USING A WEB-BASED PLATFORM TO DRIVE COMPREHENSIVE DIABETES CARE MODEL - LESSONS LEARNT FROM THE JADE PROGRAM AND THE RAMP-DM PROGRAM

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Diabetes care: challenges and strategies

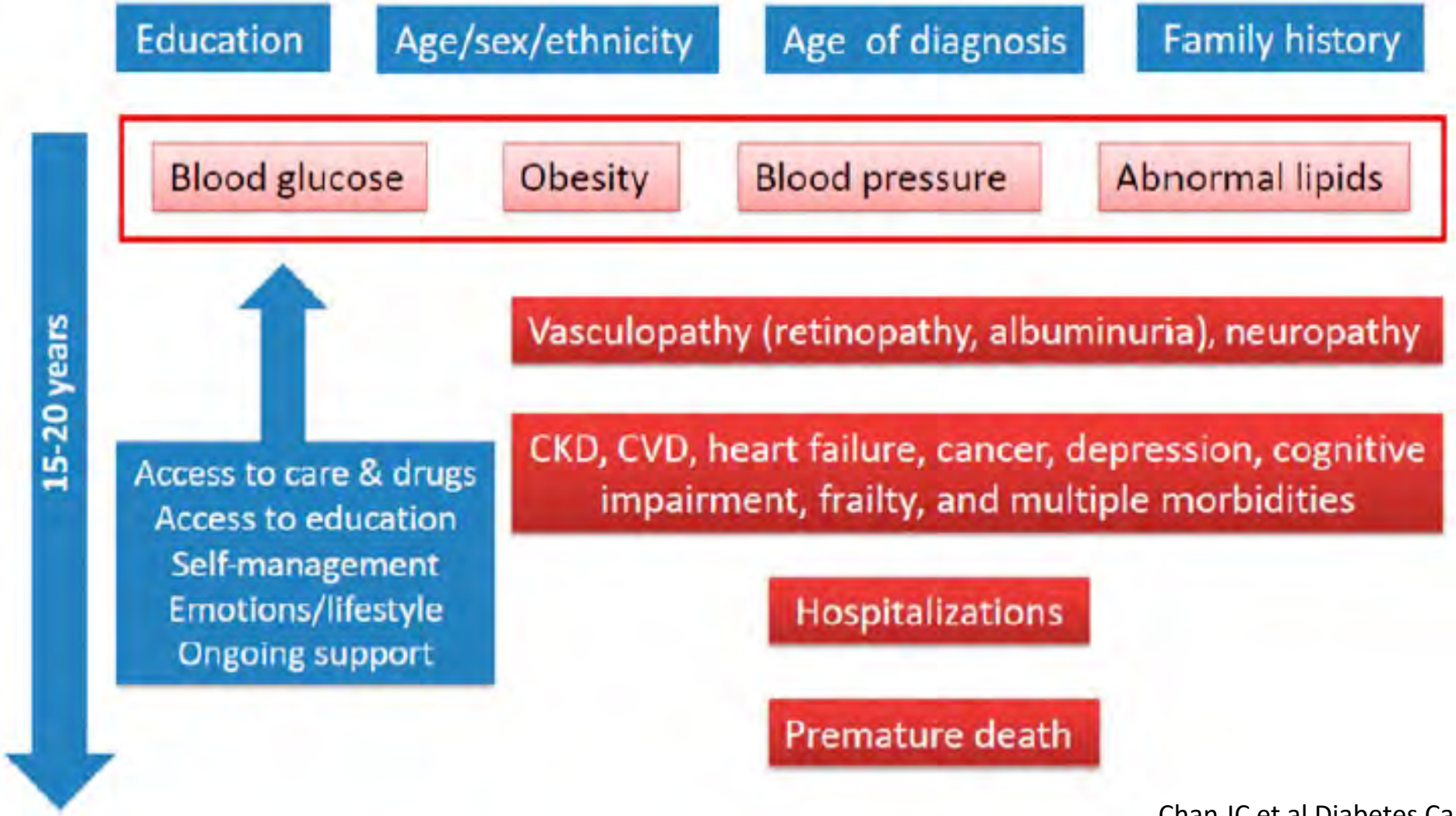
- Silent disease
- Complex protocol
- Clinical inertia
- Poor adherence
- Frequent relapse
- Psychosocial stress

- Early detection
- Team-based care
- Risk assessment
- Decision support
- Feedback and self efficacy
- Ongoing support

Key questions for physicians

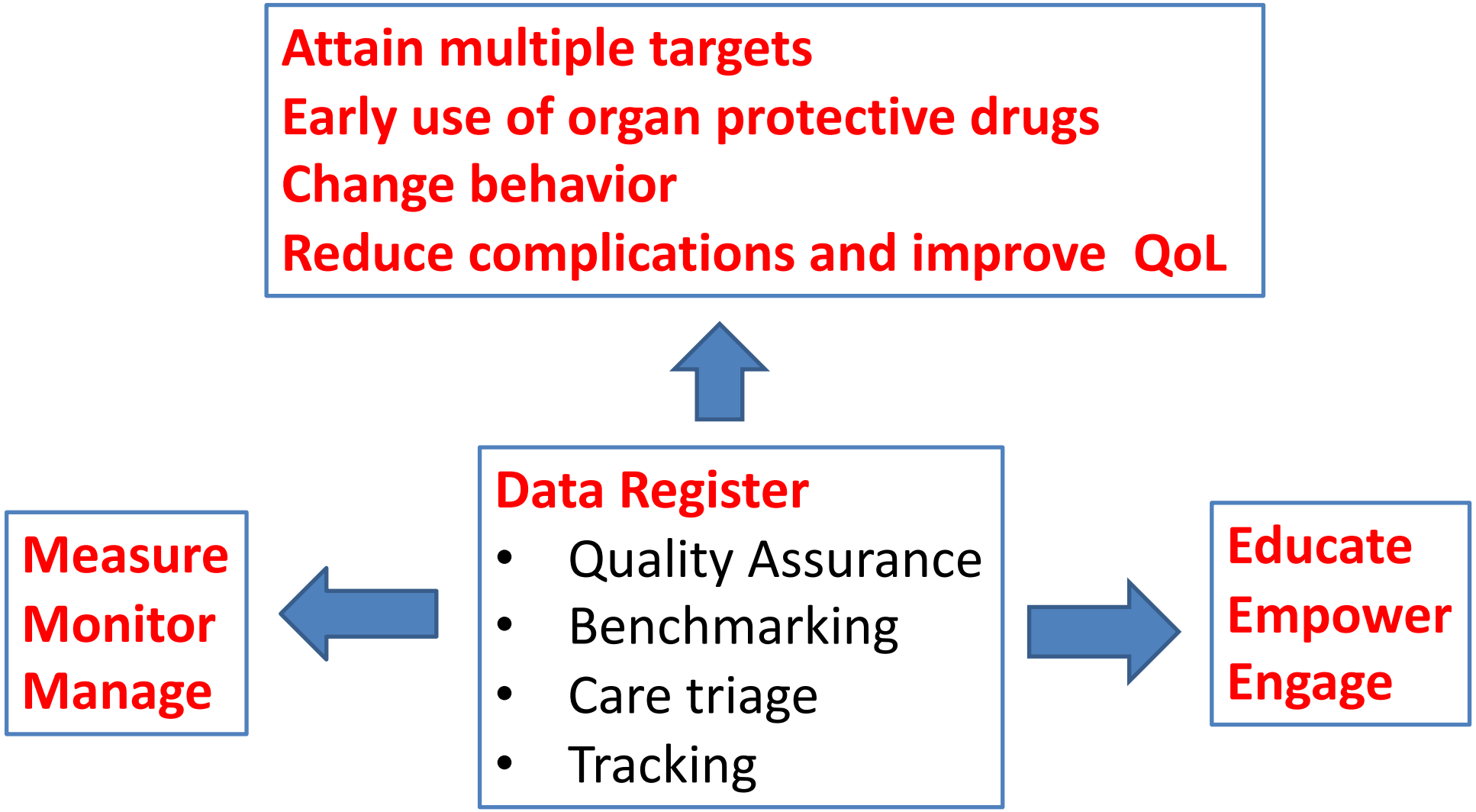
How can we treat to multiple targets?
How can we motivate behavioral change?
How can we identify unmet needs?
How can we measure our performance?
How can we diagnose patients early?
How can we prevent diabetes early?

