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高雄市立小港醫院
(委託財團法人私立高雄醫學大學經營)



Strengthening Clinical Care and Community Services to Fight COVID-19

CHAO-HUNG KUO

Cooperation
Accountability
Reverence
Effectiveness



2021/9/17

Resume



**Superintendent of KMSH
CHAO-HUNG KUO**

Education

Ph.D., Graduate Institute of Clinical Medicine,
Kaohsiung Medical University

Experience

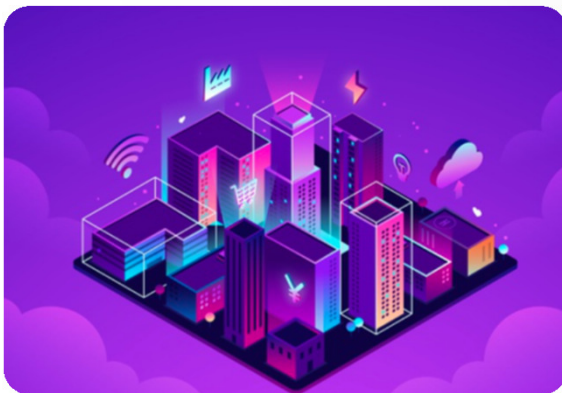
- Professor, Department of Internal Medicine, KMU
- Superintendent, Kaohsiung Municipal CiJin Hospital
- Medical Secretary of Superintendent Office, KMU
- Chief, Digestive Endoscopy Center, KMU
- Chief Executive, Kaohsiung Healthy City Promotion Center
- Chief, Tele-Healthcare Center, KMU
- Director, Kaohsiung Healthy Harbor City Association

Current Position

- Superintendent, Kaohsiung Municipal Siaogang Hospital
- Committee Member, Cancer Prevention & Control Policy Commission, Ministry of Health and Welfare
- Chief Supervisor, Taiwan Regional Hospital Association
- Committee Member, Kaohsiung Smart City Committee
- Executive Director, The Digestive Endoscopy Society of TW
- Executive Director, Taiwan Lean Healthcare Management Association
- Director, Taiwan Health Industry Balanced Scorecard Association
- Director, Taiwan Neuro-Endocrine Tumor Society
- Director, Kaohsiung City Medical Association



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高雄市立小港醫院(委託高醫經營)
Kaohsiung Municipal Siaogang Hospital

Introduction





The reasons that the university operates PPP



Duty of Medical University

1. Palace for researcher
2. Cultivate Cross-field talent
3. Practice USR

Aim of KMU

1. Educate
Cultivate talents who are equipped with liberal arts literacy and professional medical knowledge
2. Research
Research innovative topics related to healthcare
3. Service
Provide holistic health care and public service
4. Contribute
Devote to serving vulnerable groups and providing education



Benefits of PPP Model



Benefits for Operator

1. Increasing Income
2. Providing Students Various Internship
3. Enhancing Research Capacity
4. Expanding the Opportunities to Practice CSR



Benefits for Local community

1. Taking Care of Residents
2. Balancing Local Medical Resource
3. Creating Job Opportunities



Benefits for City Government

1. Systemizing Employee Selection and Training
2. Management Consistency (Operation plan, KPI), Saving Budget and Cost
3. Making Sure the Safety and Health of Citizens



Kaohsiung Medical University Affiliated Healthcare System

We are the comprehensive healthcare system in Southern Taiwan covering medical center, regional and community hospital.



Beds
2,679(+809)Beds



Outpatients/year
3,391,604

Inpatients/year
711,654



Number of Employees
6,305





KMU Milestone(OT-ROT-BOT)



KMSH

1

1998

In November 1998, the Municipal Siaogang Hospital (KMSH) started its operation. It is the first public-to-private municipal hospital entrusted by the medical center in Kaohsiung.

KMU Healthcare System signed a contract with the Kaohsiung City Government in December 2009 obtaining the 15-year entrusted operational right for the first phase of ROT of Kaohsiung Tatong Hospital.

