



ISN

INTERNATIONAL SOCIETY
OF NEPHROLOGY

ACADEMY

KIDNEY HEALTH EDUCATION FOR GLOBAL IMPACT



CKD Screening in China: Evidence and Implementation

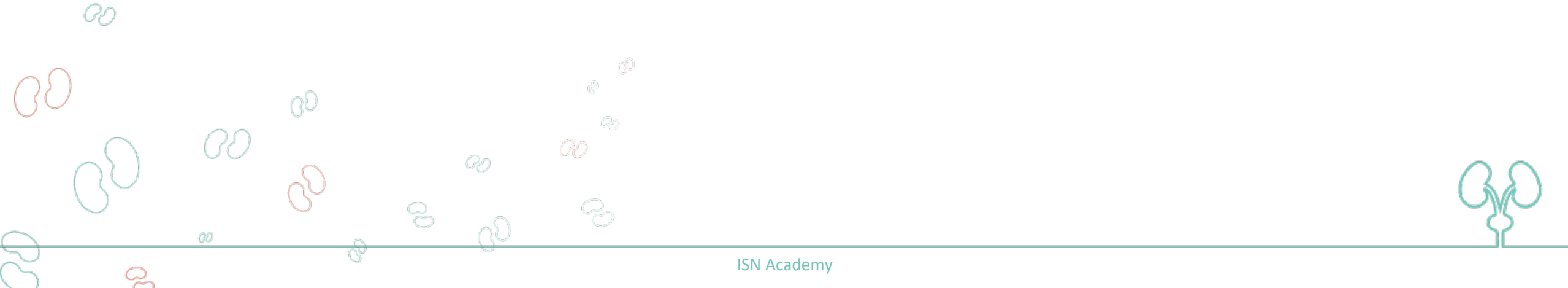
Luxia Zhang MD, MPH

National Institute of Health Data Science, Peking University
Institute for Artificial Intelligence, Peking University
Peking University First Hospital



Disclosures

- I have no actual or potential conflict of interest in relation to this presentation.



The CKD challenges in China

- Ageing population with high prevalence of DM and HTN
- Large CKD population, embedded in CKM syndrome
- Low awareness leading to late presence
- Limited and unevenly distributed nephrology workforce

Ageing population: 28% aged ≥ 60 y by 2040

High metabolic burden: DM + pre-DM 50.5%; HTN 31.6%

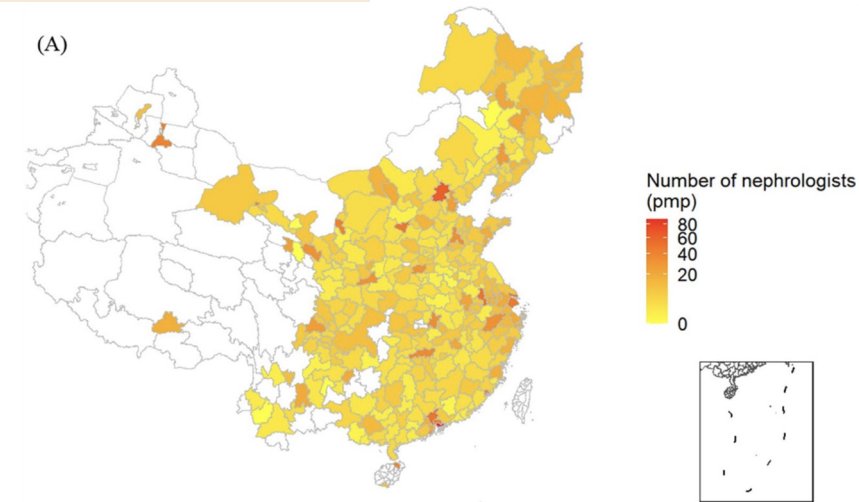
CKM prevalence rising: 77.1% in 2010 $\rightarrow$ 83.7% in 2019

Low awareness of CKD: 12.5% in 2010 $\rightarrow$ 10.0% in 2019

He et. JACC, 2025; Zhang et al, Lancet, 2012

Wang et al, JAMA Int med, 2023

Wu et al, Hum Resour Health, 2023



Building the evidence base for kidney disease



China Kidney Disease Network(CK-NET)

An academic
initiative lead by
Peking University



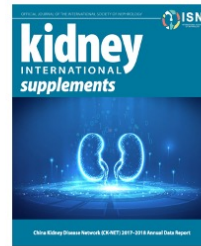
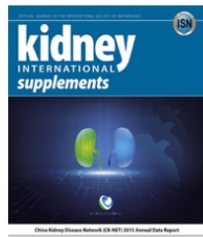
The first of
its kind in China



Leveraging the
power of big data in
kidney disease



The mission of CK-NET is to integrate diverse sources of kidney health data across China and apply advanced technologies to generate evidence that informs policy, advances research, and improves kidney disease management.



