Implementing Guideline-Informed Medical Care to Improve Kidney Disease - Prevention, Detection, and Management: How are we doing, and how can we do better?

Juliana CN CHAN
Professor of Medicine and Therapeutics
Director, Hong Kong Institute of Diabetes and Obesity
The Chinese University of Hong Kong
Prince of Wales Hospital
Hong Kong

Disclosures

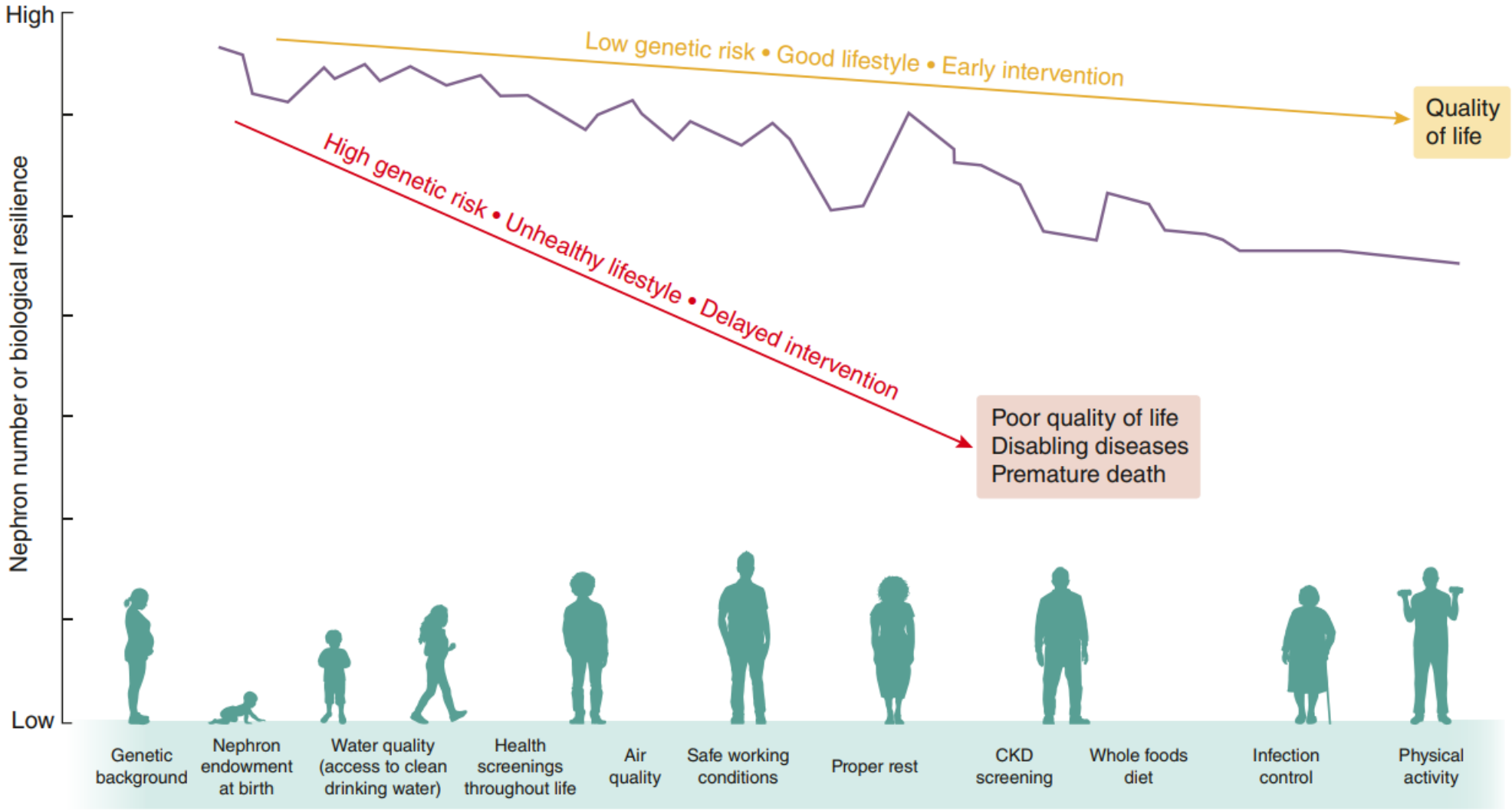
- I am an endocrinologist and clinical pharmacologist with training in epidemiology, clinical trials and psychiatry and have special interests in CKD, genetics and implementation

- I have received consultancy, lecture fees and research support (through institutions) from
  - Applied Therapeutics, Astra Zeneca, Bayer, Boehringer Ingelheim, Celltrion, Powder Pharmaceuticals, Lilly, Merck, MSD, Novartis, Novo Nordisk, Sanofi, Servier, Pfizer, Viatris and Zuelig Pharma
  - CEO (pro-bono), Asia Diabetes Foundation
  - Founding director, GemVCare

Assigned topics

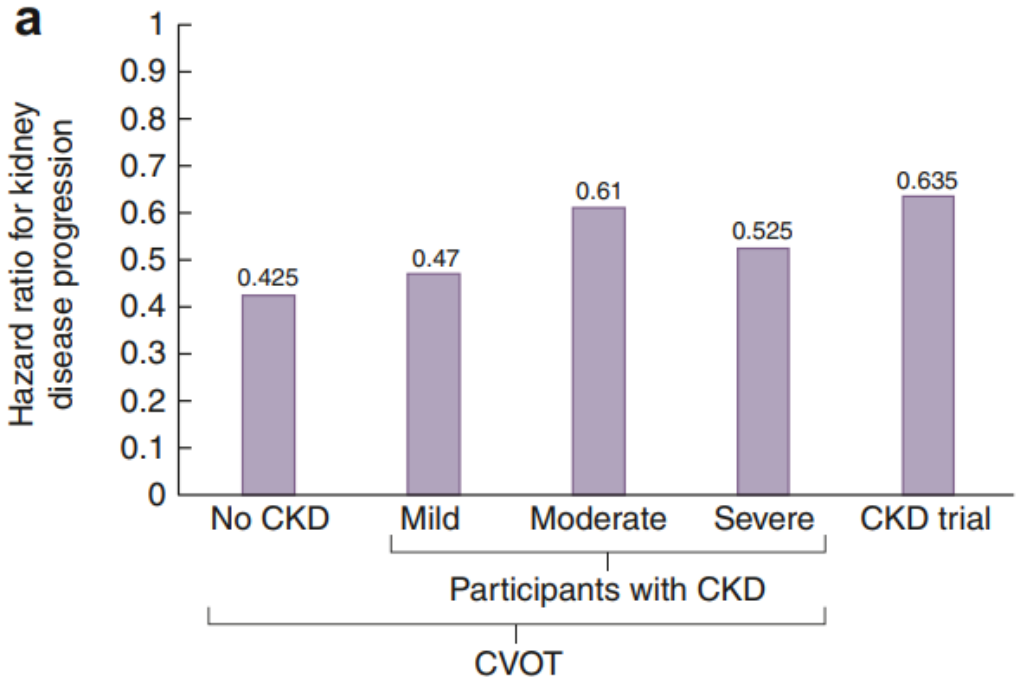
- Overview of guideline (GL)-informed medical care for adults with or at risk for CKD :
  - Analytics/metrics for evaluating GL uptake
- Guideline-informed medical care implementation:
  - Past successes and failures in nephrology or other specialties (e.g., preferably technology case examples to illustrate)
- Factors/barriers against GL implementation (reasons for clinical inertia) and potential solutions (especially opportunities for technology as part of the solution)

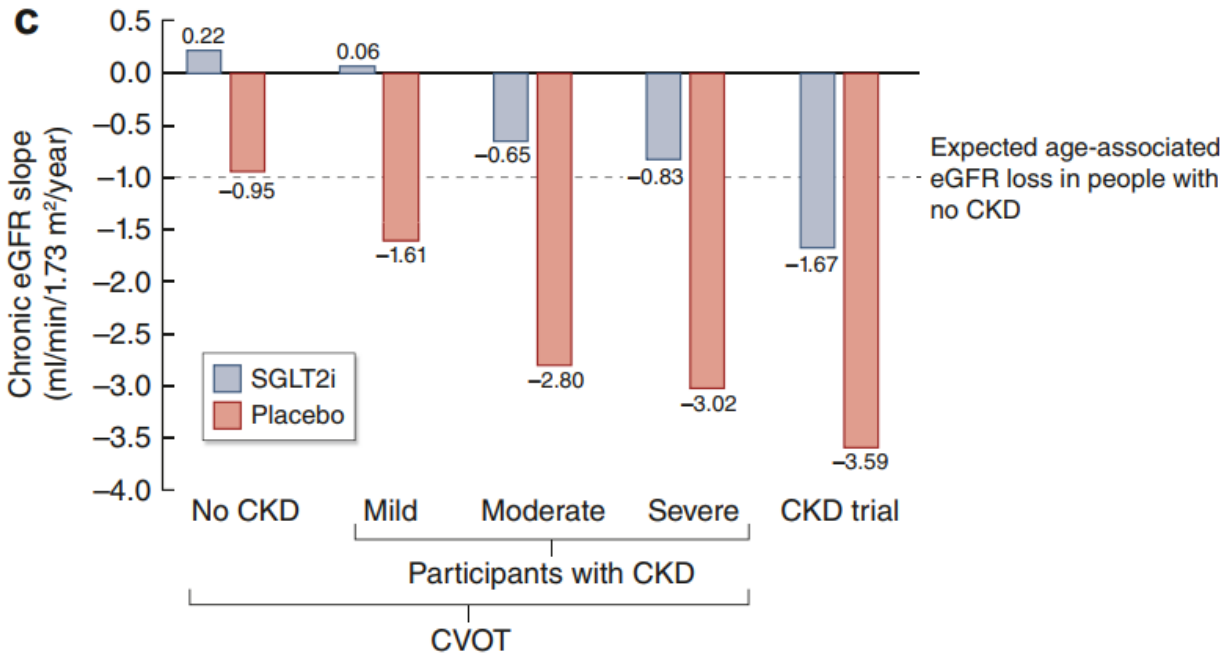
Complexity, multicausality and life-course nature of CKD