2009

2

KMTTH

KMCH

3

2014

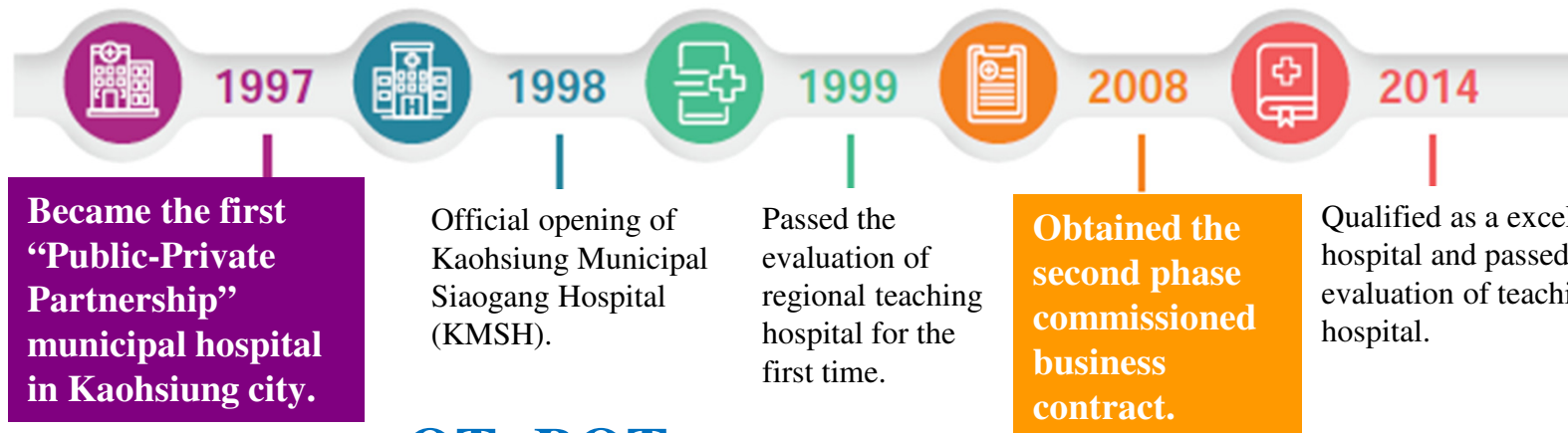
KMU Healthcare System obtained and signed the contract on March 30, 2014 for the first phase of Kaohsiung Municipal CiJin Hospital's ROT 15-year entrusted operational right