A diabetes journey: modifiable versus non-modifiable risk factors and consequences

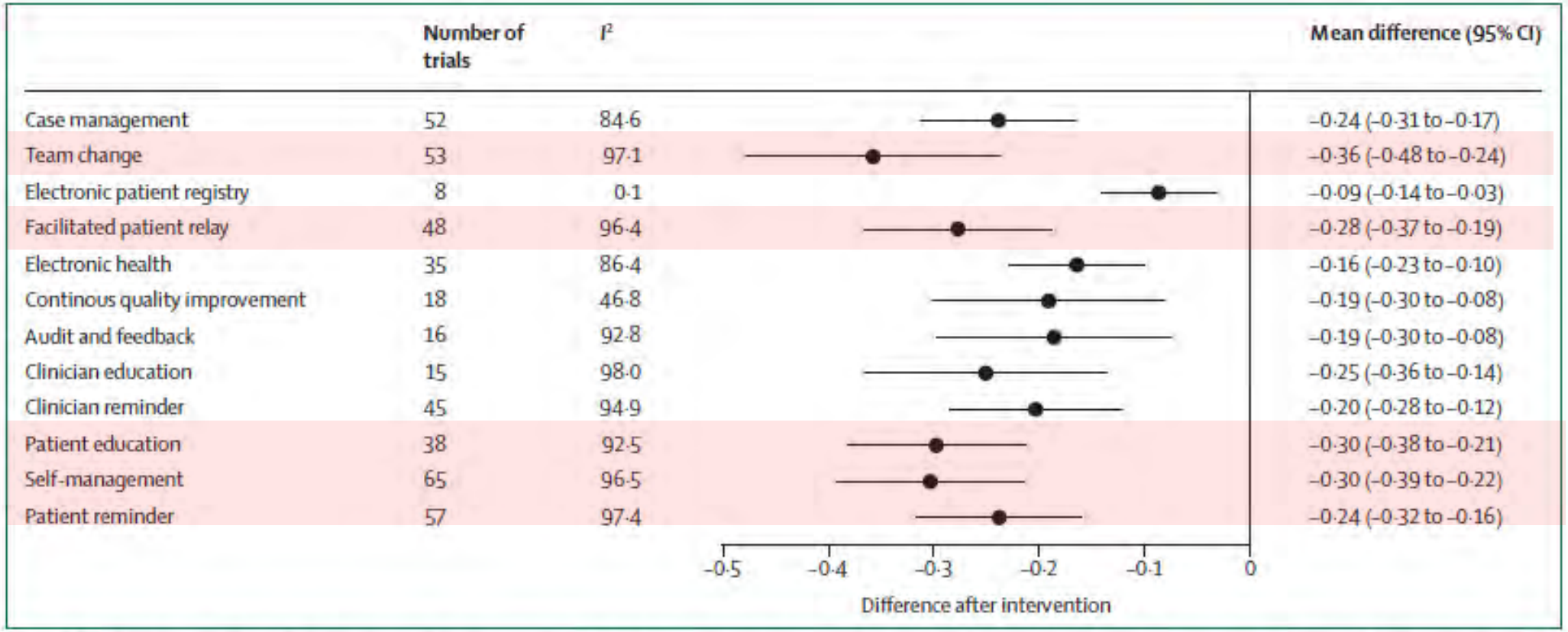


Chan JC et al Diabetes Care 2019

Data-driven multicomponent integrated care model



Meta-analysis of QI initiatives: largest effect size on A1c, BP, LDL-C with task delegation, self-care, provider-patient communication



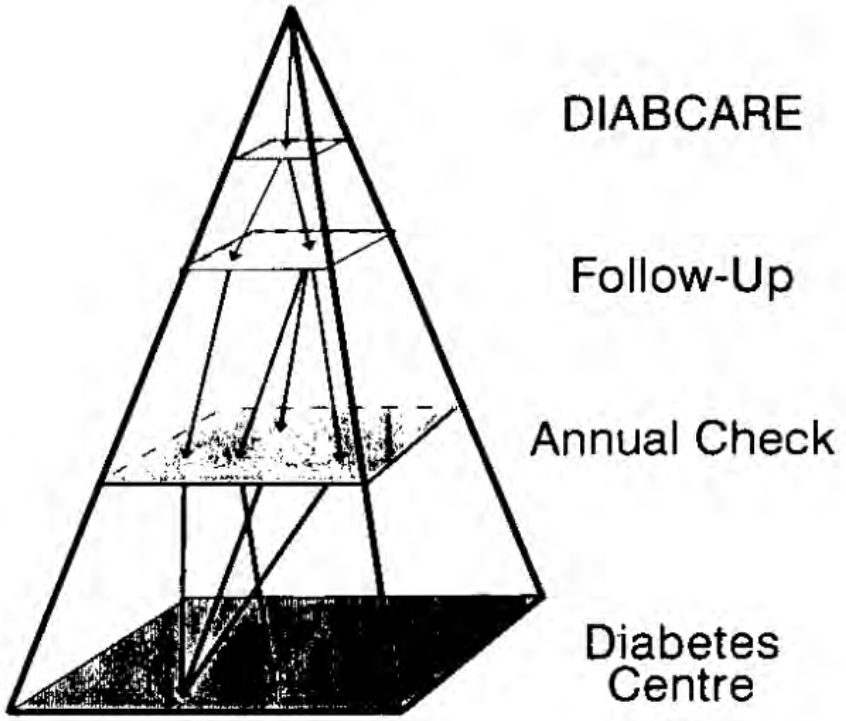
Lim LL et al Diabetes Care 2018
Chan JC et Lancet 2020