2017

2019

2020

2025

AJKD
Editorial

The China Kidney Disease Network (CK-NET):
"Big Data—Big Dreams"

Related Content: June e-supplement

In an e-supplement to this issue of *AJKD* appears the first report of the newly established China Kidney Disease Network (CK-NET),¹ which intends to become a comprehensive chronic kidney disease (CKD) surveillance system for that country. In addition to being the most populous country in the world

evolving to keep up with changing patterns of and treatments for kidney disease. Uniquely, it also supplies de-identified datasets and a data-merging service to researchers and organizations through formal data request procedures. Other prominent examples of well-developed surveillance systems in the United States include the SEER Cancer Registry² and the National CDC-CKD Surveillance Sys-

- **4** national databases
- **12** months' team work
- **30** members of work group
- **50** members of advisory committee
- **1 million** patients with kidney disease

- I. Identification and characteristics of hospitalized patients with CKD
- II. CVD in hospitalized patients with CKD
- III. Health care resource utilization of hospitalized patients with CKD
- IV. In-hospital mortality of hospitalized patients with CKD
- V. AKI
- VI. Prevalence, incidence, and characteristics of dialysis patients
- VII. Clinical measurement and treatment among dialysis patients
- VIII. Vascular access
- IX. CVD and diabetes among dialysis patients
- X. Hospitalization
- XI. Medical expenditures
- XII. Kidney transplant waiting list

CKD screening in China embedded within broader chronic disease programs

- **China Chronic Disease and Risk Factor Surveillance**
ACR and eGFR have been incorporated into national surveillance since 2018
- **National Basic Public Health Services**
No dedicated kidney disease service package
Annual urinalysis and kidney function testing are included for the elderly
Annual ACR and eGFR assessment are recommended for T2DM
- **China's Medium- and Long-Term Plan for the Prevention and Treatment of Chronic Diseases (2017–2025)**
Kidney disease was formally incorporated into chronic disease agenda

Guideline for CKD early evaluation

中国慢性肾脏病早期评价与管理指南

中华预防医学会肾脏病预防与控制专业委员会

通信作者: 张路霞, 北京大学健康医疗大数据国家研究院, 北京 100191, Email: zhanglx@bjmu.edu.cn; 赵明辉, 北京大学第一医院肾脏内科 北京大学肾脏病研究所, 北京 100034, Email: mhzhao@bjmu.edu.cn

【摘要】 慢性肾脏病(CKD)已成为全球危害人类健康的重要公共卫生问题。我国成人CKD患病率为10.8%,但人群知晓率和诊断率普遍较低。我国尚未建立规范的CKD筛查体系与标准诊疗路径。因此,加强CKD防控,推进疾病管理已迫在眉睫。本指南由中华预防医学会肾脏病预防与控制专业委员会发起,采用牛津证据分级系统对相关证据质量和推荐强度进行分级,制订了38条推荐意见,旨在规范CKD的早期筛查、管理与诊疗,推动我国肾脏疾病的医防融合研究与实践。

【关键词】 慢性肾脏病; 指南; 评价; 管理; 预防

Guidelines for the early evaluation and management of chronic kidney disease in China
Chinese Preventive Medicine Association for Kidney Disease

中华内科杂志 2023 年 8 月第 62 卷第 8 期 Chin J Intern Med, August 2023, Vol. 62, No. 8

- Regular CKD screening is recommended for people with diabetes (1a, A), hypertension (1a, A), cardiovascular disease (2c, B), and older adults (2b, B).
- People at high risk of CKD should be screened at least annually, using urinary albumin measurement and serum creatinine-based eGFR.
- Where quantitative urine protein testing is unavailable, routine urinalysis may be used for initial screening, followed by urinary albumin or protein measurement if abnormalities are detected (5, D)