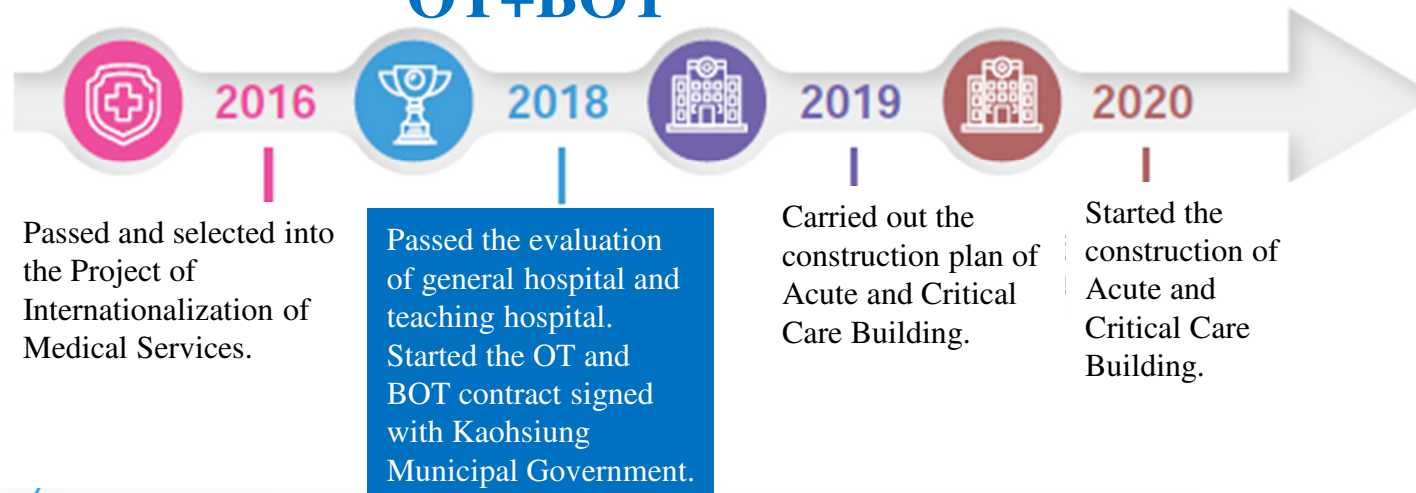


KMSH Milestone

1st OT



OT+BOT





The strategy of fighting COVID-19

We suffered seriously from SARS years ago and learnt lessons. But COVID-19 has more vibrant nature and enduring path which will exhaust the resources of healthcare system.

The Policy for COVID-19

10 Medical Preparation for COVID-19

Infection control manual for medical care facilities

Conducting un-notified on-site inspections and drills on medical responses

Tracing and identifying persons at-risk via National Health Insurance database

Implementing in-patients isolation and triage measures and dual referral

Preparing responsibility hospitals and designated wards

Implementing patient triage in communities and referral recommendation

Constructing national testing networks

Monitoring capacity of healthcare system

Expanding capacity of quarantine places

Adopting community testing network and referral and tracking management

Reference : CDC, Taipei, China Centers for Disease Control

Communication between government and Siaogang hospital



Duty of Municipal Hospital



**International Port
Evacuation Hospital**



**Travel Medicine Clinic for
COVID-19 Vaccination
Hospital**



**Kaohsiung International
Airport Rapid-Test Station**



**Siaogang Hospital
Community
Screening Station**



**Siaogang District and Daliao
District Screening Station**



**Screening station for
enterprise**



**Community
Vaccination**



**Designated
Hospital**

New Strategy to Fight COVID-19 in KMSH



- ◆ Tech for COVID-19 Prevention: Micro-Spectrometer for COVID-19
- ◆ Innovative Community Vaccination: Japan "Umimachi" Injection Method
- ◆ Cross-domain Online Prevention
- ◆ Multi-Language Line@: For Covid-19 Information

Community Pandemic Prevention



- ◆ Travel History/Quarantine Access Control System
- ◆ X-ray Alarm System
- ◆ Healthcare in Isolation Ward
- ◆ Non-Contact Heart Rate Measurement
- ◆ Remote control for Covid19

The Border Protector



Border Control

- ◆ Airport Saliva PCR Test
- ◆ Antigen Rapid-Test



Medical System Preservation

**The strategy
to fight
COVID-19 in
KMSH**

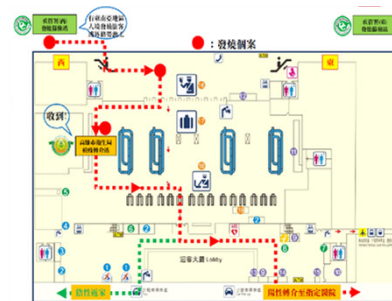
Border Control

Strategy to Fight COVID-19 in KMSH_ Border Control



Staff members from Airport Evacuation Department form a LINE group so they would not miss important information. Suspected case for migrant workers and travelers are sent to KMSH.

“Airport Pandemic Prevention” Line Group



KMSH serves as International Port Evacuation Hospital since 2003

International Port Evacuation Service

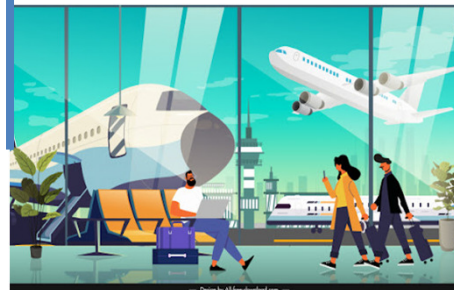


The strategy to fight COVID-19 in KMSH_ Border Control



Airport COVID-19 Self-Paid Saliva PCR Test Station tested 19 cases since establishment.