Ortiz A et al KI 2025
Adapted from Xie F et al JDI 2018

High risk groups for CKD and residual CKD risk despite use of multiple organ-protective drugs

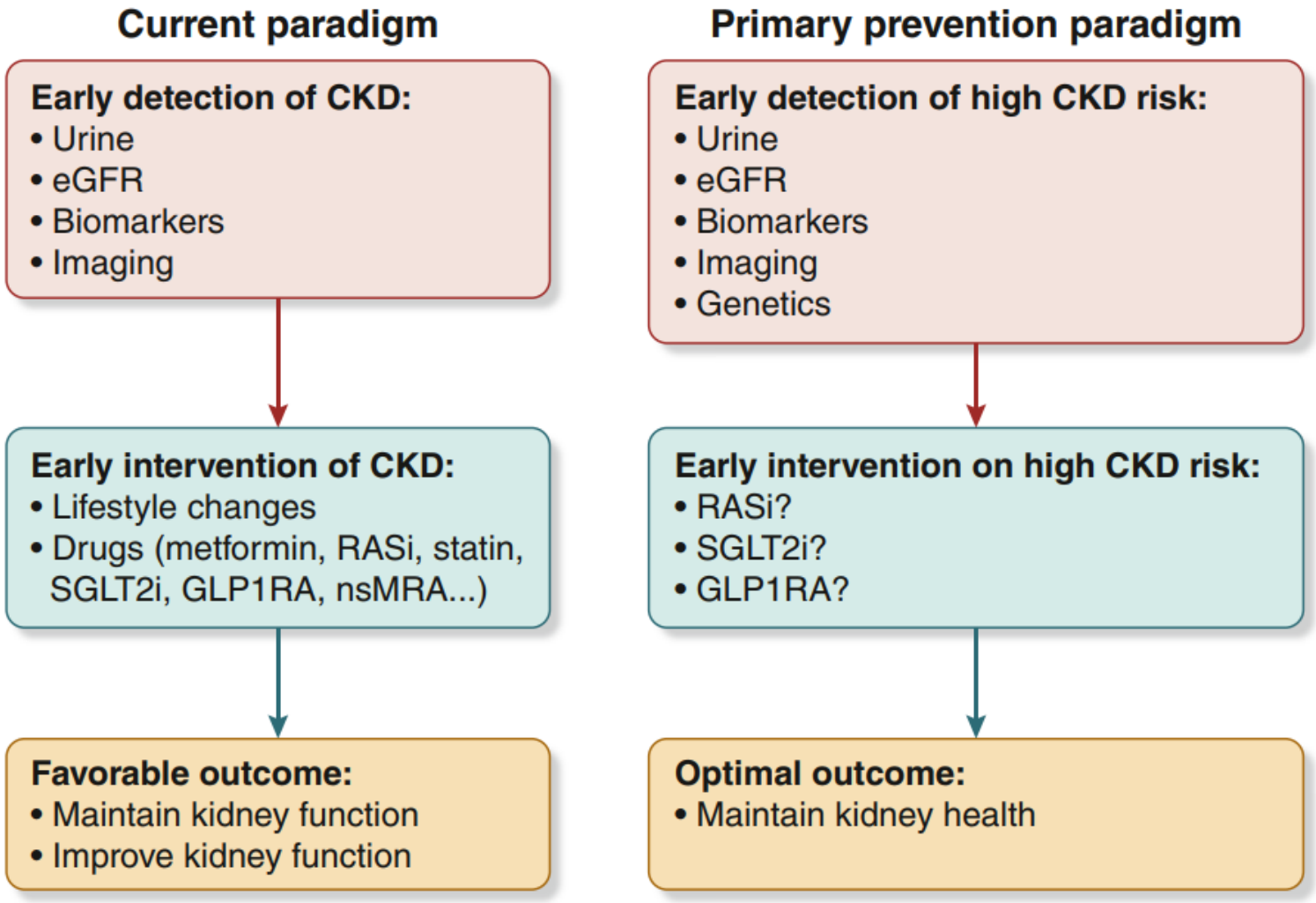




Condition	Fold increase in risk of incident CKD
Type 2 diabetes mellitus[106,107]	3 to 5[a]
GWAS polygenic risk scores (top 1% of population)[105]	
European ancestry	4
African ancestry	3
Latinx ancestry	6
Asian ancestry	8

Ortiz A et al KI 2025

CKD is preventable and treatable
Essence is early detection and timely intervention



Ortiz A et al KI 2025

Diabetes and CKD are progressive and silent digital conditions
Clinical inertia and poor adherence are major challenges

- Obesity (general/central)
- Prediabetes (A1c/OGTT)
- Diabetes (A1c/BG/CGM)
  - TIR, TAR, TBR, GMI….
- Blood pressure
- Lipids
- eGFR
- uACR

CKD is classified based on: • Cause (C) • GFR (G) • Albuminuria (A)				Albuminuria categories Description and range		
				A1	A2	A3
				Normal to mildly increased	Moderately increased	Severely increased
				<30 mg/g <3 mg/mmol	30–299 mg/g 3–29 mg/mmol	≥300 mg/g ≥30 mg/mmol
GFR categories (mL/min/1.73 m²) Description and range	G1	Normal or high	≥90	Screen 1	Treat 1	Treat and refer 3
	G2	Mildly decreased	60–89	Screen 1	Treat 1	Treat and refer 3
	G3a	Mildly to moderately decreased	45–59	Treat 1	Treat 2	Treat and refer 3
	G3b	Moderately to severely decreased	30–44	Treat 2	Treat and refer 3	Treat and refer 3
	G4	Severely decreased	15–29	Treat and refer* 3	Treat and refer* 3	Treat and refer 4+
	G5	Kidney failure	<15	Treat and refer 4+	Treat and refer 4+	Treat and refer 4+

Low risk (if no other markers of kidney disease, no CKD)
Moderately increased risk
High risk
Very high risk

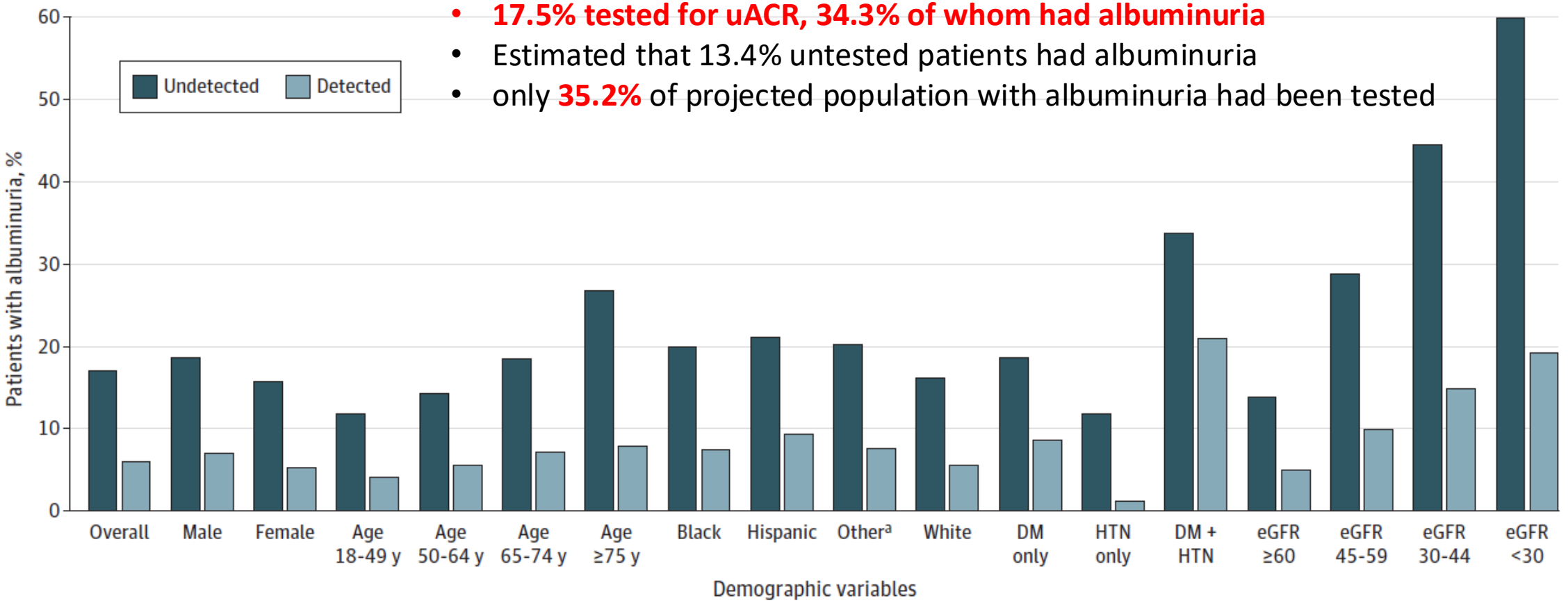
Measurement, management, monitoring

Education, empowerment, engagement

NHANES: only 1 in 3 people with HT or T2D had UACR measured

NHANES – EMR population: 192 108 patients

- 96.6% hypertension and 26.2% diabetes
- Mean eGFR 85 ml/min/1.73m^2
- **17.5% tested for uACR, 34.3% of whom had albuminuria**
- Estimated that 13.4% untested patients had albuminuria
- only **35.2%** of projected population with albuminuria had been tested