International Diabetes Federation (IDF) St Vincent Declaration

DM WORKING PARTY REPORT

Monitoring the Targets of the St Vincent Declaration and the Implementation of Quality Management in Diabetes Care: the DIABCARE Initiative

K. Piwernetz, P.D. Home, O. Snorgaard, M. Antsiferov, K. Staehr-Johansen, M. Krans, for the DIABCARE Monitoring Group of the St Vincent Declaration Steering Committee



Piwernetz K et al Diabetic Med 1993

1993: Reform diabetes care by integrating research and practice using diabetes centre as the action point

Delivery of Diabetes Care — The Experience at the Prince of Wales Hospital

Juliana CHAN, Maggie LAU, Rebecca WONG, C. C. CHOW, Vincent YEUNG, Ku-man LOO, Maggie MONG, Teresa YEUN, G. T. C. KO, K. Y. LI, W. Y. SO, W. B. CHAN, Kevin YU, C. S. COCKRAM

Prince of Wales Hospital

1993 Rebecca Wong
Visit to Joslin Clinic, NIDDK, UCSF

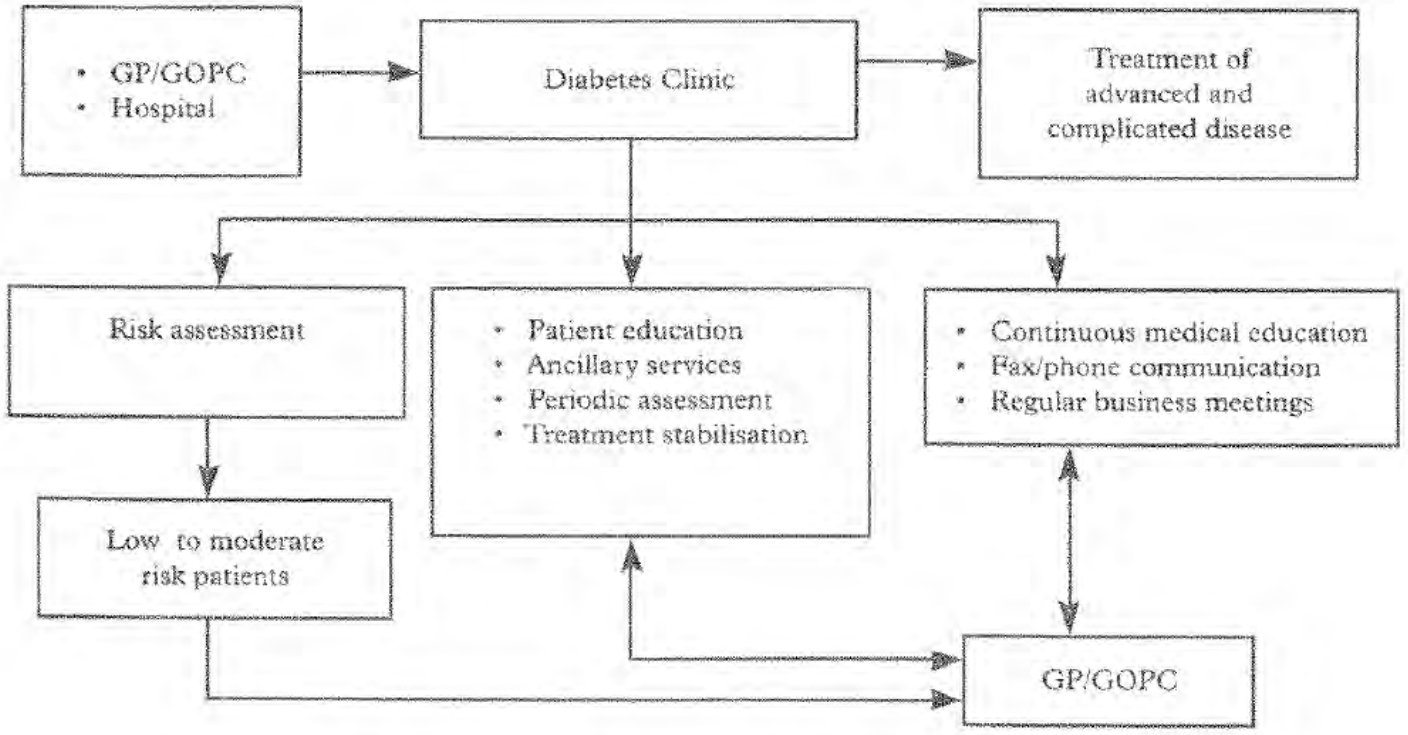


Figure 1. Summary of the PWH shared care programme

Chan JC et al HA Quality Bulletin Vol 2 No 2 page 3-21

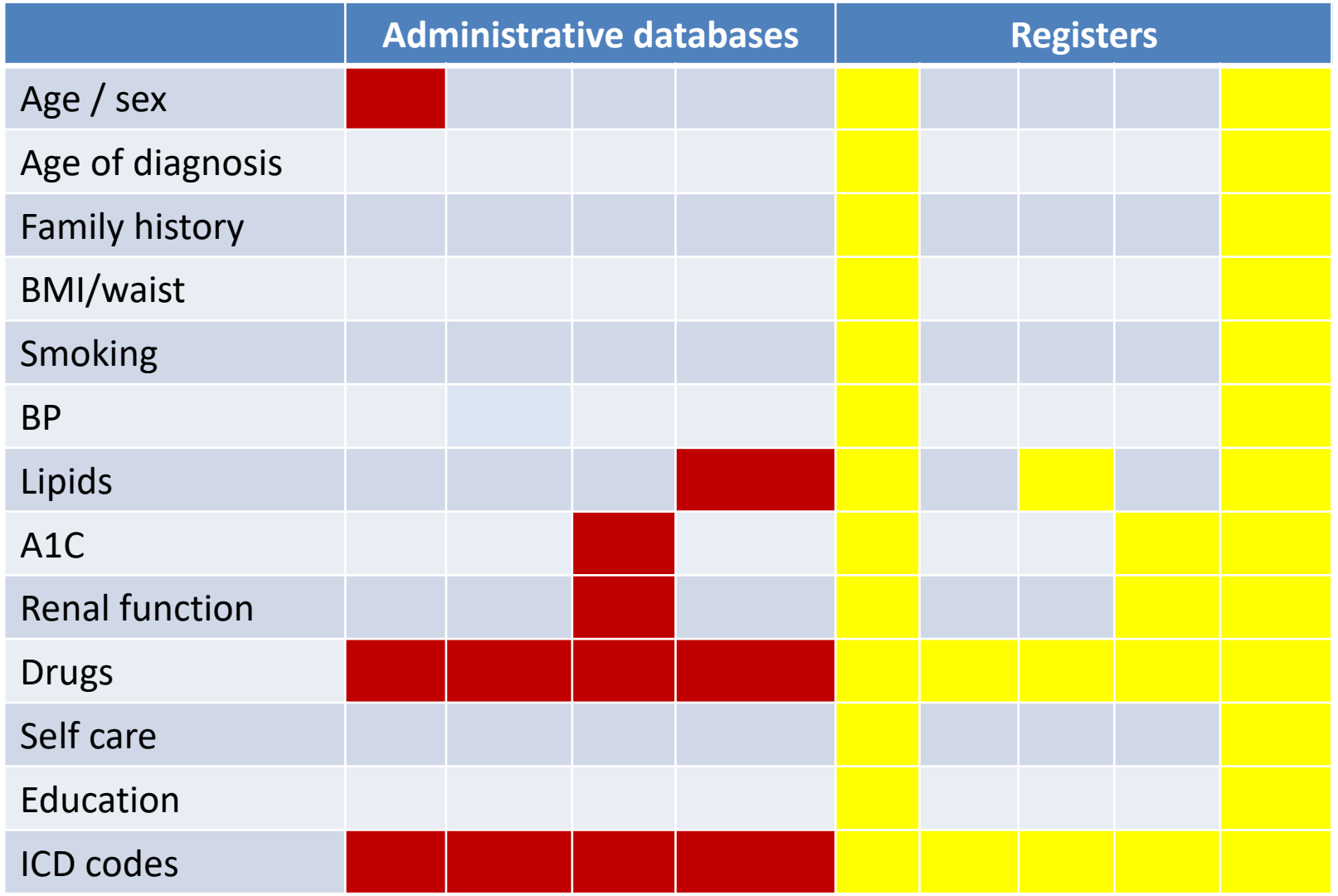