Guideline Concordance of Chronic Kidney Disease Testing Remains Low in Patients with Diabetes and Hypertension: Real-World Evidence from a City in Northwest China

Jingyi Wu^{a,b} Shanshan Yu^b Weidong Zhang^c Ying Yang^c
Shanzhen Fang^b Hongan Pan^b Pengfei Li^{a,b,d} Luxia Zhang^{b,d,e}

Kidney Dis 2025;11:610–620

- 0.2 million residents with DM/HT
- Only 0.70% underwent annual tests for both eGFR and proteinuria
- 3.44% had at least one test for eGFR and proteinuria (eGFR more than proteinuria, diabetes better than hypertension)

Evaluating CKD Screening Strategies in China

Cost-effectiveness of population-based screening for chronic kidney disease among the general population and adults with diabetes in China: a modelling study

Figure S1. Microsimulation model for Screening for CKD

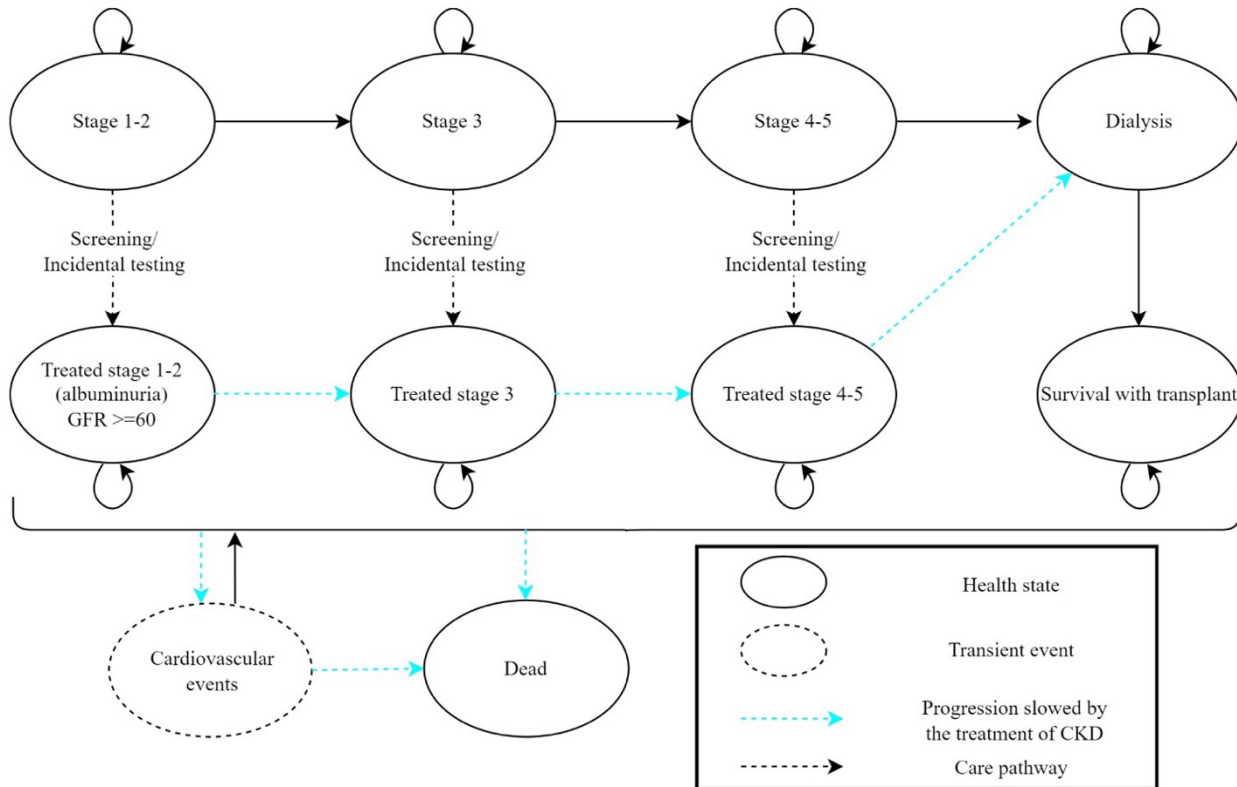
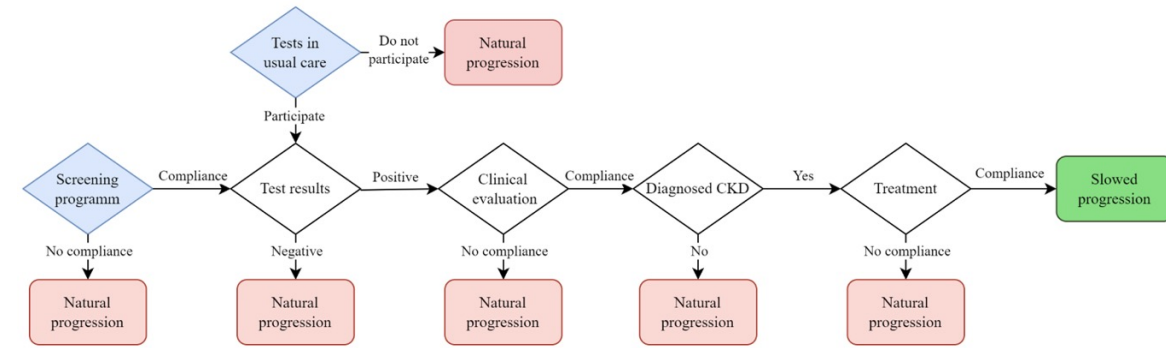