Saliva PCR Test Station founded in Dec 2020



In all, there are 129 people of receive rapid test in Kaohsiung International Airport; the test result are all negative.

International Airport Rapid-Screening Station



Travelers who fly to outlying islands shall receive antibody screening test at the airport, and there were 7990 cases tested (06.2021~08.2021). Among them, 5 were tested positive and 6 others have symptoms of COVID. They were all sent to KMSH, and their RT-PCR tests were all negative.

Antibody screening test station in Kaohsiung International Airport.



KMSH'S Contributions

- ◆ **Take a Antigen Screening / PCR test and travelers wait for the result at airport.
→ Reduce the transmission risk from travelers**
- ◆ **Suspected cases would be immediately sent to KMSH to reduce the burden of community**

Airport Covid-19 screening :
(attendees: 14185/Number of event: 105)

Budget Reduction

Cost Reduction

Manpower Reduction

**The strategy
to fight
COVID-19 in
KMSH**

**Community pandemic
prevention**

The strategy to fight COVID-19 in KMSH

Community pandemic prevention



- Community Vaccination
- Community Screening
- Enterprise Test

pandemic prevention

Innovative Community Vaccination: Japan "Umimachi" Injection Method

- Categorize by age, area, time
- The elder sits still, and doctor moves



Multi-Language Line@ For Covid-19 Information



- Cross-domain Online Healthcare
- Set-up a network between Hospital, District office, police station.

Cross-domain online healthcare



KMSH'S Contributions

- 1 Enhancing the Communicating effectiveness.
- 2 Improve the massive vaccination and infection control procedures in community.

Our Medical Performance



RT-PCR Screening has racked up
24,480 times

Category	Starting Date	Attendance
Vaccination	3/23	55,313
Community Screening	5/22	16,785
Enterprise Test	6/11	2,931

◆ 資料日期：截至9/12止 ◆

Holistic Health Care

Community Prevention

Slow Down COVID-19
Transmission

**The strategy
to fight
COVID-19 in
KMSH**

**Medical system
preservation**



Strategy of Medical system preservation

- **Reduce loading**
- **Patients divergence and pass way control**
- **Increase designated wards for COVID-19 cases**
- **Strengthen self-health monitoring level of personnel**
- **Encourage staff member to receive vaccination**
- **Enhance manpower for screening suspected cases**



KMSH'S Contributions

- 1 Enhancing Screening Capacity
- 2 Completing the Prevention Preparedness and System for Case Follow-up
- 3 Preserve the medical capacity.
- 4 Utilizing AI technology for epidemic prevention

Holistic Health Care

Healthcare Quality

Technology For
Epidemic Prevention



1. Cross-domain information sharing and integration is often confuse.
2. Difficulty of conveying messages to people.
3. Improving the accuracy of tests.
4. High-risk exposure to healthcare workers.
5. Potential crisis of environmental fomite .





THE PUBLIC HOSPITAL OPERATED BY MEDICAL UNIVERSITY -- PROBLEM SOLVING BY INNOVATION



Cross-domain online healthcare (Cooperating with health, police, civilians department, and government)

Unmet need

- Reducing the hospital visitors to prevent residents from cross infection.
- A lack of adequate knowledge of COVID-19 for non-medical workers.

Solution

- Cooperating with Siaogang district office, police station, and chief of village to complete the epidemic prevention network .
- Staff member will be answering the questions via online instead of face to face.



Multi-Language APP Line@: Latest Information about COVID-19

Unmet need

- Migrant workers in Siaogang district :increasing in recent years
- Hard to follow up the latest information due to language barrier

Solutions

- Developed Line@ APP with Wenzao University
- 4 languages in total: English, Vietnamese, Thai, Indonesian