Change setting, design protocol, use case report form and train a trio team (nurse, HCA and clerk) to set up the Hong Kong Diabetes Register (HKDR)

PRINCE OF WALES HOSPITAL (PWH) DIABETES AND ENDOCRINE CENTRE (DMEC)
DIABETES ASSESSMENT

Prince of Wales Hospital Diabetes and Endocrine Centre
Diabetic Complications Assessment

Chan JC et al HA Quality Bulletin Vol 2 No 2 page 3-21

Registers ≠ EMR
Design, implementation, evaluation, impact
Combining practice and data analytics to drive actions



HKDR: Risk equations and factors for CVD, CKD and ESKD in Chinese patients with T2D

- CHD
  - Age
  - Male
  - Current smoking
  - Duration of disease
  - eGFR
  - ACR
  - Non-HDL-C
- Stroke
  - Age
  - HbA1c
  - ACR
  - History of CHD
- Heart failure
  - ACR
  - BMI
  - HbA1c

75-90%
Sensitivity
Specificity

Yang XL et al Am J Cardiol 2008

Yang XL et al Diabetes Care 2007

Yang XL et al Cardiovas Diabetologia 2008

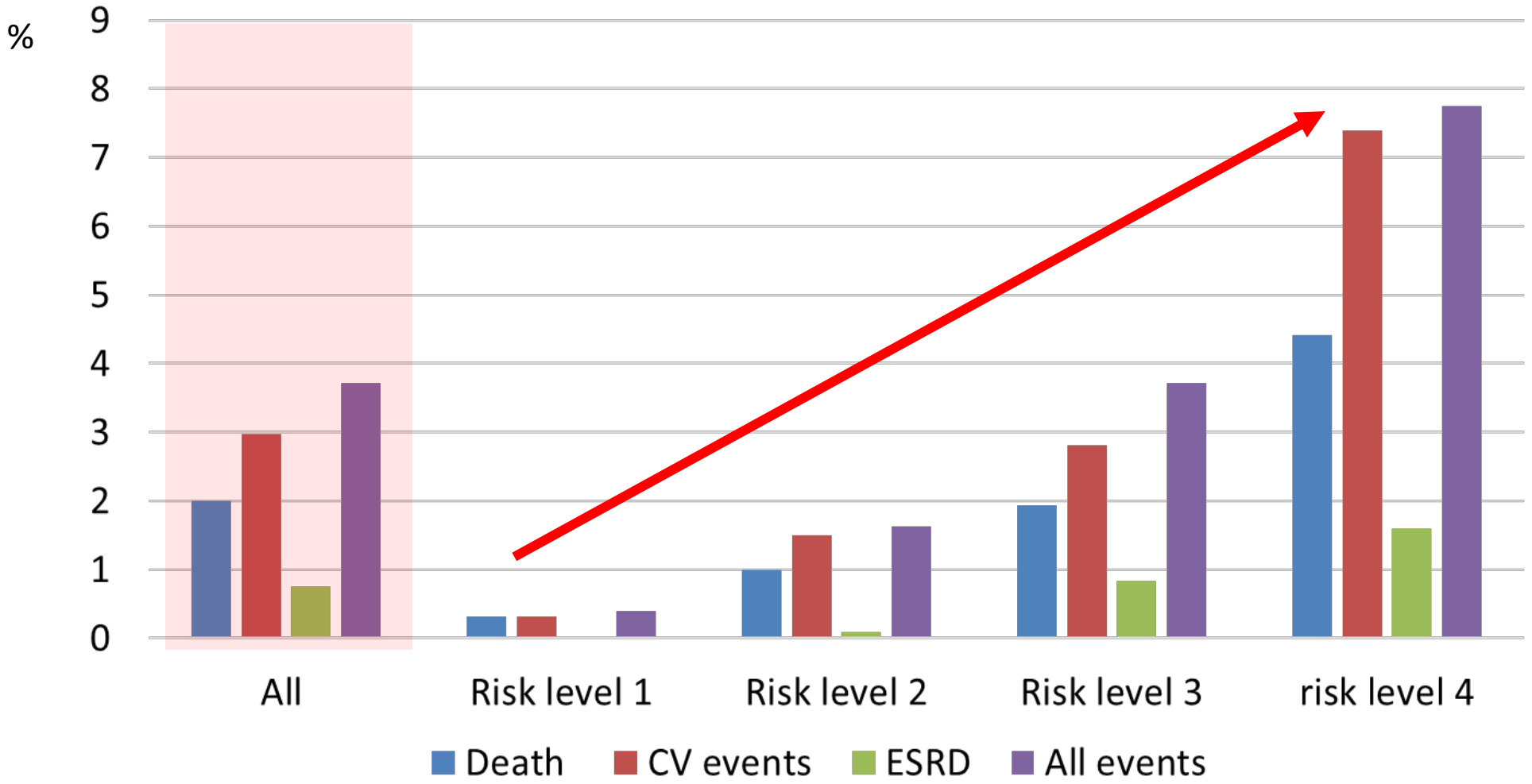
- CKD
  - Age
  - Duration of disease
  - Smoking
  - HbA1c
  - Retinopathy
  - Low BMI
  - eGFR
  - ACR
  - Metabolic syndrome
    - Triglyceride
    - Hypertension
    - High Waist
- ESRD
  - ACR
  - Haematocrit