Figure S2. Care pathways for CKD screening and usual care.

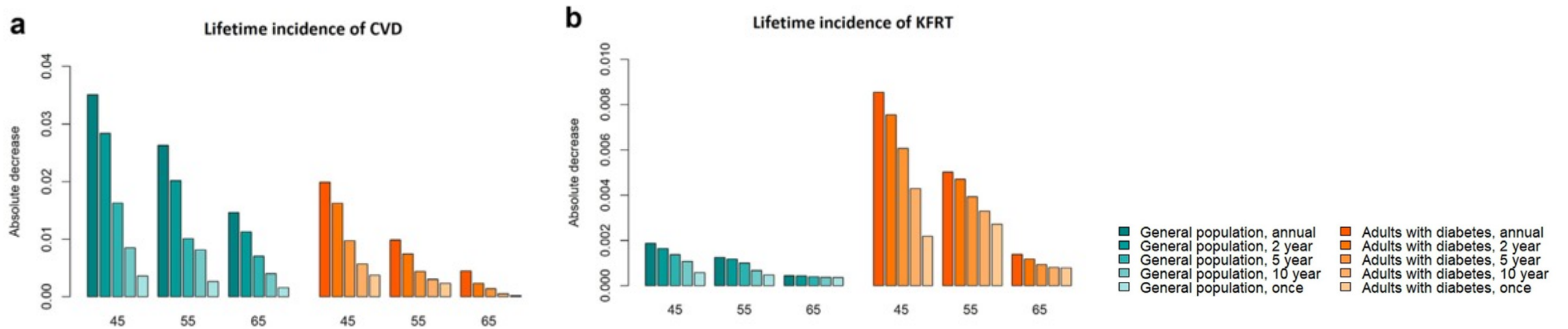


Lancet Reg Health West Pac. 2025 Feb 17:56:101493.



Evaluating CKD Screening Strategies in China

Cost-effectiveness of population-based screening for chronic kidney disease among the general population and adults with diabetes in China: a modelling study



- ❑ Develop a microsimulation model for CKD based on high-quality data in China
- ❑ Annual kidney screening from age 45 (current intervention) → avoid 19M CVD and 1M kidney failure
- ❑ Subsequent cost-effectiveness evaluation of diverse screening and treatment strategies

“Kidney health for all” – beyond CKM

The global CKD Screening Strategies

- ◆ One-time uACR screening at age 55 (US) — prevents 0.66M KRT; cost-effective at \$86,300/QALY with SGLT2 inhibitors
- ◆ Annual eGFR+uACR screening from age 45 (China) — prevents 1M KRT and 19M CVD; cost-effective at \$10,588/QALY
- ◆ Combined 2eGFR+uACR screening from age 45 (31 countries/24 HICs) — cost-effective in all settings, increasing diagnosis rates 31-fold over current practice

With new therapies and accessible low-cost screening, population-wide screening within specific age groups ($\geq 45/55$ years) warrants stronger consideration.

