

2021

Application of Smart Medical Technology



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Cloud Health Service Stations

Overview

Citizens use their ID card or National Health Insurance card for identity verification when they go to a cloud health service station, and receive testing by volunteers and nurses (BMI, waist circumference, blood pressure, blood sugar, cholesterol). Test results are automatically uploaded to the cloud data platform through the measurement interface of a tablet PC. The hospital established a data transmission security mechanism through API, JSON, SSL encryption technology, and platform switching and file conversion inside the firewall, synchronizing measurement data stored on the cloud platform to the hospital's database.

The cloud service station not only collects measurement data of subjects, but can also be connected to develop more functions to provide complete services, including: accessing measurement data on the cloud station from the physician order entry system, which is referenced by physicians

to arrive at a diagnosis; developing an app for members to access their measurement data; community nurses provide testing and health advice at service stations each month, and use the community health management system to access measurement data and fill out nursing consultation records.

Benefit

Results of cloud health service stations are as follows:

- 1.Improved timeliness and reduced paper use and labor required for filing
 - Reduces time spent on filing measurement data by 9 days each month.
 - It originally took 12 minutes to manually transcribe and enter measurement data for each person, but now only takes 4 minutes, making health service stations more efficient.
 - This reduces the manpower required for filing each month by 6.2 employees, reduces the use of 1,500 sheets of paper each year, and also

eliminates the issue of preserving paper documents containing measurement data.

2. Increased the accuracy of data input

- Measurement equipment directly upload data and reduce the probability of errors from manual transcription.
- A fool-proof mechanism is designed for items that need to be manually input, such as height and waist circumference. A warning window pops up if the difference with the previous measurement reaches 10%. This simplifies the process and also significantly improves the accuracy of data.

3. Improved satisfaction of the general public

The center conducted a questionnaire survey and found that satisfaction of the general public with the simplified process improved from 91.6% to 92.8%.

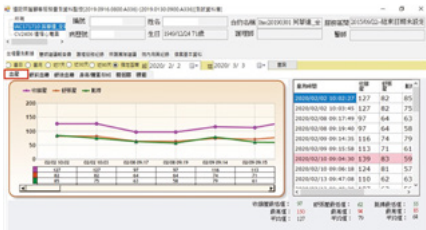
4. Cloud service station app usage rate

The app usage rate increased from 10.4% to 21.3%, an increase of 10.9%. This shows that the simplified measurement process of cloud service stations keep data up to date and increased the willingness of community residents to use the app.





APP



Physician Order System



Community Case Management System

About the Hospital

MacKay Memorial Hospital provides holistic health care through professional care services that involve multiple

teams, and strives to improve healthcare quality and patient safety.

The hospital has integrated its resources to extend the reach of its services from within the hospital to communities, rural areas, offshore islands, and even the world. The hospital implemented premium healthcare and lean management, and utilizes cloud information to improve its effectiveness and capabilities, creating new value in healthcare services by transforming from a conventional hospital to smart hospital.

Keywords

Cloud community services, Cloud health service stations, Community health advice, Telehealth

Contact Details

Tamsui Community Health Center,
Tamsui MacKay Memorial Hospital
Cooperation Partners
Inventec Appliances Corp.

Kaohsiung Medical University Medical Alliance Friendly Hierarchy of Medical Care: Smart MAP System

Overview

The hospital established a healthcare group that integrates local community health care groups, specialist physician groups, and nearby local hospitals, providing an innovative cooperation model in hopes of vertically integrating medical resources.

It reviewed key factors of the two-way referral process from the perspective of patients, hospitals, and community clinics, and proposed response strategies: Established a patient-centric two-way referral platform that is friendly, convenient, and easy to use. When a doctor is willing to refer a patient, the system provides the doctor receiving the patient with friendly access to the patient's medical information. It provides integrated medical services to improve the outcomes of referral by the clinic and two-way referral.

Benefit

1. Coverage of smart MAP system (increase in electronic applications)

The number of community hospitals that the hospital has worked with since 2008 has reached 435. The digitalization of cooperation application procedures accelerated the administrative process for contract signing and average wait time was shortened from 30 days to 14 days.