Benefits for Operator : Enhancing Research Capacity



Micro-Spectrometer for COVID-19

Unmet Needs

PCR Test

✗ time-consuming

4hr

✗ high-cost

Equipment: Costly

P3 Lab Needed

High Cost

✗ Sampling error leads to false negative

Hard to test in nasal-pharyngeal method

Low Patient Compatibility

Current Antibody Rapid Test

✗ High-cost

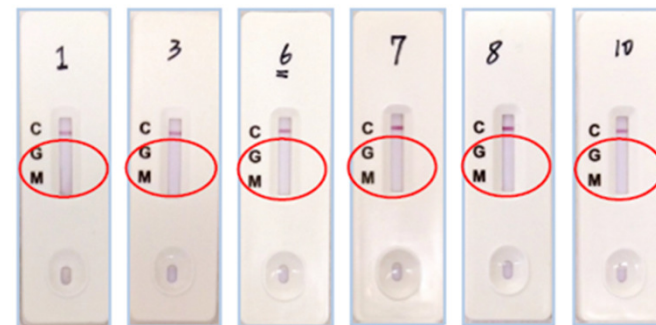
✗ High false-negative rate

Low sensitivity of antigen

Limitation for naked eyes observation

Big loophole in defense against COVID-19 epidemic

Results are all tested negative



Cannot be observed by naked eye



Micro-Spectrometer for COVID-19

Solution

Affordable

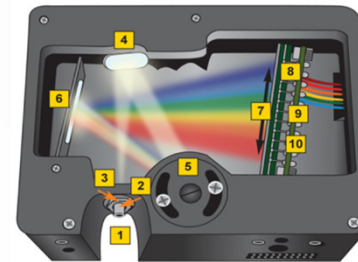
Core promoter element
Continuous Spectrum
Lower Cost

Fast

Handheld size
Convenient
Connected to Phone
Upload to Cloud

Common Spectrometer

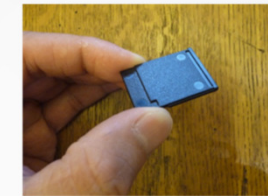
15cm × 25cm × 5cm



Spectrochip

1.4cm × 1.4cm × 0.1cm

約一張SD卡的大小



Precise

User-friendly
Low injury
Avoid Swab Miss

Collect capillary tube
blood or blood test to
Standardize test
procedure



Rely on Nasopharyngeal Swab

1. Viral Load
2. Skills of MLS
3. Patient Compatibility





CSR : Balancing Local Medical Resource



Flip Medicare- More Home Less Hospital

Doing inspections at home is no longer a dream

- ◆ Innovation- Technology: Being able to receive test at home Community Screening)
- ◆ Reducing unnecessary hospital visits
- ◆ Prevent residents from cross infection.

• Micro-Spectrochip

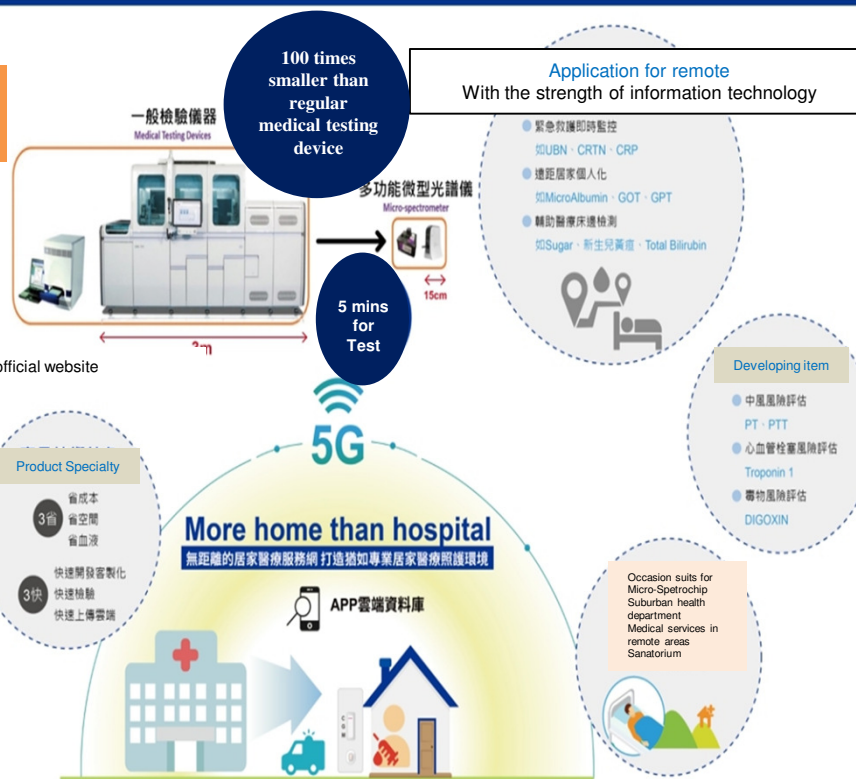
Getting tested inspections at home is not impossible anymore