A tiered approach - from dipstick urinalysis and POC Cr to confirmatory uACR and eGFR - offers a pragmatic, affordable pathway to scale CKD screening globally, particularly in LMICs

Cusick MM et al. *Annals Int Med* 2023
Wen F et al. *The Lancet Reg Health West Pac*, 2025
Tangri N et al. *Kidney Int Rep*, 2025
Lee et al. *The Lancet*, 2026



Improving UACR test by POC tools

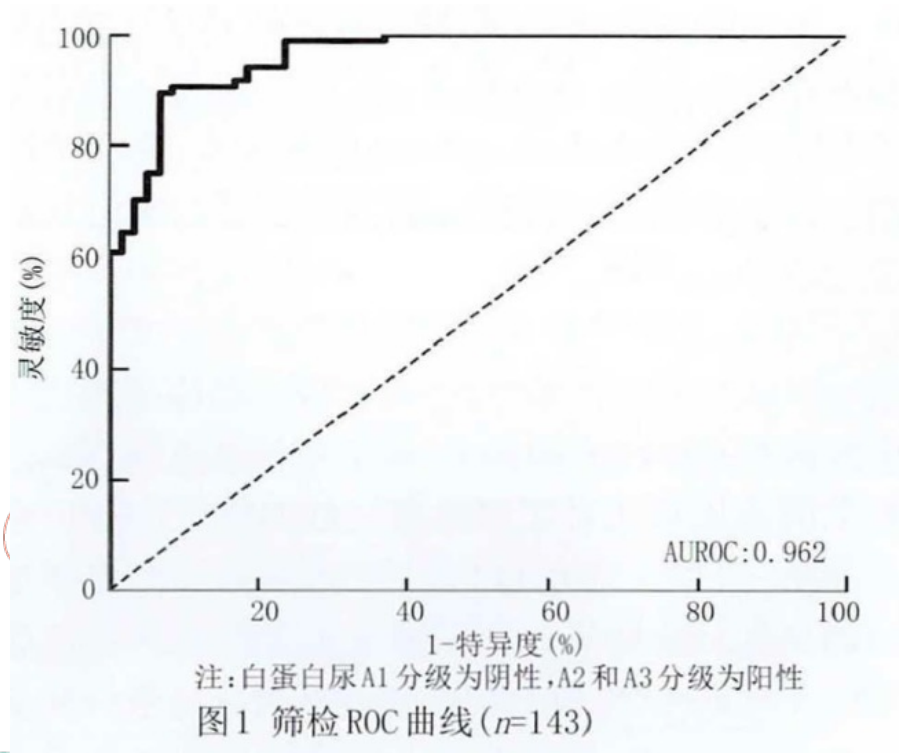
• 98 •

中国血液净化2022年2月第21卷第2期 Chin J Blood Purif, February, 2022, Vol. 21, No. 02

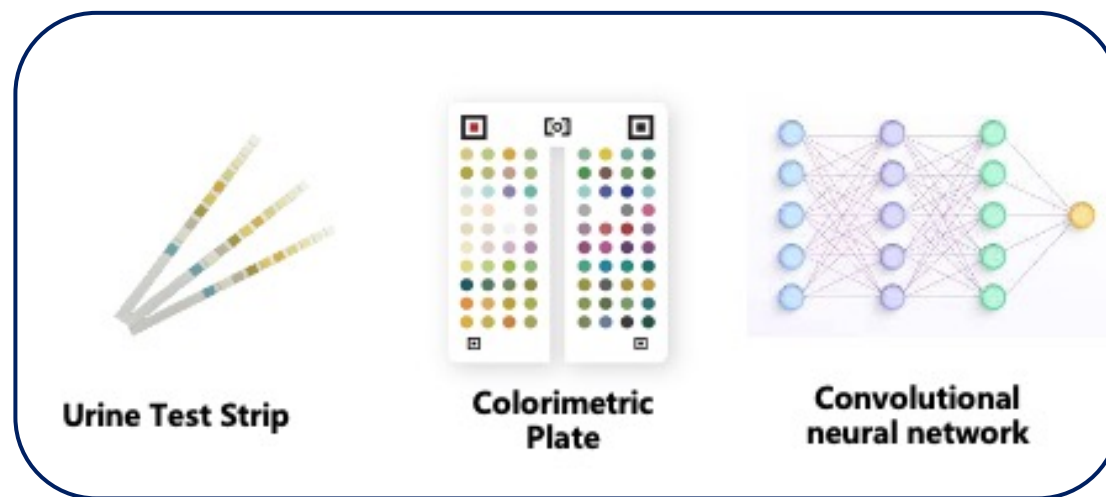
• 临床研究 •

基于计算机视觉的尿液定量分析系统在白蛋白尿
筛检中的应用效能分析

吴静依^{1,2} 王飞² 李青² 沈华² 王学晶² 鲍云非^{1,4} 李鹏飞² 高碧霞^{1,4} 张路霞^{1,2,4,5}



The performance of urine quantitative analysis system based on computer vision in detecting albuminuria



- AUC 0.962
- Sensitivity: 94.0%, Specificity: 81.4%



Intelligent UACR Home Testing & Patient Management Program

- To improve the awareness and the ability of self-management for kidney disease among patients with diabetes, by utilizing an Intelligent UACR Home Testing Kit.