Chu CD et al JAMA Network Open 2023

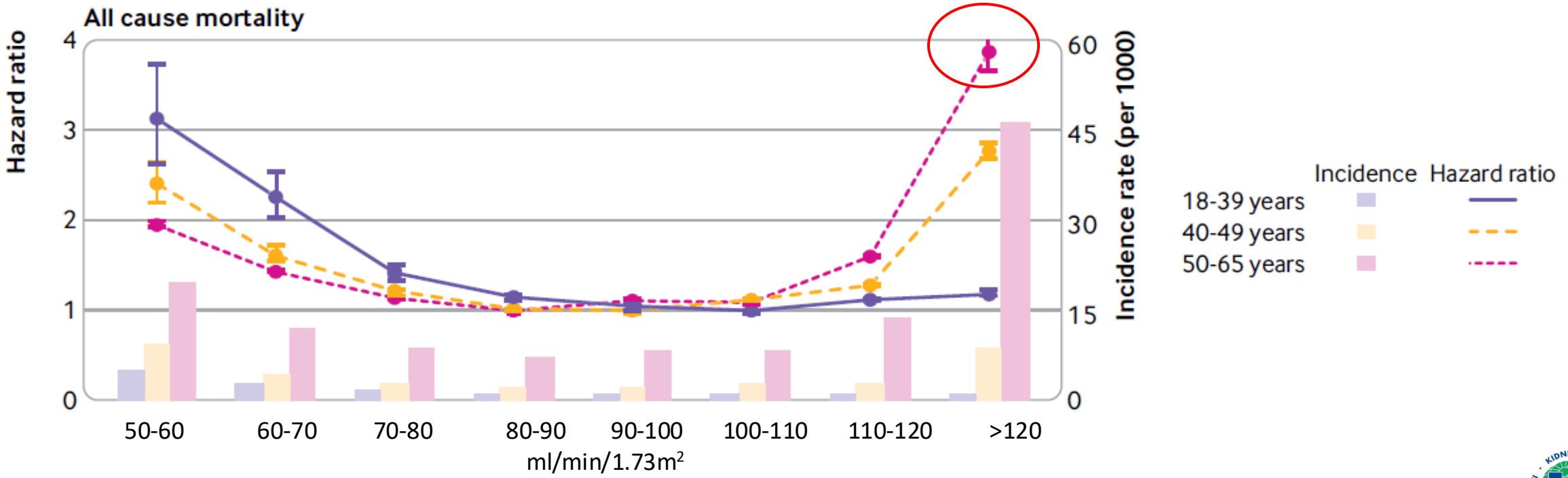
Only 1 in 10 adults in Canada Ontario EMR system had both eGFR and uACR measured

Adults (18-65 year old) with at least one serum creatinine value

N=8,703,871 (48% men) with eGFR (104.2 ml/mi/1.73m^2)

N=746,948 with ACR (0.8 mg/mmol)

2008-2021 (9.2 years follow up)



Hussain J et al. BMJ. 2023

US claim data: low initiation rates and high discontinuation rates of guideline recommended treatment in ~40,000 patients with diabetes and CKD

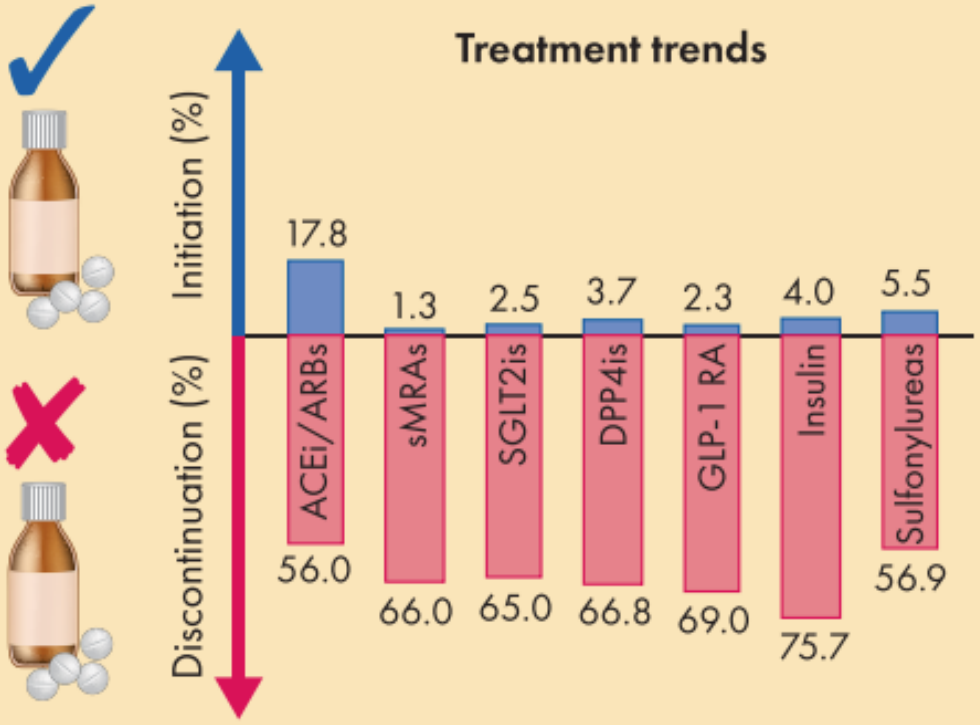
Methods

Retrospective study of administrative claims

1 January 2007 – 31 March 2019

Incident CKD: n = 63 271
Prevalent CKD: n = 326 763

Results



Hospitalization rates per 1000 person years

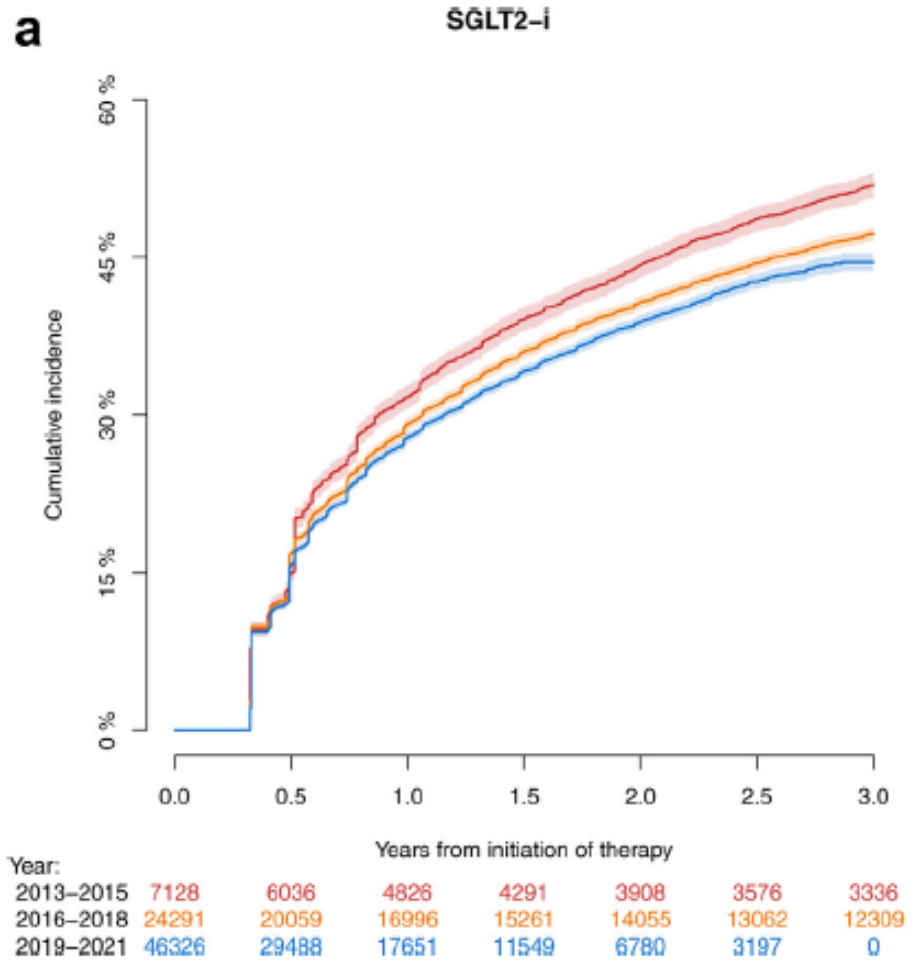
All-cause	Kidney-related
283.1	36.6

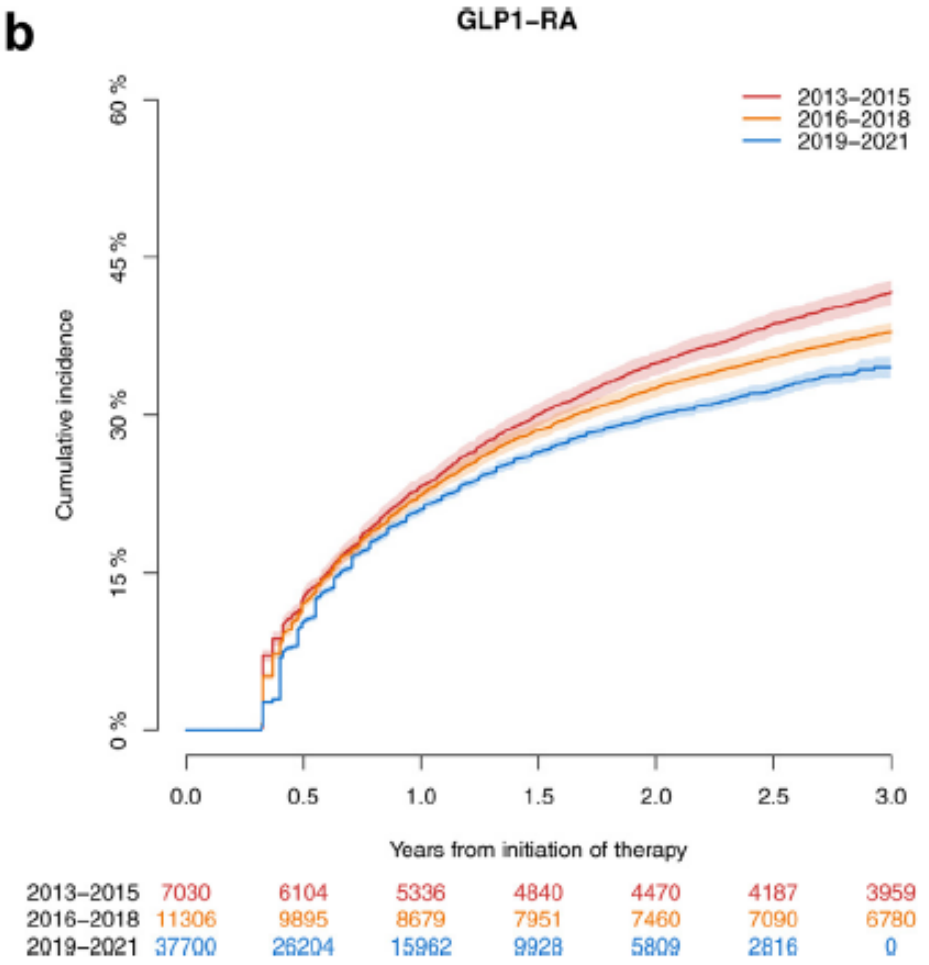
Clinical outcome rates per 1000 person years

