Technology Innovation and Health
——Technology Makes a City Healthier

Xuetao Cao M.D., Ph.D.
President of
Chinese Academy of Medical Sciences &
Peking Union Medical College

National Health and Family Planning Commission
of the People’s Republic of China
Technology Makes a City Healthier

• Technology and City Health
• Challenges Faced by City Health
• Present Situation of World's Medical Technology Innovation
• Advice on Improving City Health with Technology
Science & Technology and City Health
— Population Health

Disinfection  Healthy drinking water and food preservation.

Vaccination  Control the prevalence of infectious diseases in dense crowds.

Modern Medicine  Keep population healthy with high efficiency and quality.

Science & technology progress is the main impetus to city health.
Challenges Faced by City Health

1. Risk of infectious disease outbreaks is still existing.

2. Major chronic diseases blow out
   - **Cardiovascular disease**
     - Cause of death: rural area 44.6% city area 42.5%
   - **Diabetes**
     - Morbidity rate: adult male 10.5% adult female 8.3%
   - **Cancer**
     - Over 4.29 million patients diagnosed with cancer and 2.81 million patients dead in 2015

- High rate of various chronic diseases
- Younger age of patients
- Heavy burden on society and medical system

Two 80%s: Over 80% of total deaths are caused by major chronic diseases; cause over 80% of total burden in China.
Interaction and innovation between medicine and science

New methods of prevention and treatment continuously emerge

4P medicine
- prediction
- personalization
- participation
- prevention

Promote transformation of medical mode

Integration innovation

Technology

Biology-environment-psychology-society-engineering

Gene therapy
- minimal invasive therapy
- molecular imagine
- artificial organs
- robert surgery
- gene therapy

9th Global Conference on Health Promotion
Shanghai · 21-24 November, 2016

World Health Organization
Crosstalk between medicine and IT, internet and databases

- Mobile health
- Wearable Devices
- Medical 3D printing
- Large-scale cohorts
- Biological medicine
- Chemical medicine

Integration innovation

Basic science-clinical medicine-prevention-medicine
Advice on Improving City Health with Technology

1. Technology leads and realizes prevention
   - *Focus on major chronic diseases*, provide means to achieve prevention from the initial phase

Discover and evaluate health risk factors
- example: prevention of adult diseases since childhood

Discover efficient warning markers

Efficient means to monitor health status

Prevention and health improving technologies & products

National Health and Family Planning Commission of the People’s Republic of China
2. Implement basis development, realize sharing and building

- United planning and standard through strategic perspective

  - Basic database of biologic medicine
  - Clinical and disease-control data
  - International first-class supporting conditions
  - Experimental animals
  - Medicinal plants resources
  - Large-scale corhots and research sites

Data, biological resources, chemical resources, clinical and disease-control data, international first-class conditions, experimental animals, medicinal plants resources, large-scale cohorts and research sites.
3. Emphasize interaction, strengthen mutual security

Adapt transition of medical mode, promote original innovation...
4. Intensify technology support, insist on health equality

- Technology innovation should serve the medical reform and backup the Chinese-style solution

Tasks of medical reform

- Complete the four systems of medical health care
- Reform of public hospitals
- Diversification of medical forms
- Public hygiene service system
- Health care service system
- Medical welfare system
- Medicine supply system

Increase technology support to solve resources shortage

Biologic medicine  Medical instruments  Diagnosis, prevention and treatment  Medical care