2020 National Innovation Award



For more information, please visit InnoZone's official website





2020 National Innovation Award

- Handheld micro-spectrometer that is highly slim, light, and sensitive can dramatically decrease the false negative result for COVID-19 antibody tests.
- Multifunctional micro-spectrometer improves the quality of testing and completes remote healthcare.



Export to Japan's market



spectrochip

INNOVATION MINIATURIZED SPECTRO CHIP

SpectroChip product Systematization

SpectroChip Mass Production

SpectroChip Module Customization

SpectroCare AIoT Solutions

SpectroChip Miniaturization

We are a Taiwan startup company located in Hsinchu, Taiwan. We develop our own core technology "Spectro Chip" and miniature spectrometers. Our chip has been miniaturized to the size of an SD card and is produced on a wafer with a spectral resolution of 5nm. This technology has been applied to our product "The One InstantCare" for COVID-19 quantitative analysis, which has been certified by FDA and is highly valued internationally.

spectrochip

COVID-19 IMMUNOASSAY TOTAL SOLUTIONS

The advanced medical mobile device for trace quantitative antibody/antigen test

STEP 01	STEP 02	STEP 03	STEP 04	STEP 05
Collecting Sample	Dropping Sample	Diluting Sample	Waiting for Analysis	View Results
Collect finger-tip blood with lancet and Pac-tur pipette.	Transfer 50 µL blood to specimen well on the detection cassette.	Add 2 drops (about 70-100 µL) of sample diluent buffer to the cassette well.	Wait 15 minutes for control line to appear and read result with InstantCare device.	Wait for the reading to complete and view the test result on the PC or mobile App.

APPLICATIONS

Medical Center **Transportation** **Airport** **Business** **Commercial Site** **Community**

spectrochip

UTSR UNIVERSAL TEST STRIP READER

Analyzed the test strips for human/pet urinalysis, blood, or a variety of industrial applications

- 1 Test Strip Analysis**
- 2 Quantitative Result**
- 3 Rapid Examination**
- 4 History Test Record**
- 5 Test Item Expandable**

UTSR is a spectrometer built in with the world-first high-resolution "Spectro Chip", which can be used in analyzing the test strips for human/pet urinalysis, blood, food safety, or a variety of industrial applications. UTSR can replace multiple test lab equipment simultaneously with same accuracy as lab. The results can be read from the mobile APP immediately and help user to track the test record.



Operators: Enhancing Research Capacity



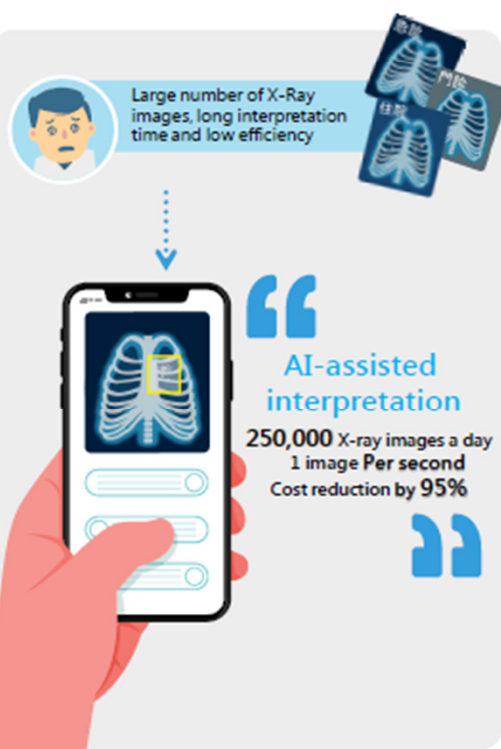
X-ray Alarm System Improves Clinical Procedure and Helps Finding Out Suspected Case