Mortality	ESKD
35.1	104.2

Fried L et al NDT 2022

Denmark Diabetes Register: ~50% of patients on GLP1RA or SGLT2i discontinued treatment within 3 years with 50% of them having treatment reinstituted





Malik ME et al The Lancet Regional Health Europe 2023

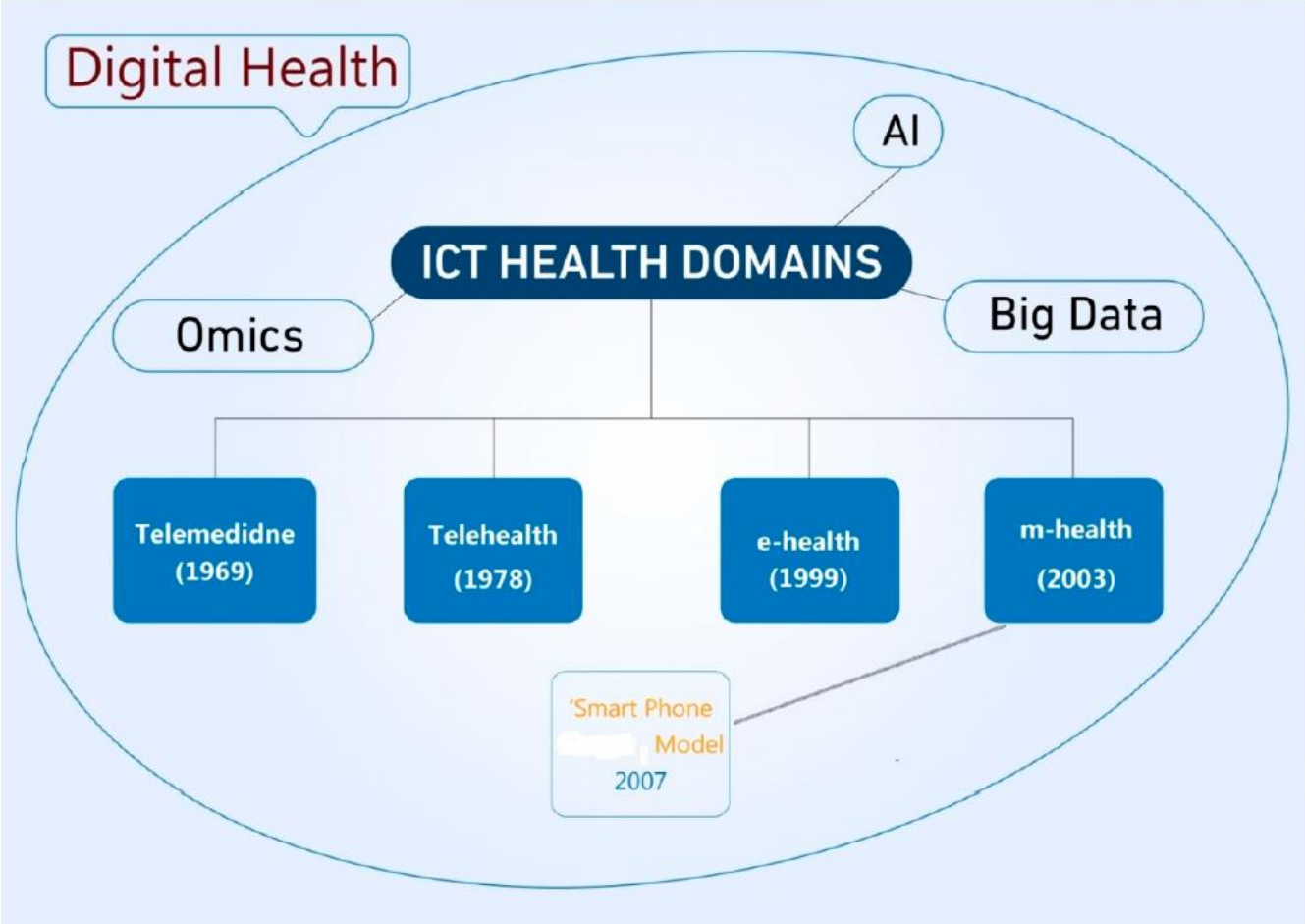
Digitalization of information in healthcare

Diagnosis, classification, prognosis, education, treatment, monitoring, evaluation

Digital/mobile/AI-driven health =
mobile (smart phone app) + data + healthcare delivery service

ICT=
Information
Communication
Technology

AI is only part of the big picture



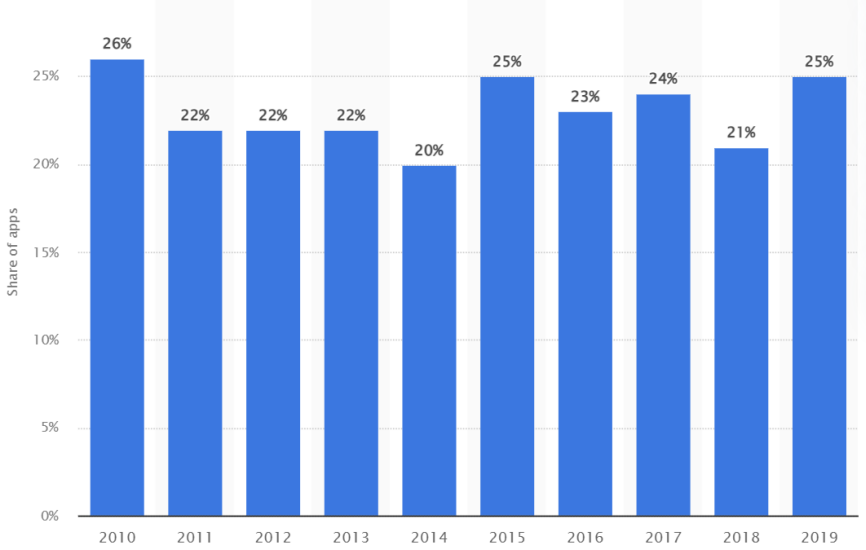
Istepanian RSH. J Environ Res Public Health 2022

What is artificial intelligence (AI)? AI application in healthcare depends on source, quality, relevance, reliability and utility of data

https://www.linkedin.com/posts/yuhelenyu_ai-data-cto-activity-7239648906194644995-SwAI/

Healthcare and technology – successes and learning

Only 1 in 4 APPs has been used at least once after downloading - Statistica



Association of Real-time Continuous Glucose Monitoring With Glycemic Control and Acute Metabolic Events Among Patients With Insulin-Treated Diabetes

Cost-Effectiveness of the FreeStyle Libre® System Versus Blood Glucose Self-Monitoring in Individuals with Type 2 Diabetes on Insulin Treatment in Sweden

Healthcare IT News
https://www.healthcareitnews.com › news › optum-virtua...

Optum Virtual Care said to be closing down

26 Apr 2024 — Optum leaders reportedly shared internally that the company would shutter its sizable telehealth business. Parent company UnitedHealth Group ...

Digital Commerce 360
https://www.digitalcommerce360.com › 2024/05/01 › w...