2. Policy implementation results

Evaluating the number of referrals each quarter, there is a clear upward trend from 237 people in 2017 Q1 to 3,071 people in 2020 Q1, in which the number reached 4,016 people in 2019 Q3, showing that the referral system is being accepted by users in the implementation of two-way referral. Furthermore, the hospital ranks top three in number of referrals in

Kaohsiung and Pingtung, and over 50% are referred to clinics each month.

3. Service satisfaction

Cooperating institutions and patients who were referred were surveyed, in which 1 point indicated highly dissatisfied and 5 points indicated highly satisfied:

- Platform interface was 4.11 (SD=0.60)
- Platform stability was 4.15 (SD=0.65)

- Information quality was 4.17 (SD=0.56)
- Information correctness was 4.24 (SD=0.58)
- Service quality was 4.16 (SD=0.62)
- Attitude of administrators towards issues was 4.21 (SD=0.60)

Public satisfaction improved from 76 points in the pre-test to 95 points in the post-test, and good care results were achieved.





About the Hospital

Kaohsiung Medical University Chung-Ho Memorial Hospital is the affiliated hospital of the first private medical university in Taiwan. The hospital has a total of 1,704 beds, 68 clinical medicine departments and 10 integrated medical centers, providing over 1.93 million outpatient services and over 440,000 patient-days of hospitalization services every year.

The hospital has maintained its status as an academic medical center and teaching hospital since 1989, and has received numerous domestic and international certifications and awards over the years, including the College of American Pathologists Laboratory Accreditation, TAF accreditation, Health Promotion

Administration Cancer Treatment Quality Level A Certification, and the silver award, bronze award, and certification in the National Biotechnology and Medical Care Quality Award. The hospital became the first medical center to obtain the international JCI accreditation in Southern Taiwan in April 2016.

Keywords

Hierarchy of medical care, Medical alliance, National health insurance, Smart MAP system, Two-way referral

Contact Details

Medical Safety Management Center,
Kaohsiung Medical University Chung-Ho Memorial Hospital

Kaohsiung Medical University Chung-Ho Memorial Hospital Provides Care to Rural Areas via an Integrated Smart Technology Care System

Overview

Public health centers in mountain areas, offshore islands, and remote areas play an extremely important role in healthcare. Case management at public health centers in mountain areas, offshore islands, and remote areas is still mainly done on paper or Excel, and integrated information on patients cannot be obtained, causing personnel of public health centers to spend a lot of time on manual operations. The hospital established an integrated smart technology care system for rural areas in Kaohsiung City, Taitung County, and Pingtung County. The system uses smart technology to provide active reminders that make work simpler for personnel, and integrate information for managing patient diseases. It uses smart measurement equipment and disease warning and predictions to increase the accessibility of healthcare resources for residents of mountain areas, offshore

islands, and remote areas. The assistance of information technology transforms passive care to active care and raises citizens' health awareness for more effective disease management.

Benefit

1. Broadest coverage of services for townships around Taiwan: Service coverage includes Kaohsiung City (Maolin District, Taoyuan District, and Namasia District), Taitung County (Dawu Township and Daren Township), and Pingtung County (Wutai Township, Taiwu Township, and Mudan Township), covering 47% of the land area in Kaohsiung City, 11% of Taitung County, and 21% of Pingtung County.
2. The first household health management: The system makes a breakthrough in the individual healthcare model of public health centers in rural areas, and connects to the household registration

system to provide 60,343 people in 22,179 households with integrated health management services.

3.The only cross-system integration of public health centers in rural areas: Public health centers of rural areas currently have 21 systems. This system integrates 5 commonly used systems to simplify work for personnel of public health centers in rural areas.

4.Innovative technological breakthrough: Utilized 9 types of technology equipment in rural areas, and designed a friendly and convenient user interface to increase the accessibility of smart care resources and raise citizens' health management awareness. Established

6 smart care modes and integrated overall health data to improve the workload of personnel of public health centers.