Urinalysis Kit



**Mobile Health
Management Software**



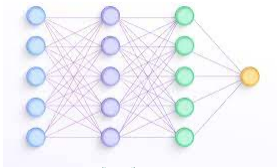
**Data Management
Platform**



Urine Test Strip



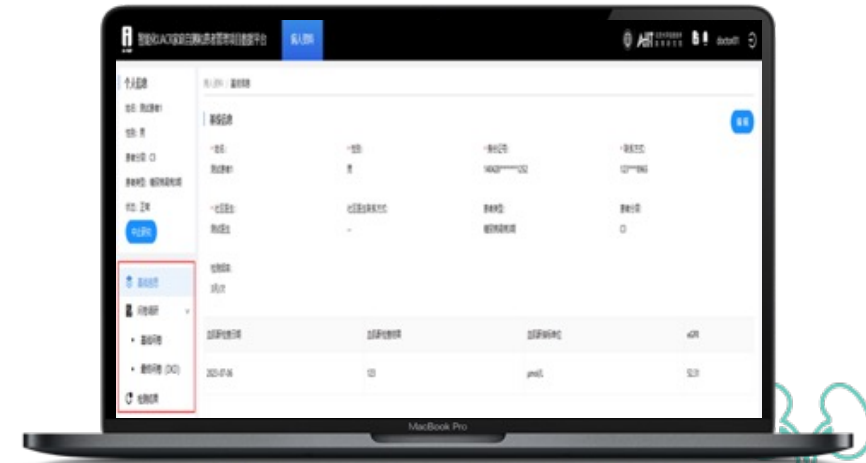
Colorimetric
Plate



Convolutional
neural network

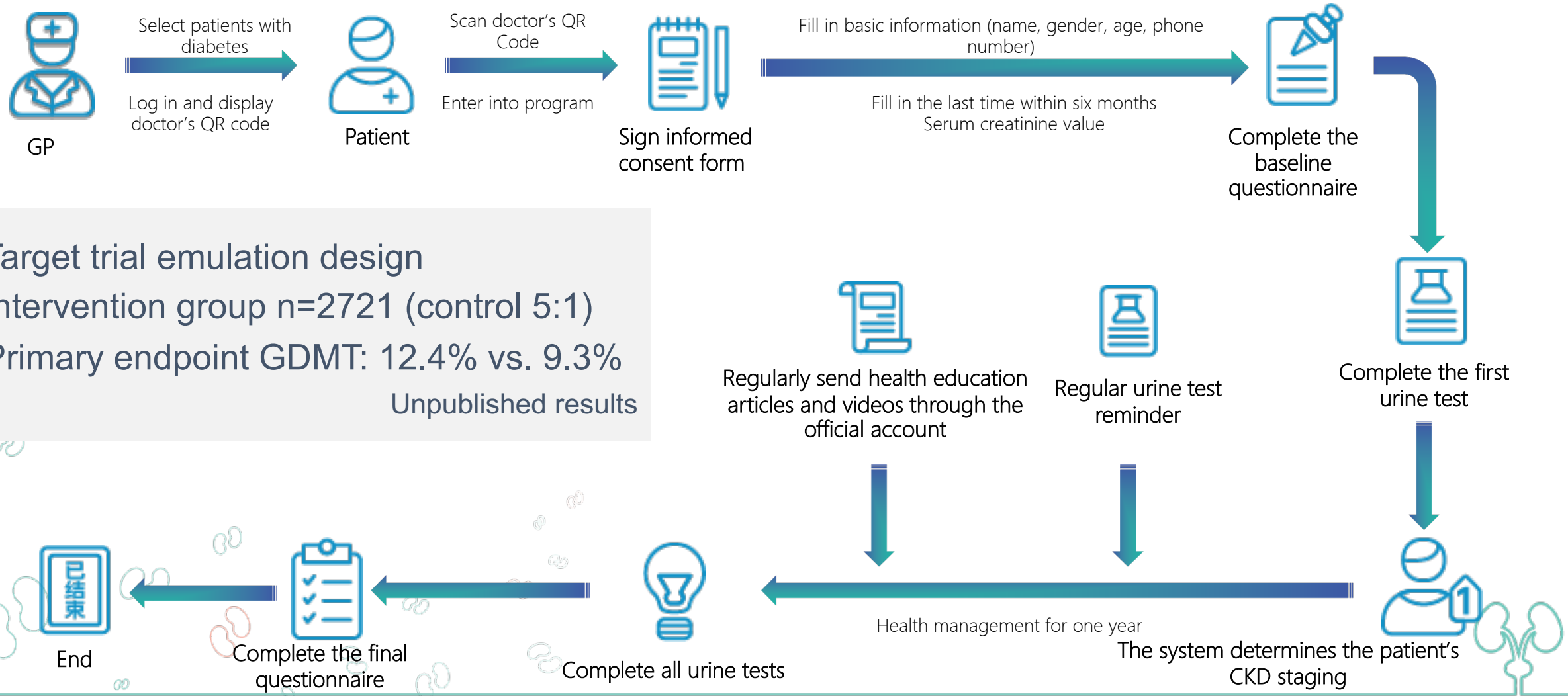


ISN Academy



Jinwei Wang,¹ Beiyao Bao,² Peng Shen,³ Guilan Kong,⁴ Yu Yang,⁴ Xiaoyu Sun,⁴ Guohui Ding,⁵ Bixia Gao,¹ Chao Yang,¹ Minghui Zhao,^{1,6} Hongbo Lin,³ Luxia Zhang^{1,4}

- Yinzhou District, Ningbo City in southeast of China
- 1 million population, well-established EHR, solid GP system



- Target trial emulation design
 - Intervention group n=2721 (control 5:1)
 - Primary endpoint GDMT: 12.4% vs. 9.3%
- Unpublished results

Portable ECG device for kidney disease



Shenda Hong, PhD
Asst. Prof.

Traditional Pattern
Recognition
Algorithms

Deep Learning
Algorithms

- AI-ECG Backbone Network
- Integration of Traditional Pattern Recognition Algorithms

Self-Supervised
Learning Algorithms

Generative Models

Large Language
Models

2017

2021

2023

2024

The "World's First" ECG Foundation Model