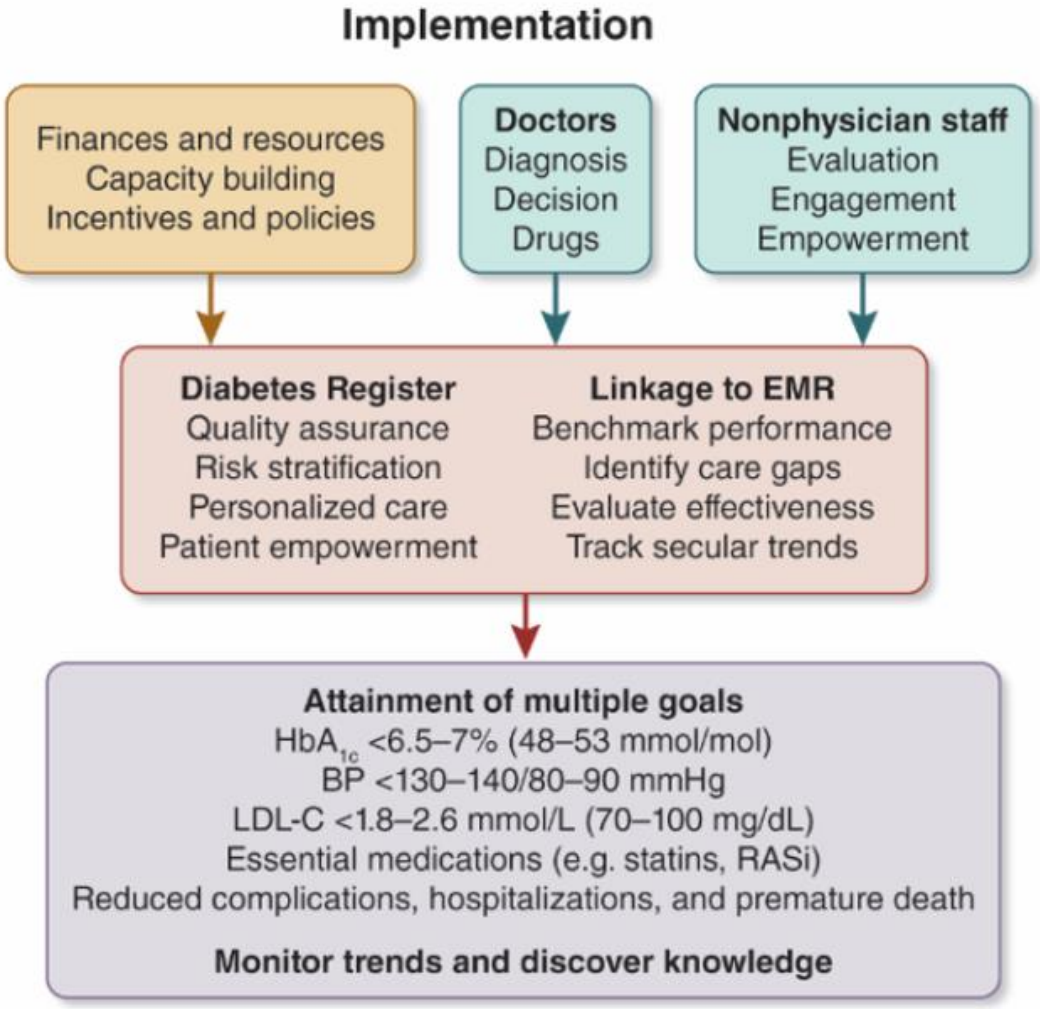
Walmart to close health centers and virtual care

1 May 2024 — Walmart is **closing** all 51 of its health **centers**, the retailer announced April 30. It will also **shut down** its **virtual health care** operations.

https://blog.mirrorreview.com/mhealth/

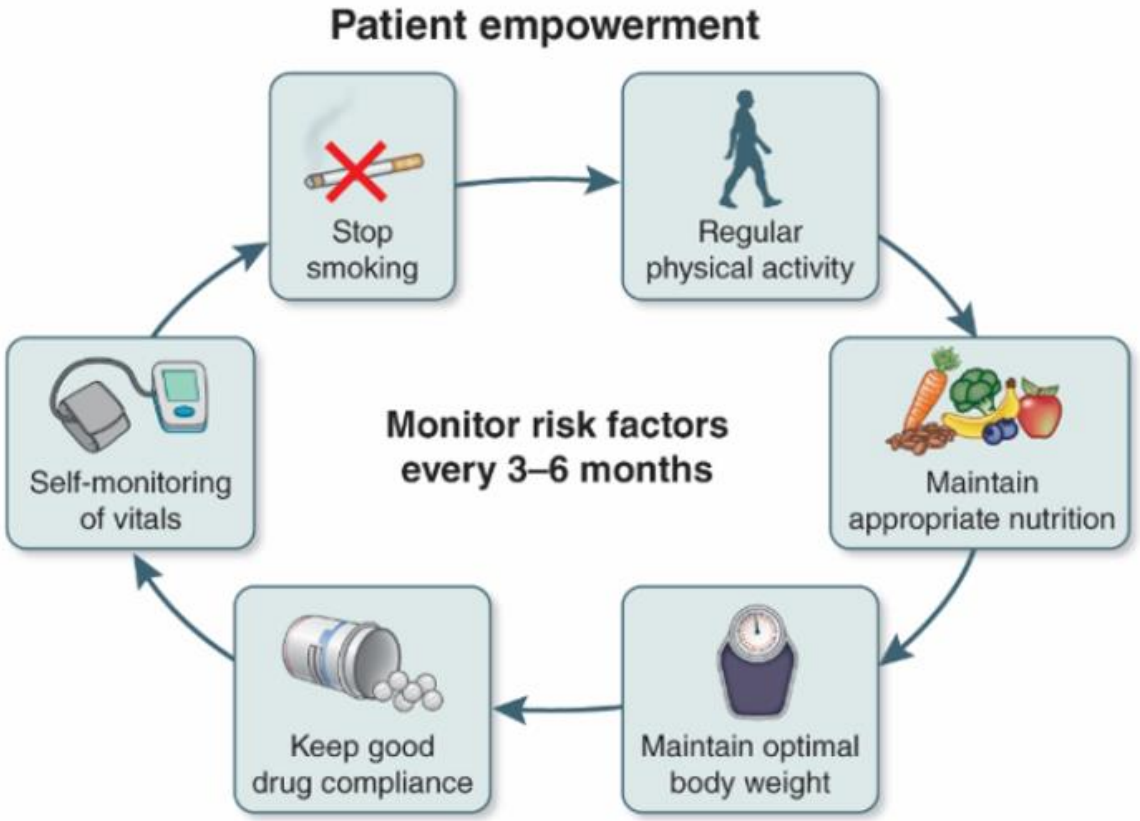
Patterns of Telemedicine Use and Glycemic Outcomes of Endocrinology Care for Patients With Type 2 Diabetes

From data-driven care to patient empowerment

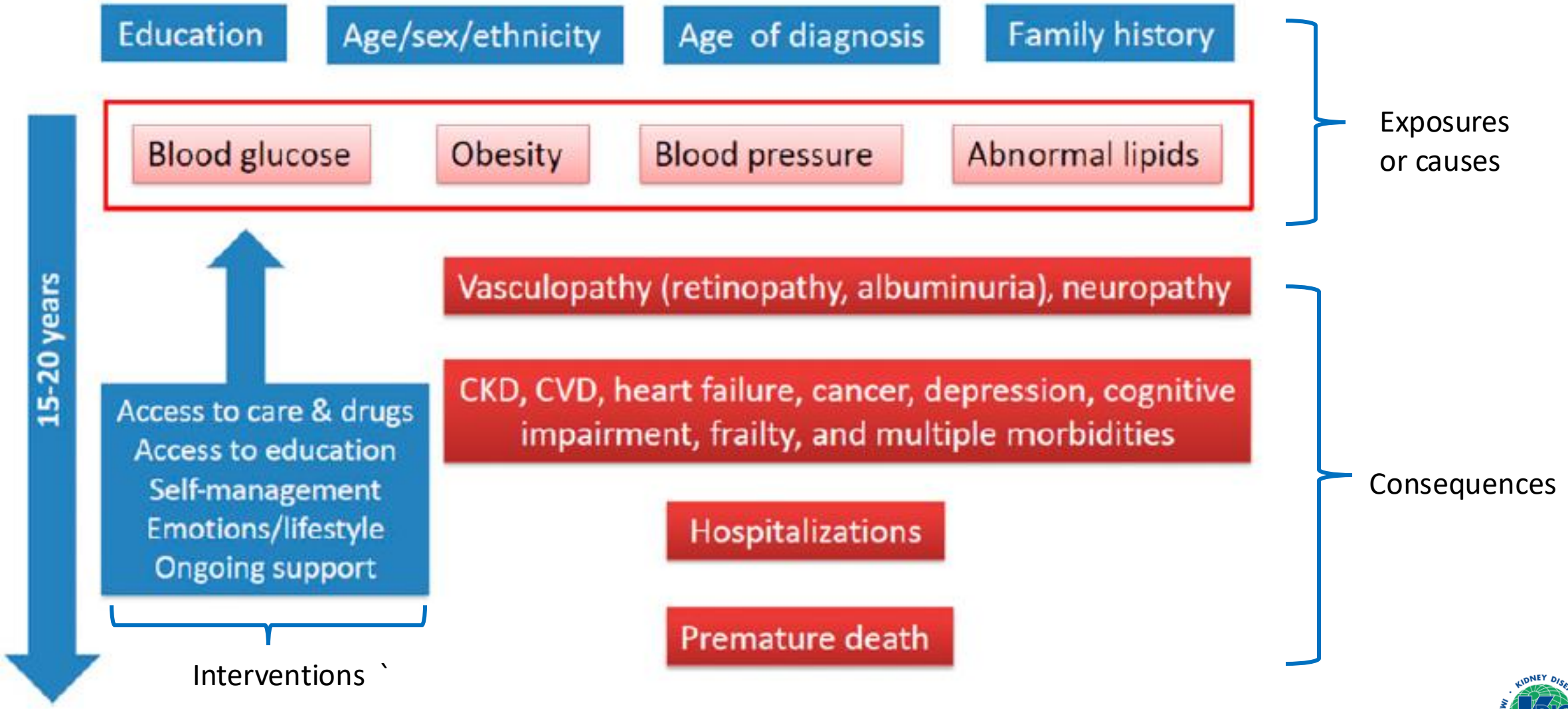


Li P et al KI Report 2025

Kidney Disease: Improving Global Outcomes Summit Recommendations on Implementation of Diabetes Management in CKD: From Primary to Data-Driven Collaborative Care



Heterogeneity of causes, trajectories and consequences of diabetes
Modifiable versus non-modifiable risk factors



Chan JC et al Diabetes Care 2019

1995: Set up of the Hong Kong Diabetes Register

Using team, protocol and workflow to implement structured assessment (eye/feet/blood/urine and PROMs) for quality improvement and identifying unmet needs