Unmet need

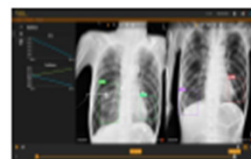
- Short-handed in night ER
- Helping ER doctor to identify pneumonia swiftly

A
F
T
E
R



Radiologist

List in order of priority according to the size and quantity of the label



1

The Information Management Office will receive a notification from the system and pass it to the radiologist by text messages

2

- Decision-making for the interpretation result
- Remark/feedback



Attending Physician

1

Prediction of system integrated images

2

- Doctors' holistic judgement decision-making for the interpretation result
- Medical triage (Emergency department, ICU, General Ward)



- Vital Signs
- Inspection Report
- TOCC
- Estimation of risk of death





Non-Contact Heart Rate Measurement

- Application Field : Preliminary screening in the emergency room 、 Respiratory infectious diseases screening 、 Automatic care in the ward 、 Remote Monitoring care

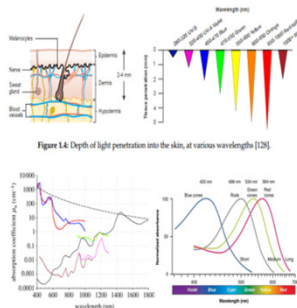
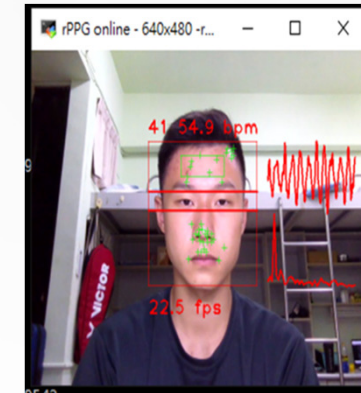
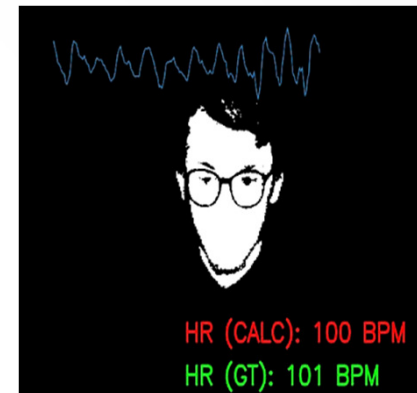


Figure 1.4: Depth of light penetration into the skin, at various wavelengths [126].

Figure 1.5: (Left) Absorption coefficient spectra of endogenous tissue chromophores [10]. cytochrome c (red), hemoglobin (blue), deoxyhemoglobin (green), water (black line, 80% by volume in tissue), lipid A (brown line, 20% by volume in tissue), lipid B (pink line), melanin (black dashed line), collagen (green line) and elastin (yellow line). (Right) Spectral sensitivity of the two types of photoreceptors in the human retina, rods and cones.





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Kaohsiung Municipal Siaogang Hospital

Conclusion



The Advantage of the PPP scheme in addressing COVID-19



More Efficiency Reponse To Challenge



Government intervention boosted the vaccination rate within medical personnel.



Municipal Hospital assists Kaohsiung City Government to perform mass COVID-19 vaccination venues which effectively help control the pandemic.

KMSH



Thanks for Listening

文稿



- Airport COVID-19 Self-Paid Saliva PCR Test Station was established in Dec 2020.
- In all, **19** cases were tested.
- In total, there were **1046** government-funded saliva PCR test cases since July 2, 2020.
- Set up International Airport Rapid-Test Station
- Travelers who fly to outlying islands shall receive antigen screening at the airport, and there were 7990 cases tested (06.2021~08.2021).
- Among them, 5 were tested positive and 6 others had symptoms of COVID. They were all sent to KMSH, and their RT-PCR tests were all negative.