Luk A et al Diabetes Care 2009

Yang XL et al Diabetologia 2009

Joint Asia Diabetes Evaluation (JADE®) Platform
Risk categories and annual event rate

Age, sex, disease duration, risk factors, CKD (eGFR, ACR) complications, risk scores



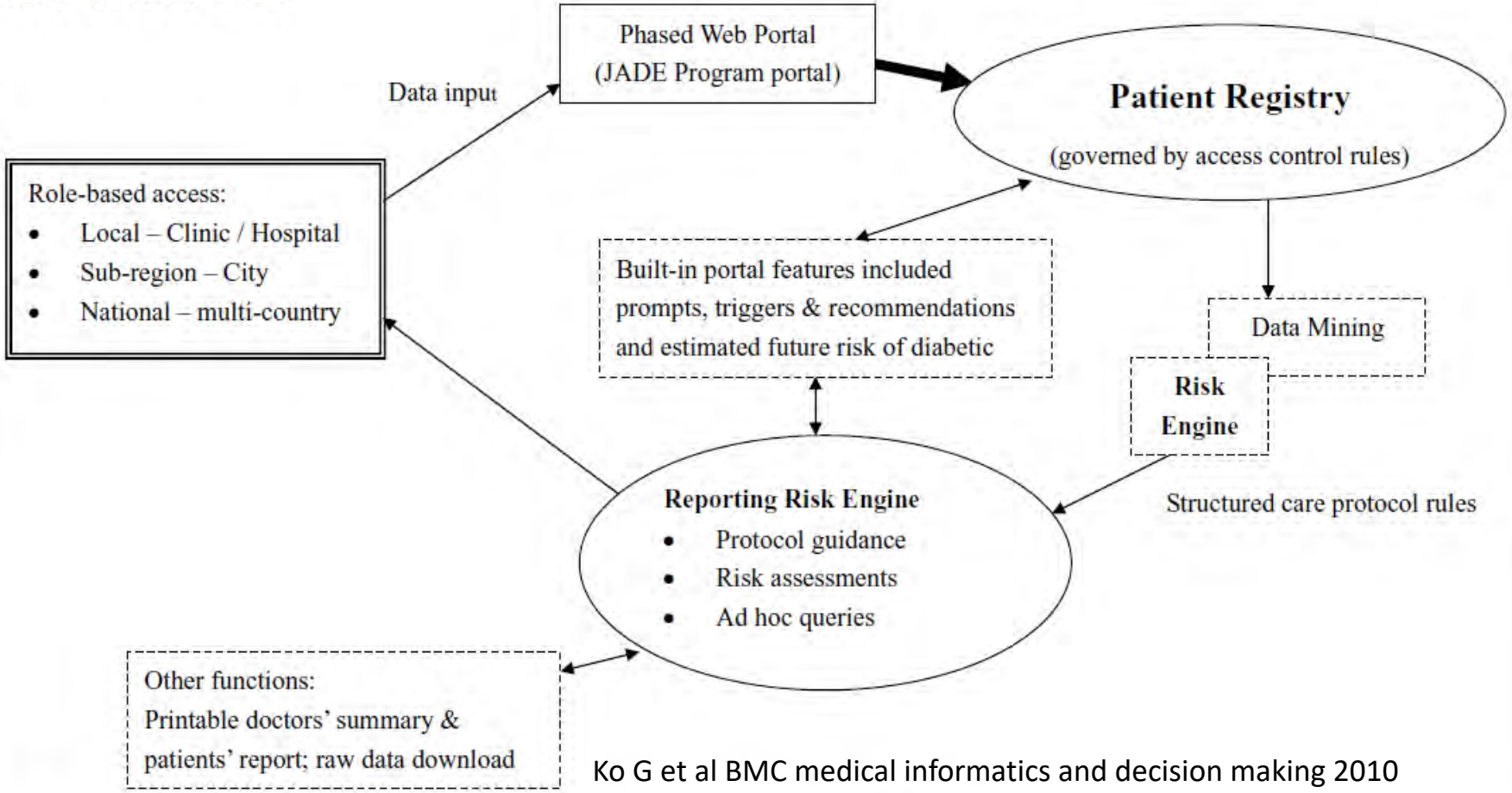
Chan JC et al Diabetic Medicine 2009

Ko et al. BMC Medical Informatics and Decision Making 2010, 10:26
http://www.biomedcentral.com/1472-6947/10/26