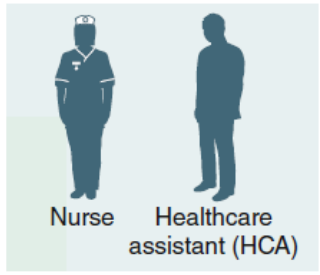
Variables of Exposures	Outcomes from administrative databases				Purposely built and well-executed registers				
Age / sex									
Age of diagnosis									
Family history									
BMI/waist									
Smoking									
Blood pressure									
Lipids									
A1C									
Renal function									
Drugs									
Self care									
Education									
ICD codes									

Chan JC et al TLRHWP 2025

A 30-year case study of local implementation of global guidelines for data-driven diabetes management starting with the Hong Kong Diabetes Register

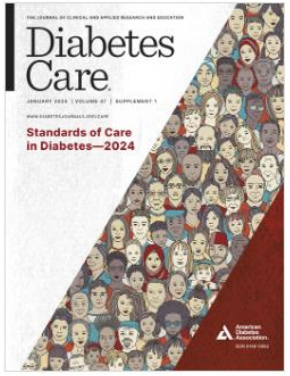
Primary roles of doctors:
- Make diagnosis and clinical decisions, and monitor progress
- Prescribe medications
- Refer for education
- Refer for assessment
- Provide on-job training
- Support nurses/HCA

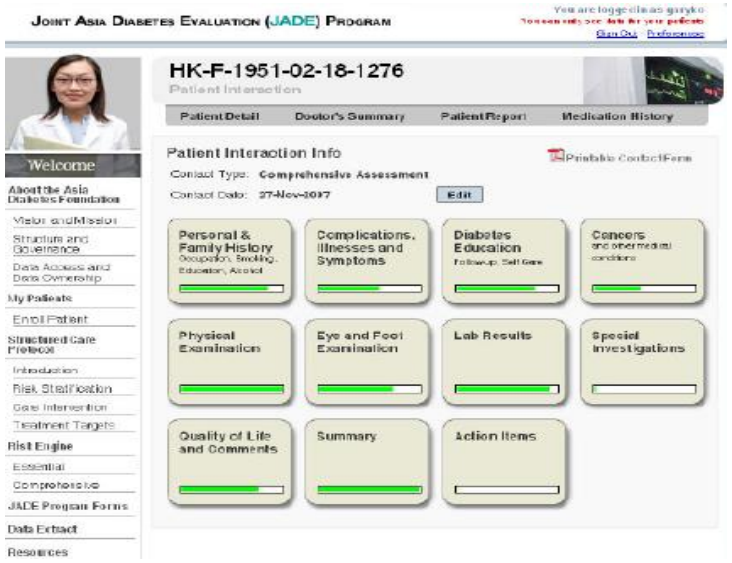
Transform the setting of a busy clinic to a risk assessment unit

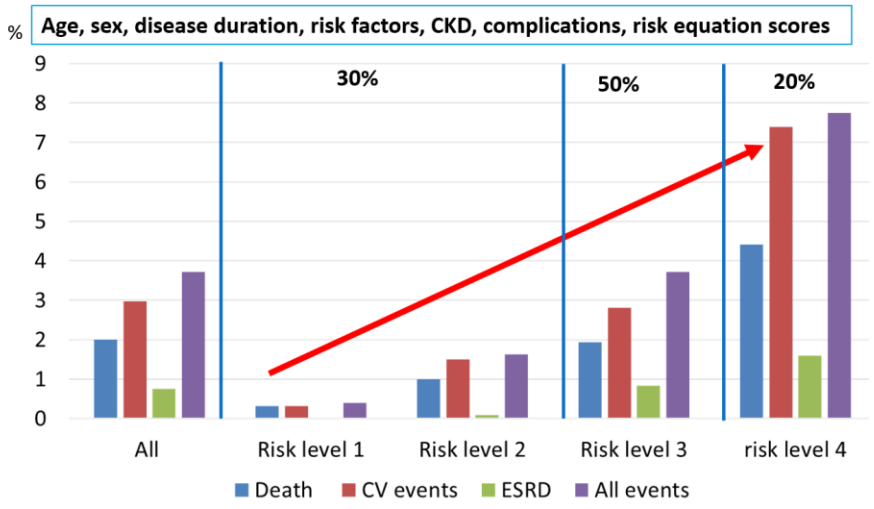


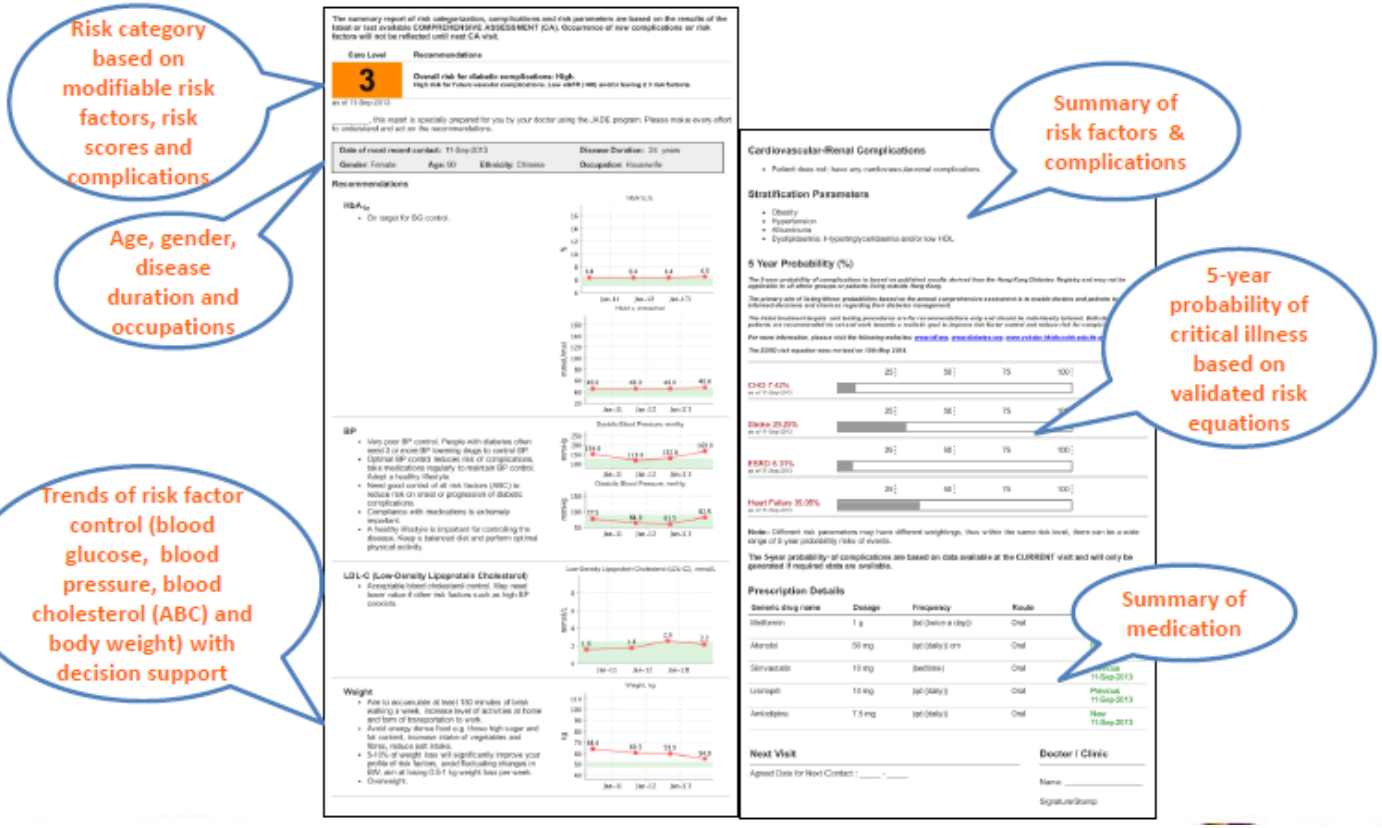
Basic requirements of a risk assessment unit:
- Small room and simple tools, e.g. monofilament, tuning fork, Snellen chart
- Office equipment, e.g. computer, printer
- Pre-booking and patient instructions
- Case report forms to guide history-taking and structured clinical assessment including collection of blood and urine samples, and eye* and feet* examination

2007: Joint Asia Diabetes Evaluation (JADE) Technology/Platform
A webapp-based quality improvement program with built-in HKDR protocol for data gathering, analytics, visualisation and reporting with decision support