5.Effectively reduces the healthcare expenses of people in rural areas: The rural area integrated healthcare service reduced 1,944 trips made by residents of rural areas to the doctor in 2019, which is expected to save nearly NT\$1.2 million in expenses. Smart technology equipment is used for disease screening, actively and effectively discovering cases at risk of chronic diseases for tracking and management, in order to reduce the probability of onset or deterioration.



Cross-departmental team operations



Facial recognition smart measuring station



Won the 2020 Sustainability in Power Social Innovation Competition Health and Well-being Award

About the Hospital

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Keywords

Health and well-being, Integrated care, Innovative technology applications, Smart care service, Technology network

Contact Details

Medical Safety Management Center,
Kaohsiung Medical University Chung-Ho Memorial Hospital

AI Automatic Determination System for Labor Health Examination of Special Operations

Overview

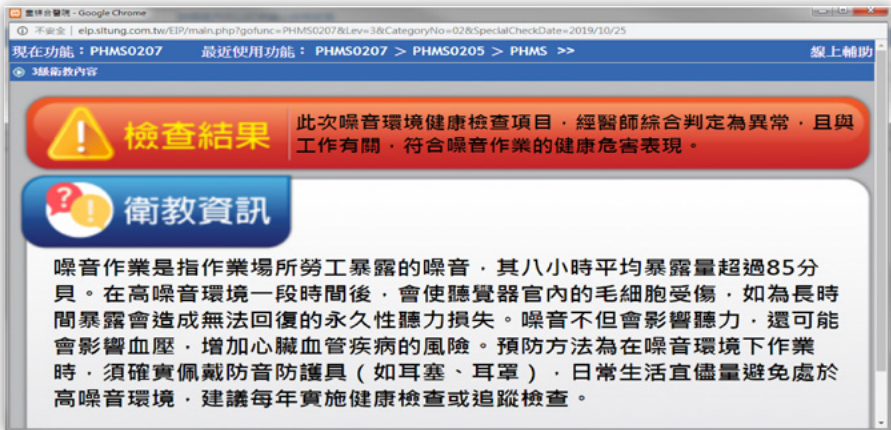
The purpose of labor health examination for special operations is to protect labor health, allow early discovery of occupational diseases, and improve the working environment.

Hence, the hospital developed an AI automatic determination system for labor health examination of special operations. The system is able to rapidly make the right decision and improves the efficiency of workers, which further improves the timeliness of reports and accuracy of diagnoses.

The system immediately reports findings to the company and subject for early discovery and early treatment of diseases. It is able to further detect hazards in the working environment, so that protective measures can be improved and avoid harming workers' health.

Benefit

In terms of diagnostic accuracy, compared with conventional analysis by physicians, the AI system scored 0.976, 0.966, 0.961, and 0.963 points in Accuracy, Average Precision, Average Recall, and Average F1-score, respectively, which were all better than physicians, who scored 0.951, 0.94, 0.926, and 0.932 points. In terms of overall examination performance, efficiency with respect to operation time improved 83%, the efficiency of physicians arriving at a diagnosis improved 97%, and cost decreased 84%. After the system was implemented, it improved the quality of examination of special operations in the hospital, and allowed the hospital to transition from conventional manual operations to smart health. The use of an AI management platform allows abnormalities to be quickly reported, and health education recommendations are provided for early discovery, protection, and treatment of subjects.



The screenshot shows a web browser window with the following content:

- Address bar: <http://elp.situng.com.tw/EIP/main.php?gofunc=PHMS0207&Lev=3&CategoryNo=02&SpecialCheckDate=2019/10/25>
- Navigation: 現在功能: PHMS0207 最近使用功能: PHMS0207 > PHMS0205 > PHMS >> 線上輔助
- Section: **檢查結果** (Check Results)
- Text: 此次噪音環境健康檢查項目，經醫師綜合判定為異常，且與工作有關，符合噪音作業的健康危害表現。
- Section: **衛教資訊** (Health Education Information)
- Text: 噪音作業是指作業場所勞工暴露的噪音，其八小時平均暴露量超過85分貝。在高噪音環境一段時間後，會使聽覺器官內的毛細胞受傷，如為長時間暴露會造成無法回復的永久性聽力損失。噪音不但會影響聽力，還可能會影響血壓，增加心臟血管疾病的風險。預防方法為在噪音環境下作業時，須確實佩戴防音防護具（如耳塞、耳罩），日常生活宜盡量避免處於高噪音環境，建議每年實施健康檢查或追蹤檢查。

