at the point of time training that is not available currently. For now, new healthcare workers in a TPC-OHCIS facility depends on their co-workers to show them how to use TPC-OHCIS while working. This may take a long time for the worker to become comfortable using TPC-OHCIS.

# **Stakeholder Analysis**

The related Sustainable Development Goal (SDG) in this project are 1) SDG 3: Good health and well-being; 2) SDG 4: Quality education; and 3) SDG 9: Industry, innovation and infrastructure which would involve multiple stakeholders. As the users of TPC-OHCIS are still within MOH Malaysia, the stakeholders of this project is within this ministry. All stakeholders will be made involved officially in this project.

The of stakeholders for this project are as below:

* TPC Sector, Family Health Development Division, MOH Malaysia
* Health Literacy Unit, Family Health Development Division, MOH Malaysia
* Health Promotion Division, MOH Malaysia
* Information Management Division, MOH Malaysia
* TPC-OHCIS champions
* All TPC-OHCIS users

The TPC Sector, Family Health Development Division of MOH Malaysia is the main stakeholder of this project. Its main duty is to do the deployment, change management, management and improvement of TPC-OHCIS. It is also in charge of the information and communications technologies (ICT) in government health clinics that is also much related to the implementation of TPC-OHCIS and other eHealth systems. The Health Literacy Unit from the same division will be roped in as experts in educating users effectively. The Health Promotion Division, MOH Malaysia has expertise and equipment in developing effective and attractive education materials.

The Information Management Division, MOH Malaysia is in charge of developing and managing websites in the ministry. Input from TPC-OHCIS champions and TPC-OHCIS users are very important to develop education materials that fit most users’ literacy level and understanding.

# **Expected Outcomes**

Setting up TPC-OHCIS in health clinics is expensive. The optimal use of TPC-OHCIS is needed to gain its many benefits. The main benefit of this project is the increase and optimal usage of TPC-OHCIS. This will in return make the high investment made to put the system in place worth it. Proper use of TPC-OHCIS is a prerequisite for the functioning of the report generation from TPC-OHCIS. If the users do not fulfil certain information, reports cannot be generated, as what is happening currently. Good user training can fix this. Generating routine reports from TPC-OHCIS reduces or eliminates double entries in the clinic to collect data to produce reports for the district health office. This will give more time for the healthcare worker to deliver quality health services and overall improve the image of MOH Malaysia.

This user training website will be very useful for the TPC-OHCIS champions as there are chunks of TPC-OHCIS educational materials they can use when needed when facilitating the clinic users in a timely manner. This in-time, what-needed feature of the training modules specifically tailored to healthcare worker by designation makes it flexible for prioritizing training the important portion of TPC-OHCIS first. This makes the TPC-OHCIS champions more efficient and independent thus making this extra responsibility to their main task of a healthcare worker manageable. This TPC-OHCIS user training website will employ a unique identification controlled by the state TPC-OHCIS champion. This safety feature will ensure that only users of this system have access to this training modules.

Although TPC-OHCIS is already in MOH Malaysia’s Digitalization Strategic Plan, the budget for the expansion of TPC-OHCIS to other government health clinics is not yet secured. Many of the busy clinics demand that TPC-OHCIS be installed in their clinic. This user training module can make the deployment and management of TPC-OHCIS easier, thus convincing management to invest in the expansion, maintenance of the system and for its technology update of TPC-OHCIS. Good performance of TPC-OHCIS will increase user satisfaction and reduce complaints.

After using the module for six months, an evaluation of the modules will be done followed by improvement of the system. This user training will be included in the clinic orientation programme with CME points. A helpline will be established if more funding is received for this purpose.

# **Plan for Implementation**

The plan of implementation is demonstrated in the work plan below.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **WORK PLAN** | | | | | | | | | | | | | | | | |
| **Activity Description** | **Year** | **Oct** | **Nov** | **Dec** | **Jan** | **Feb** | **Mac** | **Apr** | **May** | **Jun** | **July** | **Aug** | **Sept** | **Oct** | **Nov** | **Dec** |
| 1.1. Proposal development supported by the Global Health Learning Programme by Western Pacific World Health Organization Office | 2022 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1.2 Presentation of proposal to the director | 2022 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2.1 Letters for website approval | 2023 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2.2 Website development | 2023 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 3.1 Letters of invitation for TPC-OHCIS workshop | 2023 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 3.3 Filmora online training | 2023 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 3.4 Two days workshop | 2023 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4.1 Outpatient microtraining workshop and material development | 2023 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4.2 MCH microtraining workshop and material development | 2023 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4.3 Allied Health microtraining workshop and material development | 2023 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5.0 Officiating TPC-OHCIS User Training Modules website | 2023 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6.0 Use of TPCOHCIS user training modules | 2023 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|  |  |
| --- | --- |
| Legend |  |
|  | Phase I |
|  | Phase II |