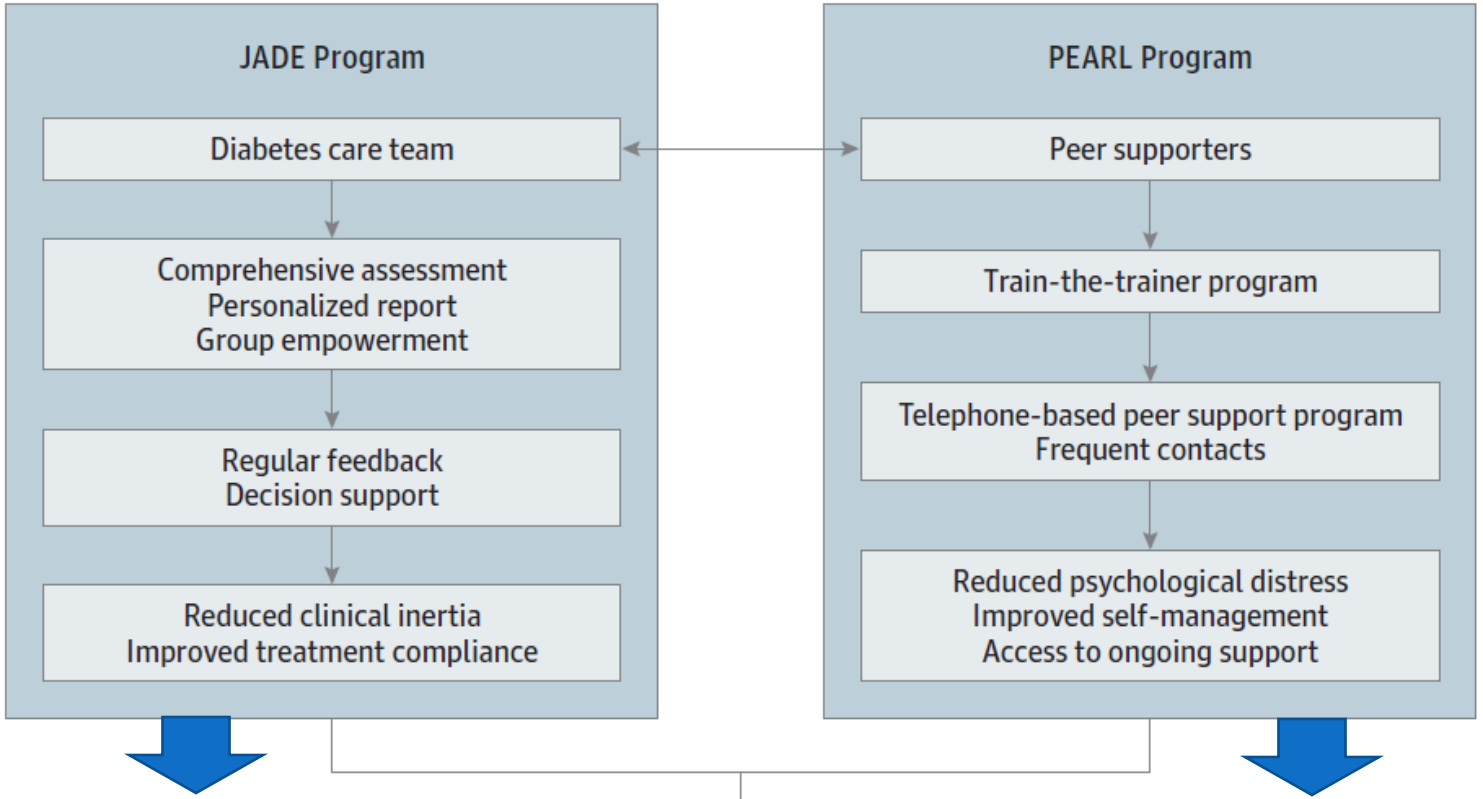




Ko G et al BMC medical informatics and decision making 2010
Chan JC et al JAMA Int Med 2014
Chan JC et al Diabetes Care 2019

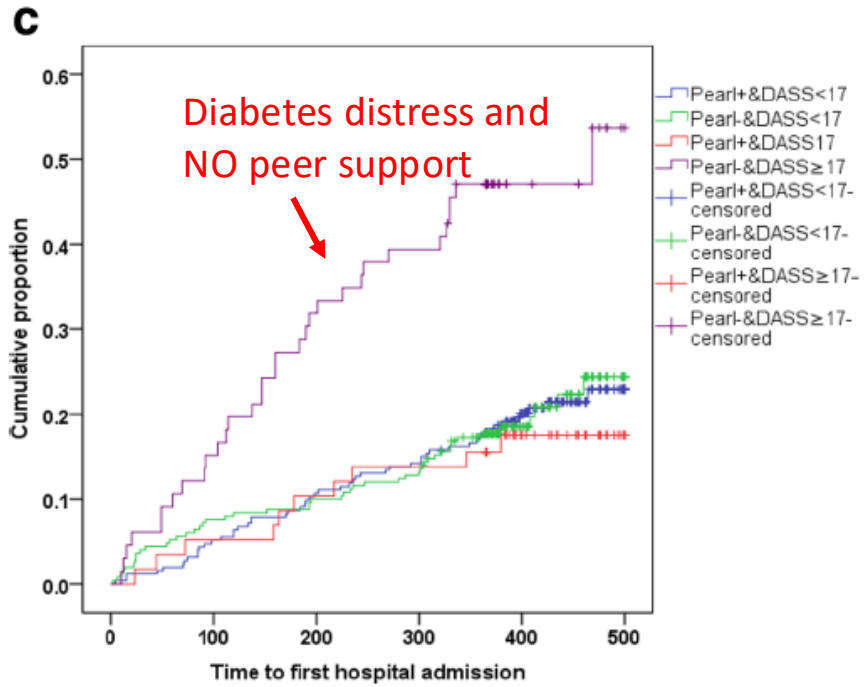
>300 HCPs from 11 countries/areas in Asia enrolling >120,000 patients with T2D along with staff training and creation of a JADE Register with RWE

JADE (IT-enabled) and PEARL (peer support) program: high tech soft touch



- Better health literacy
- Better self care
- Better risk factor control
- Better adherence
- Less distress
- Increased use of RASi/statin

- Reduced hospitalization in those with severe emotional distress



Average 15 calls per person
In the peer support group

Chan JC et al JAMA IM 2014
Yeung R et al Clinical Diabetes Endocrinol 2018

1-year JADE-augmented care delivered by a doctor-nurse team improved attainment of multiple treatment targets in patients with CKD and T2D

JAMA Network Open

RCT: Effect of a Web-Based Management Guide on Risk Factors in Patients With Type 2 Diabetes and Diabetic Kidney Disease

POPULATION

1267 Men, 1126 Women

Adults with type 2 diabetes and diabetic kidney disease

Mean age, 67.7 y

SETTINGS / LOCATIONS

13 Hospital-based diabetes centers, 8 countries or regions

INTERVENTION

2393 Patients randomized and analyzed

795 Usual care (UC)
Joint Asia Diabetes Evaluation (JADE) technology-guided structured assessment

802 Empowered care (EC)
UC, a personalized JADE report, and 3 monthly nurse telephone calls

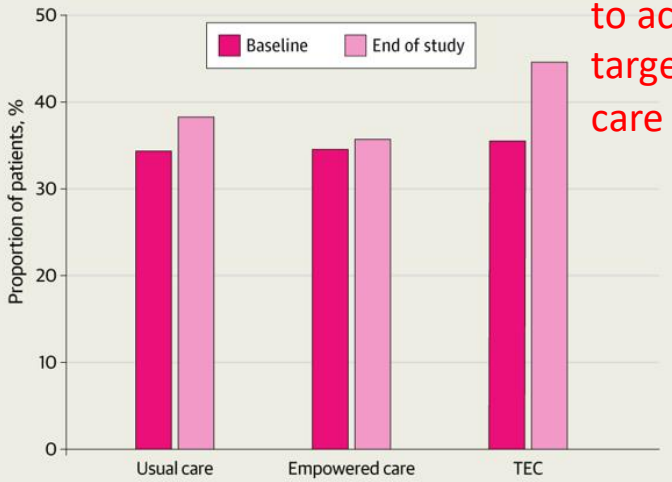
796 Team-based empowered care (TEC)
EC care and 3 monthly face-to-face reviews by a physician-nurse team

PRIMARY OUTCOME

Proportion of patients treated to multiple targets at 12 mo, defined as ≥3 targets: $HbA1_c$ <7%, blood pressure <130/80 mm Hg, LDL-cholesterol level <1.8 mmol/L, triglyceride level <1.7 mmol/L and/or persistent use of renin angiotensin system inhibitors

FINDINGS

The TEC group was more likely to attain ≥3 treatment targets than either the UC or EC groups



25%↑likelihood to achieve ABC targets vs usual care

TEC vs UC: RR, 1.17 (95% CI, 1.00-1.37); *P* = .04
EC vs UC: RR, 0.94 (95% CI, 0.79-1.11); *P* = .45
TEC vs EC: RR, 1.25 (95% CI, 1.06-1.48); *P* = .007

Chan JC et al JAMA Network Open 2022

Highlighted in https://openminds.com/

From register to outcome models to precision care and real-world evidence

Development cohort

Hong Kong Diabetes Register (HKDR)

- *n* = 21,453
- two public hospital diabetes clinics
- median follow-up = 7.9 years
- 166,433 patient-years
- <5% missing data