BMC
Medical Informatics & Decision Making

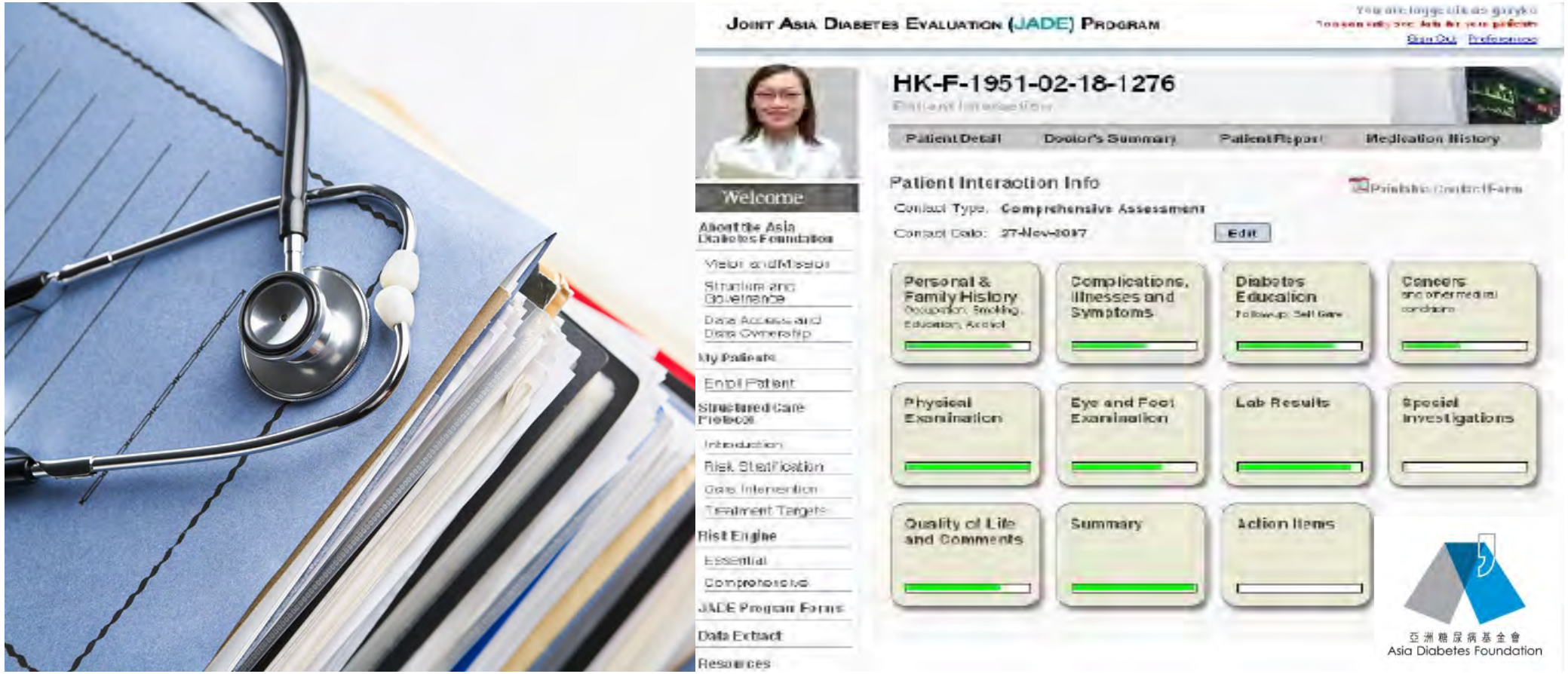
TECHNICAL ADVANCE Open Access

From design to implementation - The Joint Asia Diabetes Evaluation (JADE) program: A descriptive report of an electronic web-based diabetes management program



Ko G et al BMC medical informatics and decision making 2010
Chan JC et al JAMA Int Med 20145

2007: web-based Joint Asia Diabetes Evaluation (JADE®) Technology Digitalization of protocol with data collection, interpretation & visualization

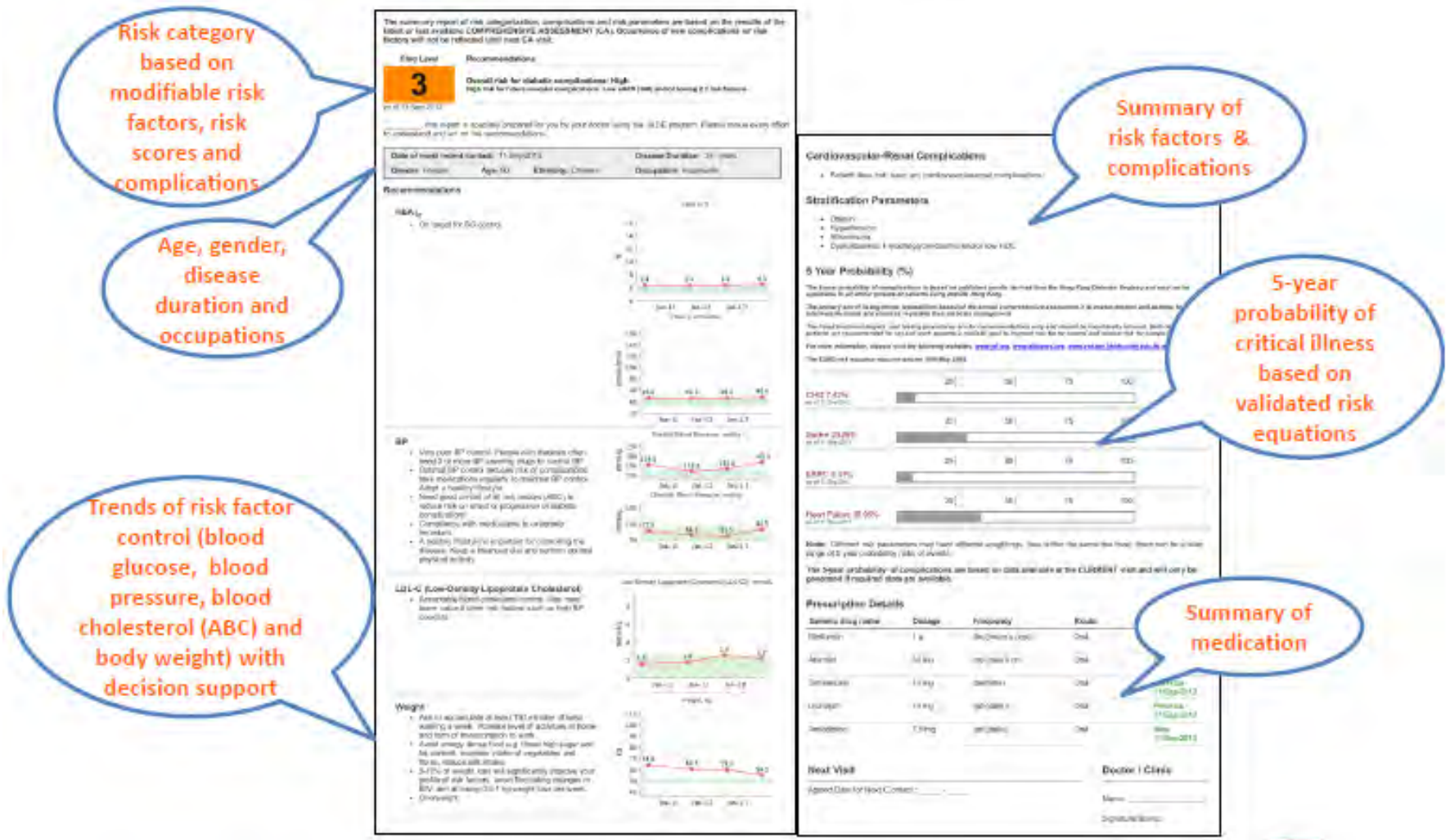


Ko G et al BMC medical informatics and decision making 2010
Chan JC et al JAMA Int Med 20145

Personalized JADE® report complete with risk categories, targets, trends, decision support and risk of future events