Designed to be both an effective out-of-the-box solution and easily fine-tunable for downstream tasks

ORIGINAL ARTICLE

An Electrocardiogram Foundation Model Built on over 10 Million Recordings

NEJM
AI

Jun Li , B.S.,^{1,2,3} Aaron D. Aguirre , M.D., Ph.D.,^{4,5} Valdey Moura Junior , Ph.D.,^{5,6} Jiarui Jin , B.S.,^{1,2,3} Che Liu , M.S.,⁷ Lanhai Zhong , B.S.,⁸ Chenxi Sun , Ph.D.,^{5,9} Gari Clifford , Ph.D.,^{10,11} M. Brandon Westover , M.D., Ph.D.,^{5,9} and Shenda Hong, Ph.D. ^{1,2,3}

A multi-center RCT

Monitoring and management of serum potassium levels among pts with CKD by single-lead ECG device



ISN Academy

Validation	AUROC
Internal	0.9306
Time External	0.8568
External	0.7683



Summary

- **Close the implementation gap** Improve uptake of guideline-recommended eGFR and UACR testing in high-risk populations
- **Extend screening beyond high-risk groups** China-specific microsimulation supports general-population screening from age 45
- **Bring testing closer to patients** Integrate POC testing with confirmatory assessment, timely treatment, and ongoing monitoring



Thank you !

zhanglx@bjmu.edu.cn

<http://www.nihds.pku.edu.cn>