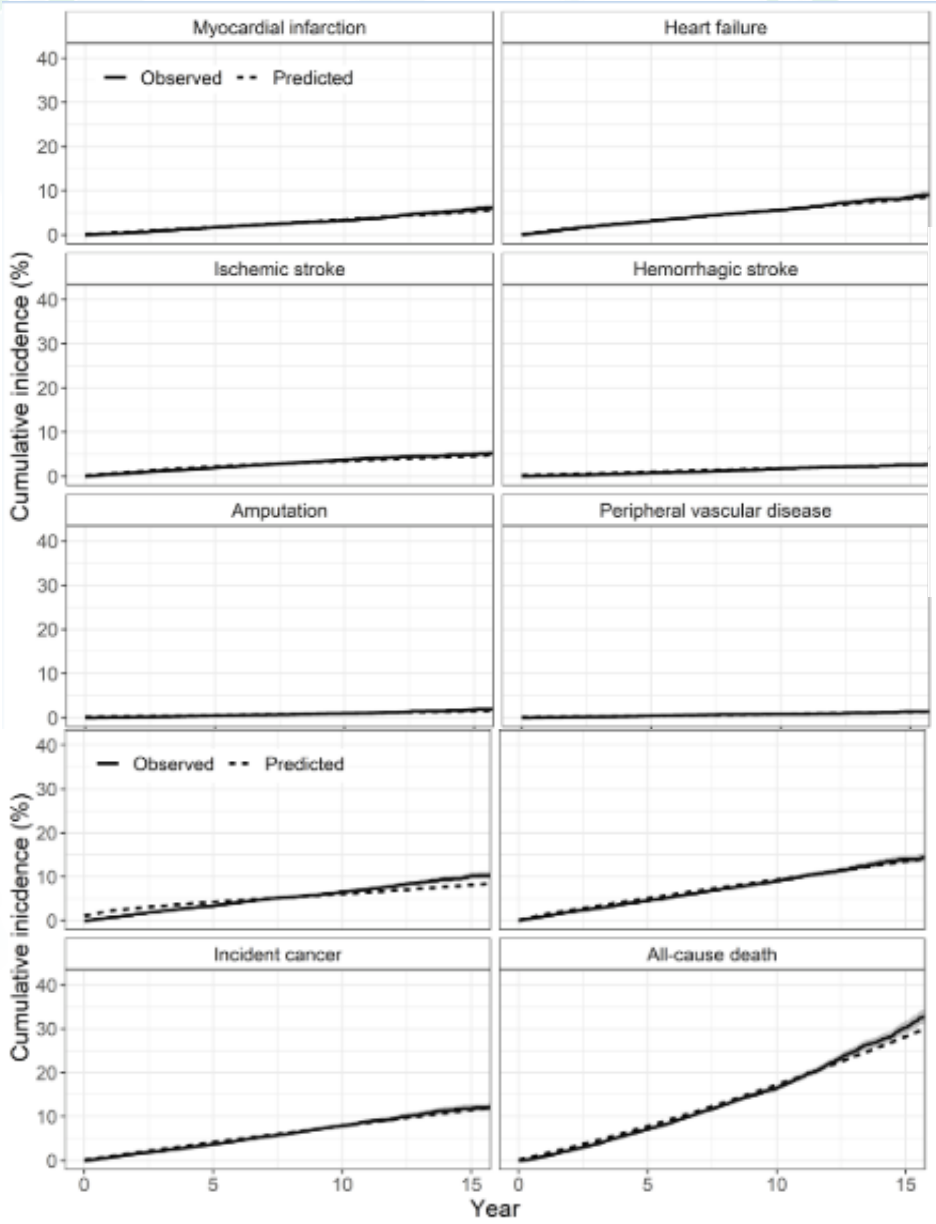
Validation cohort

Hong Kong territory-wide cohort

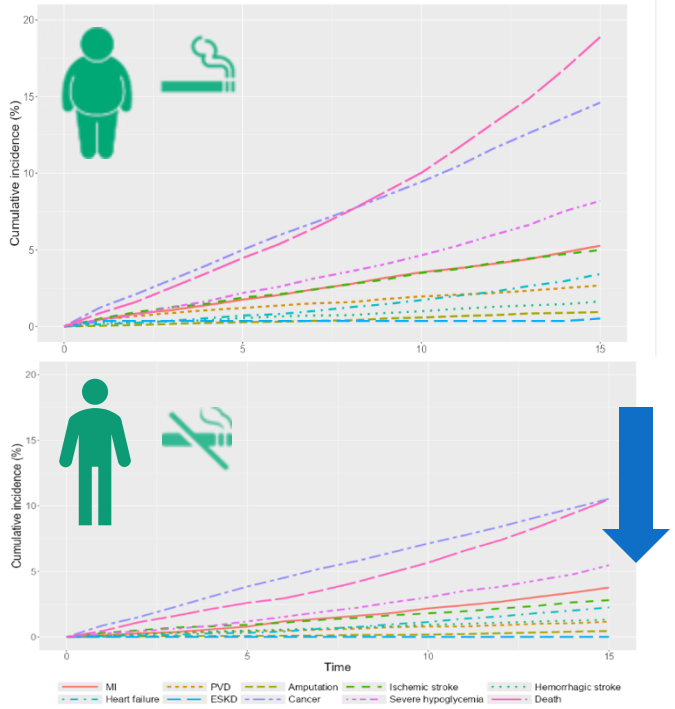
- *n* = 176,120
- all Hong Kong public diabetes clinics
- median follow-up = 7.2 years
- 953,523 patient-years

Lau E et al Diabetes Care 2025

Observed and predicted rates of 10 outcomes



- Male, smoker, 53.9 years old
- 2 years of diabetes
- BMI 29.4 kg/m^2 Waist 98 cm
- BP 146/94 mmHg
- LDL-C 3.85; HDL-C 1.1 mmol/L
- TG 1.2 mmol/L.
- HbA1c 7.4%, Hb 14.7 g/dL
- uACR 2.2 mg/mmoL
- eGFR 103 mL/min/1.73m^2

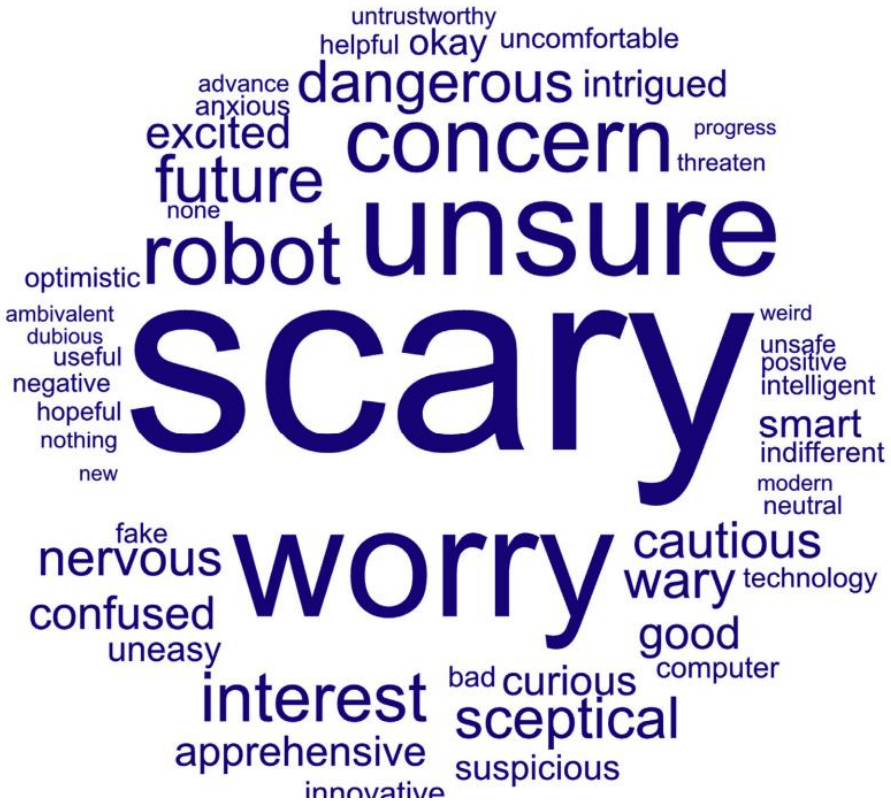


- Quit smoking
- 5% reduction in CKM risk factors
  - LDL-C 1.8 mmol/L,
  - BMI 27.9 kg/m2
  - Waist 93.1 cm
  - BP 130/80 mmHg
  - HbA1c 7%

Patient's perspectives

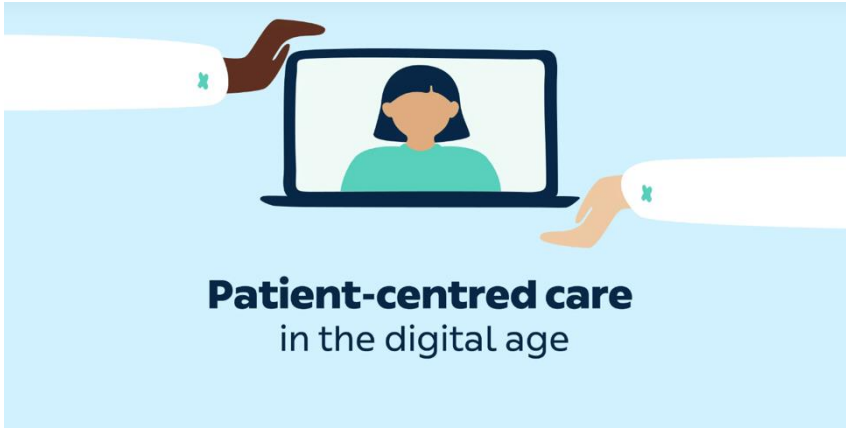
Artificial intelligence: The good, the bad and the beautifiable. A patient's view

Marlene Winfield, OBE*



At a time of increasing cyber-attacks on vital systems including healthcare, cybersecurity should be given a visibly high priority in the government's security activities. Great care must be taken to eliminate, as far as possible, bias and discrimination in AI decision-making and to help me understand the basis on which decisions are made about me. The old garbage in / garbage out adage should be taken seriously.

Too often in recent times we have shown ourselves to be under-prepared for problems like pandemics, droughts, floods, energy supply issues and IT outages. I would like to feel confident that there is sufficient forethought and action to prepare for the impacts – good and bad – that our increasing dependence on AI will have on our society and on health and social care delivery.



Importance of doctor-patient relationship

- US nationally-representative sample of 5,842 adults
- high trust for health information
  - Doctors (95%)
  - Scientists (84%)
  - Government health agencies (70%)
  - Social media (18%)
- Less trust with uncertainty or conflicts amongst experts
- Clear, consistent and transparent information

Arch G. Mainous III et al Frontiers in Medicine 2024

Evidence, clinical competency and human touch enabled by AI will help patients make the right decision at the right time for the right intervention with the right support

https://catalyst.nejm.org/doi/full/10.1056/CAT.17.0559

Conclusion

- CKD is silent, progressive and complex with genetic, modifiable and non-modifiable risk factors
- Clinical inertia, poor adherence and health illiteracy are key barriers to achieve positive outcomes
- CKD is preventable and treatable through early detection, intervention and engagement
- Systematic personalized data collection with feedback to patients, care providers and payors align patient-centered decision-making
- Improving practice environment with task delegation to set up registers (and biobanks) will close gaps in prevention, care, data and professional knowledge
- Well-designed and executed registers create high quality data for machine learning to generate algorithms and models to drive actions using communication and information technology for personalized care with value and precision