# **Budget**

All the activities of this project are within the operations of MOH Malaysia and using ispring application to be bought for a one-year subscription. Activities in this project do not involve any vendors. Only the cost of meals for the workshop must be budgeted in the Family Health Development Division’s yearly operational spending.

|  |  |  |
| --- | --- | --- |
| **No.** | **Item** | **Cost (RM)** |
|  | Online TPC-OHCIS User Training Modules workshop   * Meals for 30 pax | 600.00 |
|  | Outpatient modules educational material development workshop   * Meals for 30 pax | 600.00 |
|  | Maternal and Child Health modules educational material development workshop   * Meals for 30 pax | 600.00 |
|  | Total | 1,800.00 |

# **Conclusion**

Although TPC-OHCIS is a comprehensive EHR, healthcare workers in the government health clinic only use a set of functions of it and there are always new healthcare workers all year round who needs the TPC-OHCIS user training soonest as they start work. Currently, TPC-OHCIS user training uses a traditional, classroom-based TOT. The cascade approach access to knowledge is limited to a small set of master trainers, and the process of bringing individuals off-site removes healthcare workers from their workplaces bringing logistical inconvenience. Understanding the nature of work and the health system of the typically busy government health clinic is key in addressing the poor coverage of TPC-OHCIS user training. Cooperation from state level master trainers and staff is very important in developing a complete TPC-OHCIS user training modules within a 6 months period as all of the participants in this project has their own demanding main tasks as healthcare workers and IT officers themselves. This project uses available user friendly application and optimizes the current workforce and functions within MOH Malaysia to deliver quality training and education to healthcare workers. All levels of literacy must also be taken under consideration to conduct this project successfully. Finally, improving the user training of TPC-OHCIS will facilitate the ground users to optimize the usage of TPC-OHCIS and deliver quality and efficient healthcare to patients.

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# **Annexes**

## Annex 1. Tentative program for the Online TPC-OHCIS User Training Modules workshop

Day 1

|  |  |  |  |
| --- | --- | --- | --- |
| **Time** | **Activity** | | |
| 8.00 am | Registration | | |
| 8.30 am | Talk: Introduction on TPC-OHCIS modules by TPC Sector, MOH Malaysia | | |
|  | Group 1: Outpatient | Group 2: MCH | Group 3: Allied Health |
| 9.00 am | Group activity: TPC-OHCIS modules tailored to healthcare worker designation | | |
| 10.00 am | Morning tea break | | |
| 10.30 am | Group activity: Education materials and its description | | |
| 11.30 am | Group presentation | | |
| 12.30 pm | Lunch break | | |
| 2.00 pm | Introduction: Development of Action Plan by TPC Sector, MOH Malaysia | | |
| 2.30 pm | Group activity: 6 month action plan development | | |
| 3.30 pm | Group presentation | | |
| 4.30 pm | Conclusion | | |

Day 2

|  |  |  |  |
| --- | --- | --- | --- |
| Time | Activity | | |
| 8.30 am | Microtraining, Health Promotion Division | | |
| 9.00 am | Tutorial videos story board and script, Health Promotion Division | | |
| 9.30 am | Making tutorial videos using Filmora, Health Promotion Division | | |
|  | Group 1: Outpatient | Group 2: MCH | Group 3: Allied Health |
| 10.00 am | Group activity: Development of story board and script | | |
| 11.30 am | Presentation of story board, script and infographics drafts | | |
| 12.30 pm | Lunch break | | |
| 2.00 pm | Group work: Making online course using Filmora | | |
| 3.00 pm | Group work: Making Tutorial video using Filmora | | |
| 4.30 pm | Presentation | | |
| 5.00 pm | End | | |

## Annex 2. Modules in the Online User Training Modules according to healthcare worker designation

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| --- | --- |
| Annex 2. | Modules in the Online User Training Modules according to healthcare worker designation |

|  |
| --- |
| **Outpatient** |
| * Registration clerk * Nurse * Medical Assistant * Medical Attendant * Medical Laboratory Technician * Radiographer * Pharmacist * Doctor * Family Medicine Specialist * Clinic Administrator |
| **Maternal and Child Health** |
| * Registration clerk * Nurse * Medical Attendant * Doctor |
| **Allied Health** |
| * Dietician * Food Science Officer * Physiotherapist * Occupational Therapist * Medical Social Worker * Counsellors * Optometrist |