Joint Asia Diabetes Evaluation
亞洲糖尿病評估計劃

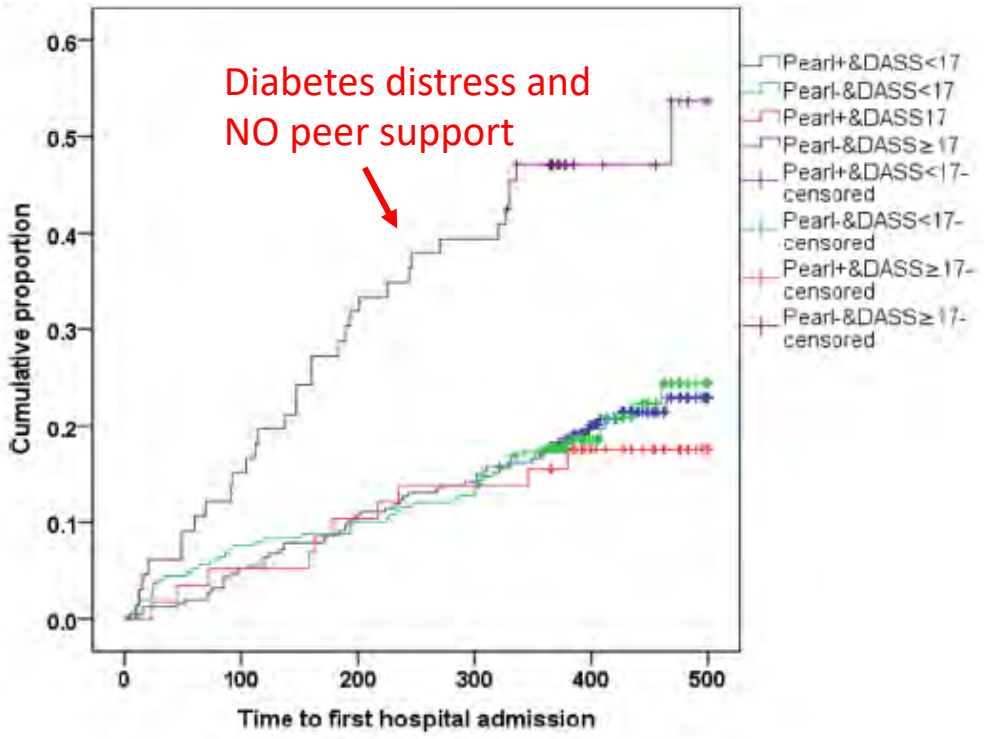
亞洲糖尿病基金會
Asia Diabetes Foundation

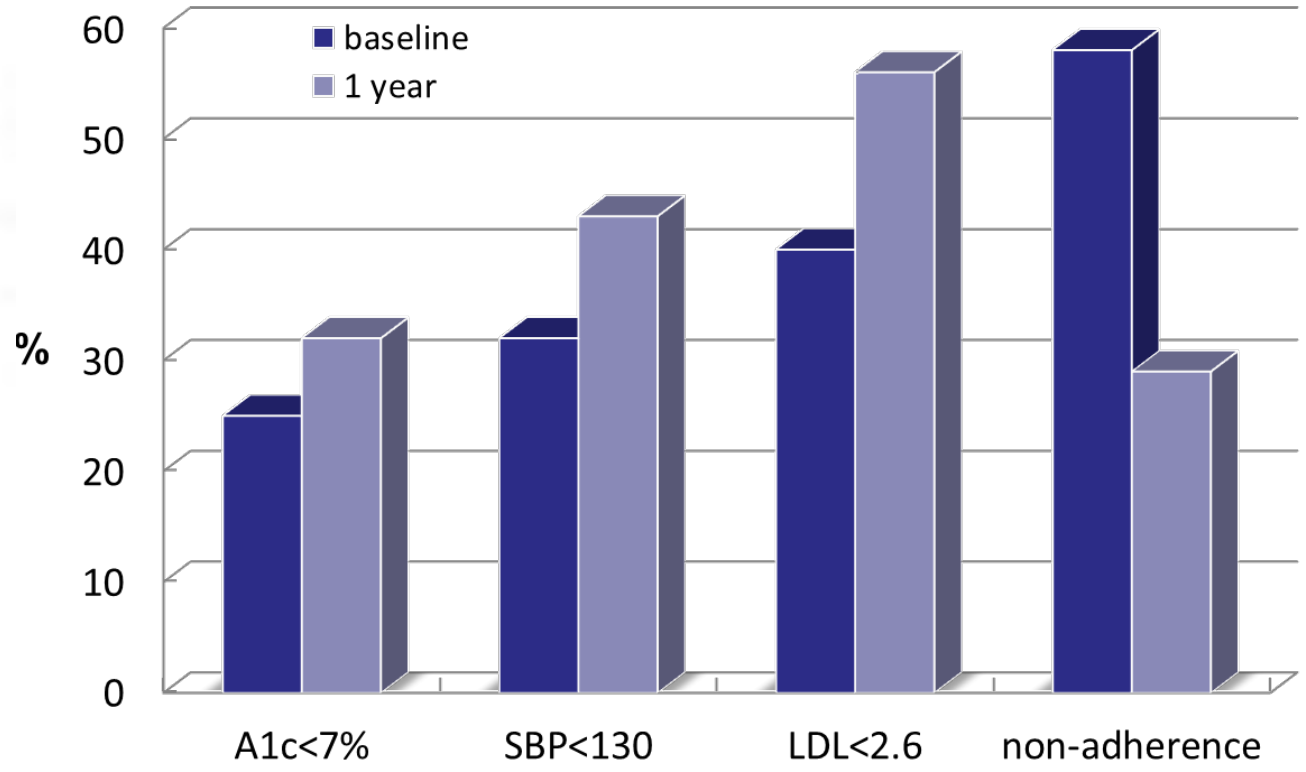


Ko G et al BMC medical informatics and decision making 2010
Chan JC et al JAMA Int Med 20145

JADE® Report: Personalized information reduced clinical inertia, non-adherence and negative emotions

Effects of Telephone-Based Peer Support in Patients With Type 2 Diabetes Mellitus Receiving Integrated Care
A Randomized Clinical Trial

