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## [SDGs 3] Good Health and Wellbeing 健康與福祉

### [3.3.1] Does your university as a body have current collaborations with local or global health institutions to improve health & wellbeing outcomes?

NCUT actively collaborates with local and national medical institutions to enhance community health, develop healthcare technologies, and train health-oriented professionals. Through research partnerships, joint training programs, and technological innovation, NCUT integrates engineering, medicine, and social responsibility to advance SDG 3 — Good Health and Well-Being.

#### 1. Key Collaborations

##### (A) Partnership with Taichung Tzu Chi Hospital

NCUT signed a Memorandum of Understanding (MOU) with the Minimally Invasive Spine and Joint Center at Taichung Tzu Chi Hospital to combine sports science with medical expertise.

- Faculty and students jointly design personalized exercise prescriptions for patients.
- The collaboration promotes rehabilitation therapy, community health, and preventive medicine.
- Students gain hands-on experience through observation and internship opportunities at the hospital.

##### (B) Cooperation with Taichung Armed Forces General Hospital

A cooperation agreement was signed to launch the Precision Sports Instructor Training and Sarcopenia Detection Service Plan for the Elderly.

- Focus: smart health management and community elder care.
  - Activities include:
    - Community-based fitness programs to strengthen muscle endurance and prevent sarcopenia.
    - Healthcare education for elderly residents.
    - Professional instructor training in precision sports science.
- This partnership strengthens interdisciplinary research and promotes well-being through preventive healthcare.

#### 2. Technological Innovation in Medical Applications

##### AI-Powered Auxiliary Medical Services

Developed by NCUT's College of Engineering, these projects integrate Artificial Intelligence (AI) and Machine Vision for medical assistance:

- **Vocal Cord Disease Detection:** AI analyzes endoscopic laryngeal images to assist doctors in identifying diseased regions.
- **Psoriasis Diagnosis:** Machine-vision algorithms classify psoriasis type and severity for remote telemedicine.
- **IoT-Based Patient Monitoring:** Bed-exit warning systems reduce nurse workload and improve patient safety.

These technologies were field-tested at Changhua Christian Hospital, and the Mobile Bed Exit Warning Device received the 17th National Innovation Award.

### 3. Health and Epidemic Prevention Seminars

#### Epidemic Prevention Air-Conditioning Seminar

NCUT hosted a national seminar uniting experts, engineers, and epidemic-control specialists to discuss:

- Principles of air-purification systems for infection prevention.
  - Integration of AIoT for smart environmental control.
  - Practical hospital applications for microbial deactivation and odor removal.
- The seminar positioned HVAC professionals as “environmental doctors”, improving both healthcare environments and air-quality standards.

#### Environmental Doctors Forum

The follow-up “Epidemic Prevention Air Conditioning and Environmental Doctors Seminar” focused on environmental purification methods for microorganisms and chemical pollutants. Case studies demonstrated effective purification systems to enhance indoor air quality and living environments.

### 4. Cooperation with National Military Taichung General Hospital

This collaboration expands the Precision Sports Instructor Training and Sarcopenia Detection Plan, emphasizing:

- **Improved Health and Fitness:** Personalized exercise and diagnostic testing for seniors.
- **Quality of Medical Care:** Training certified senior sports instructors to integrate medical knowledge into community fitness.
- **Professional Consultation:** Providing accessible exercise and health guidance regardless of social status.

- **Education and Training:** Offering academic courses and certifications to cultivate future health management professionals.

## 5. Outcomes and Impact

Through these collaborations, NCUT has:

- Enhanced the integration of medical and engineering disciplines.
- Promoted healthy aging and disease prevention in local communities.
- Advanced AI-driven smart healthcare technologies.
- Contributed to public health capacity building in the Taichung-Changhua region.

These efforts directly support SDG 3 (Good Health and Well-Being) and SDG 9 (Industry, Innovation and Infrastructure) by linking academic research, industrial innovation, and community health development.

## 6. Alignment with Sustainable Development Goals

SDG Goal	Description	NCUT Initiative Alignment
<b>SDG 3 – Good Health and Well-Being</b>	Ensure healthy lives and promote well-being for all at all ages.	Partnerships with hospitals, elderly fitness training, AI medical technologies.
<b>SDG 4 – Quality Education</b>	Ensure inclusive and equitable quality education.	Student training in medical technology and community health.
<b>SDG 9 – Industry, Innovation and Infrastructure</b>	Build resilient infrastructure and foster innovation.	Development of AIoT and medical engineering systems.
<b>SDG 17 – Partnerships for the Goals</b>	Strengthen implementation through partnerships.	Industry-university-hospital collaborations and knowledge sharing.