About the Hospital

Tungs' Taichung MetroHarbor Hospital respect patients' rights and privacy, provide complete healthcare services, and actively promote disease prevention and health promotion concepts in communities to improve public health. Our vision is to become an international medical center and provide international healthcare services.

Keywords

AI, Automatic assisted determination, Diagnostic accuracy, Special operations, The efficiency of physicians arriving at a diagnosis

Contact Details

Department of Community
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MetroHarbor Hospital

Community
Health Service

Far Eastern Memorial Hospital

5G Telemedicine Platform, New Healthcare Model for Areas with Insufficient Medical Resources

Overview

The Hospital worked together with Shiding District Public Health Center and Far EastOne Telecommunications Co., Ltd. in using the Health+ Telemedicine Platform to integrate information and hospital systems, including: registration, process of seeing the doctor, and information exchange and filing. After completing registration and reservation procedures for remote consultation, local physicians can use the Health+ Telemedicine software interface, as well as high definition images and screen sharing without any latency via 5G, for remote consultation and view images of the patient on site and previous medical records. The patient's funduscopy, otoscopy, and dermatoscopy images taken using medical devices at the site are directly sent to the hospital's PACS, so that the physician providing remote consultation can further analyze

the images and create a consultation medical record. After remote consultation, the physician can leave a consultation record in the virtual visit medical record in the hospital's system. The telemedicine service platform is already being used for diabetes patients in Shiding District, and consultation with physicians in the Division of Metabolism and Ophthalmology Division of the Hospital helps patients control their blood sugar and ensure the early discovery and early treatment of eye diseases.

Benefit

Results of remote consultation are as follows:

- 1.Helps residents of areas with insufficient medical resources see the doctor
Saves patients living in remote areas time and cost when seeing the doctor.

2. Allows physicians providing consultation to be more effective

Examination rooms in the hospital's clinic only need a Pad to schedule remote consultations. This is very cost effective and makes the consultation process simpler and more convenient. Physicians providing consultation can remain in the clinic while providing remote consultation.

3. Resolves the ineffectiveness of mobile health care

Transportation is inconvenient in remote areas, and a round trip often takes several hours. Mobile health care is usually provided by family physicians to meet the needs of most

people, but they cannot meet other medical needs when residents need a specialist. The 5G telemedicine service model increases service capacity and also makes medical specialists available, allowing residents of areas with scarce medical resources to access suitable medical resources without any constraints on time and place.

4. The smooth consultation process gives patients a good experience

Operations can be completed with simple steps on a mobile device, which make it easier for healthcare workers to get started, and leads to higher patient satisfaction.





About the Hospital

Far Eastern Memorial Hospital shoulders the responsibility of emergency and critical care. It currently has 64 divisions, 2 centers, and a total of 1,408 beds. It provides over 6,500 outpatient services and nearly 400 emergency medical services each day, the fourth highest in Taiwan, and bed occupancy rate is maintained at 85% and above. There are standard operating procedures for all operations, and the hospital implemented ISO9001 quality management system as early as 2004. The hospital sets quality goals each year and passed care quality certifications of five disease.

The hospital encourages research and established 3 common laboratories, 1 animal laboratory, and a 24-hour electronic library that provides electronic services. The hospital publishes approximately 150 journal papers each year, in which at least 120 are SCI papers.

Keywords

Hand-held Diagnostic Scopes, Health+ Telemedicine Platform, 5G

Contact Details

Community Health Development
Center, Far Eastern Memorial Hospital
Cooperation Partners

Far Eastone Telecommunications Co.,
Ltd