NCUT's extensive collaborations with hospitals and healthcare institutions underscore its role as a leader in health innovation. By combining medical expertise, engineering innovation, and community engagement, the university contributes to enhancing health outcomes, empowering future healthcare professionals, and advancing Taiwan's sustainable development agenda.

## D. Industry-University Collaboration and Innovation

### (A) Industry-University Cooperation with Taichung Tzu Chi Hospital

NCUT has signed a memorandum of understanding (MOU) for industry-university collaboration with the Minimally Invasive Spine and Joint Center of Taichung Tzu Chi Hospital. This partnership integrates expertise from both the sports and medical fields to provide patients with personalized exercise prescriptions, achieving effective therapeutic outcomes and promoting community health and well-being.

Faculty and students visited the Minimally Invasive Spine and Joint Center of Taichung Tzu Chi Hospital on an exchange and for observation. Guided by physical therapists, they learned how to provide exercise prescriptions for patients in need, gaining valuable experience.



▲ Exchange Visit and Observation at the Minimally Invasive Spine and Joint Center of Taichung Tzu Chi Hospital

### (B) Industry-University Cooperation Contract with Taichung Armed Forces General Hospital

NCUT signed a memorandum of cooperation with the Taichung Armed Forces General Hospital and jointly launched the "Precision Sports Instructor Training and Sarcopenia Detection Service Plan for the Elderly". This collaboration creates more opportunities for cooperation in healthcare, education, and research, establishing a closer exchange platform. The focus of this partnership is on smart health development.

The initiative involves taking students into nearby communities to provide exercise training for the elderly, improving their muscle endurance, preventing sarcopenia, and offering healthcare knowledge to promote overall well-being.



▲ Students went to the nearby communities to help enhance the elderly's muscle endurance through exercise training

## NCUT Collaborations with Local Health Institutions to Improve Health & Wellbeing

### AI-Powered Auxiliary Medical Services

The Department of Engineering at NCUT, involving both teachers and students, leverages AI technology to develop auxiliary medical services, significantly enhancing the accuracy of diagnosis and treatment. Specific areas of focus include:

- **Vocal Cord Diseases:** AI analyzes endoscopic images of the larynx, assisting doctors in identifying critical areas for disease diagnosis during consultations.
- **Psoriasis Diagnosis:** Machine vision technology is used to determine the extent and type of psoriasis, facilitating remote diagnosis by providing doctors with essential information.

In clinical care, integrating the Internet of Things (IoT) and smart judgment systems enables:

- **Patient Bed Departure Sensing:** This technology issues warnings when patients leave their beds, thereby reducing the time and effort required by medical staff for patient care.

These innovations have been recognized externally, with significant accomplishments achieved in collaboration with Changhua Christian Hospital. Notably, the mobile bed exit warning device earned the 17th National Innovation Award after successful field verification.

### Industry-University Cooperation with National Military General Hospital

NCUT signed a memorandum of cooperation with the National Military Taichung General Hospital, initiating the "Precision Sports Instructor Training and Sarcopenia Detection Service Plan for the Elderly." This collaborative effort aims to promote health and well-being while exerting a positive influence. Key components of the project include:

#### 1. **Improving Physical Fitness and Health:**

- Providing professional athlete guidance, training, and sarcopenia testing services for the elderly.
- Personalized exercise guidance helps seniors choose methods tailored to their needs, reducing injury risks, enhancing fitness, preserving health, and ultimately improving quality of life.

#### 2. **Enhancing Medical Care Quality:**

- The involvement of the National Military Taichung General Hospital ensures the delivery of high-quality health management services.
- Training senior sports instructors ensures they have the necessary professional knowledge and skills to offer tailored exercise programs.
- The sarcopenia detection service plays a crucial role in early identification and prevention of sarcopenia-related issues, enhancing the overall quality of medical care.

#### 3. **Increasing Professional Consulting Services:**

- Training senior sports instructors allows more seniors to access professional sports consultation, benefiting them regardless of socioeconomic status or background.
- This initiative aims to reduce potential problems associated with age inequality.

#### 4. **Providing Education and Training Opportunities:**

- Through industry-university cooperation, relevant education and training courses are offered to cultivate more professional health management personnel.
- This effort contributes to establishing a more comprehensive health management system, fostering heightened awareness and knowledge of health and well-being among the population.

These collaborations and initiatives underscore NCUT's commitment to enhancing health and well-being through innovative technology, professional training, and comprehensive health services.