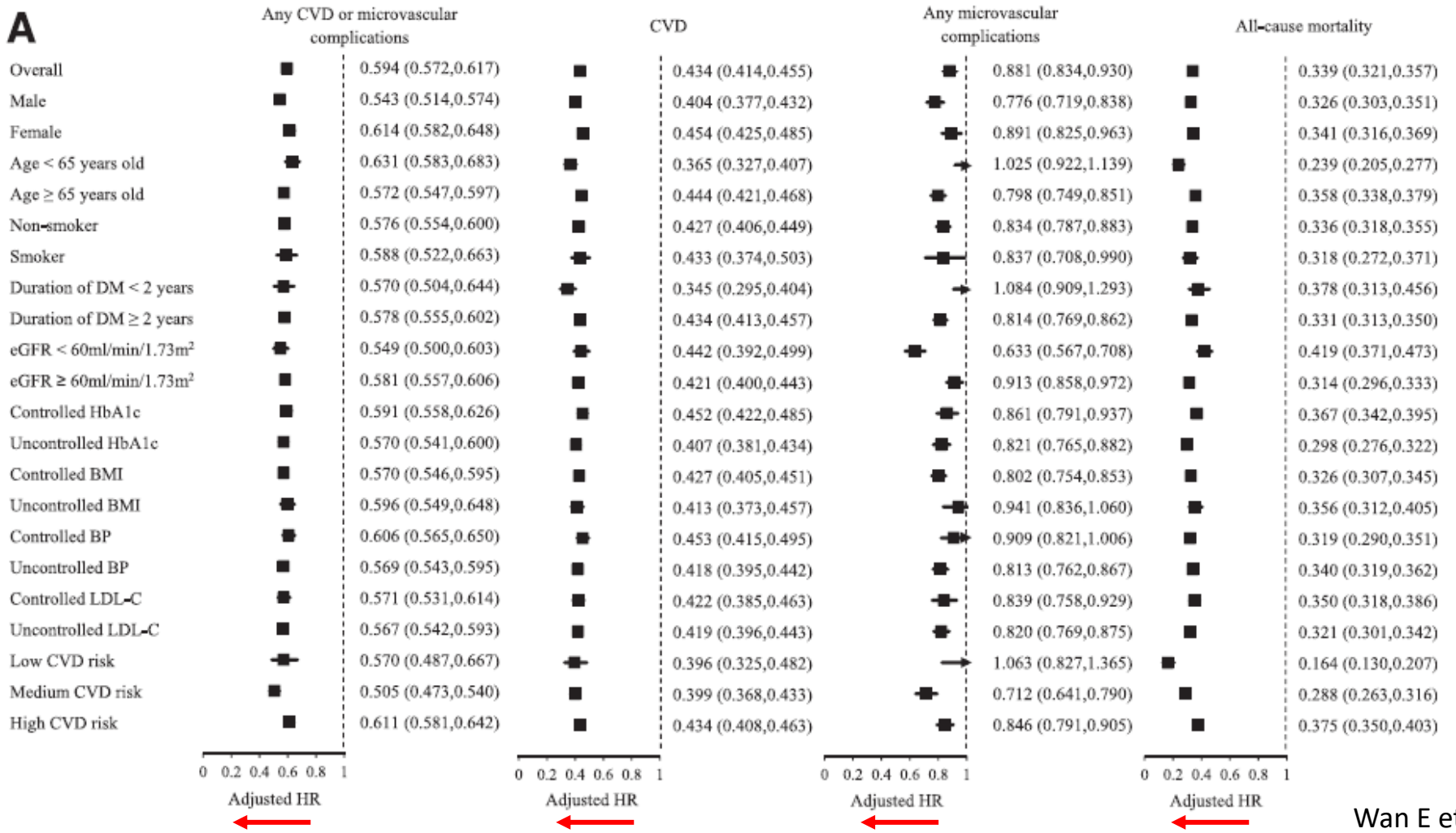




Chan JC et al JAMA IM 2014

2000: A territory-wide Risk Assessment & Management Program (RAMP)

26,718 RAMP vs non-RAMP with propensity score matching in patients with no complications
Age 53, Male 47%; disease duration 7.8 years; median FU 4.5 years



Wan E et al Diabetes Care 2017

7.5 million people, Universal health coverage, 50% doctor in public sector. >500,000 patients exposed to RMP

Public private partnership: Self-funded university-affiliated nurse-coordinated Diabetes Centre supports private doctors reduced all events by 50% versus usual care

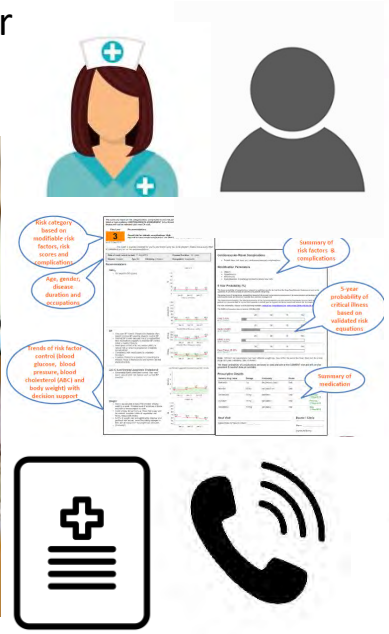
Self-referral

OR

Referred by community doctors

JADE-PPP Group (PPP setting) n=3436

- JADE-guided assessment
- JADE report
- Endocrinologist written comments
- Personalized explanation
- Yearly telephone reminder



Subgroup	Adjusted Hazard Ratio (95% CI)	*P*-value
Any major clinical events		
Non-JADE	1.22 (1.15-1.30)	<0.001
JADE-P	0.70 (0.66-0.75)	<0.001
All-cause death		
Non-JADE	1.12 (0.96-1.29)	0.14
JADE-P	0.69 (0.59-0.80)	<0.001
Coronary heart disease		
Non-JADE	1.08 (0.91-1.28)	0.399
JADE-P	1.01 (0.85-1.20)	0.902
Myocardial infarction		
Non-JADE	1.32 (1.02-1.69)	0.032
JADE-P	0.71 (0.53-0.95)	0.02
Peripheral vascular disease		
Non-JADE	1.88 (1.35-2.60)	<0.001
JADE-P	0.96 (0.67-1.38)	0.83
Stroke		
Non-JADE	1.18 (0.94-1.47)	0.153
JADE-P	0.94 (0.75-1.17)	0.569
Heart failure		
Non-JADE	1.44 (1.16-1.80)	0.001
JADE-P	0.90 (0.71-1.15)	0.4
Chronic kidney disease		
Non-JADE	1.24 (1.16-1.33)	<0.001
JADE-P	0.69 (0.64-0.74)	<0.001
End-stage renal disease		
Non-JADE	1.32 (1.14-1.53)	<0.001
JADE-P	0.95 (0.80-1.12)	0.533

Lim LL et al PLoS Med 2020

Implementing JADE® Program in Asia

using the JADE portal to train HCPs, create register and inform decision making

Say Bye bye to chaos

- Usual clinic visit
- Prescribe medications
- Refer for education
- Refer for assessment
- Provide on-job training
- Support nurses / HCA

google image

- Small room
- Simple tools (monofilament, tuning fork, Snellen eye chart)
- Office equipment (computer, printer)
- Structured assessment
  - Blood
  - Urine
  - Eye
  - Feet

Nurse

Healthcare Assistant (HCA)

	Mon	Tues	Wed	Thurs	Fri
Assessment	4-6	4-6	4-6	4-6	4-6
Booking, data entry & print report	✓	✓	✓	✓	✓
	Lunch				
Group education & give report		10-15		10-15	
Individual consultation	✓		✓		✓
Liaison between patient and doctor	✓	✓	✓	✓	✓
Special programs	e.g. injection class, peer support program, YOD, DKD				

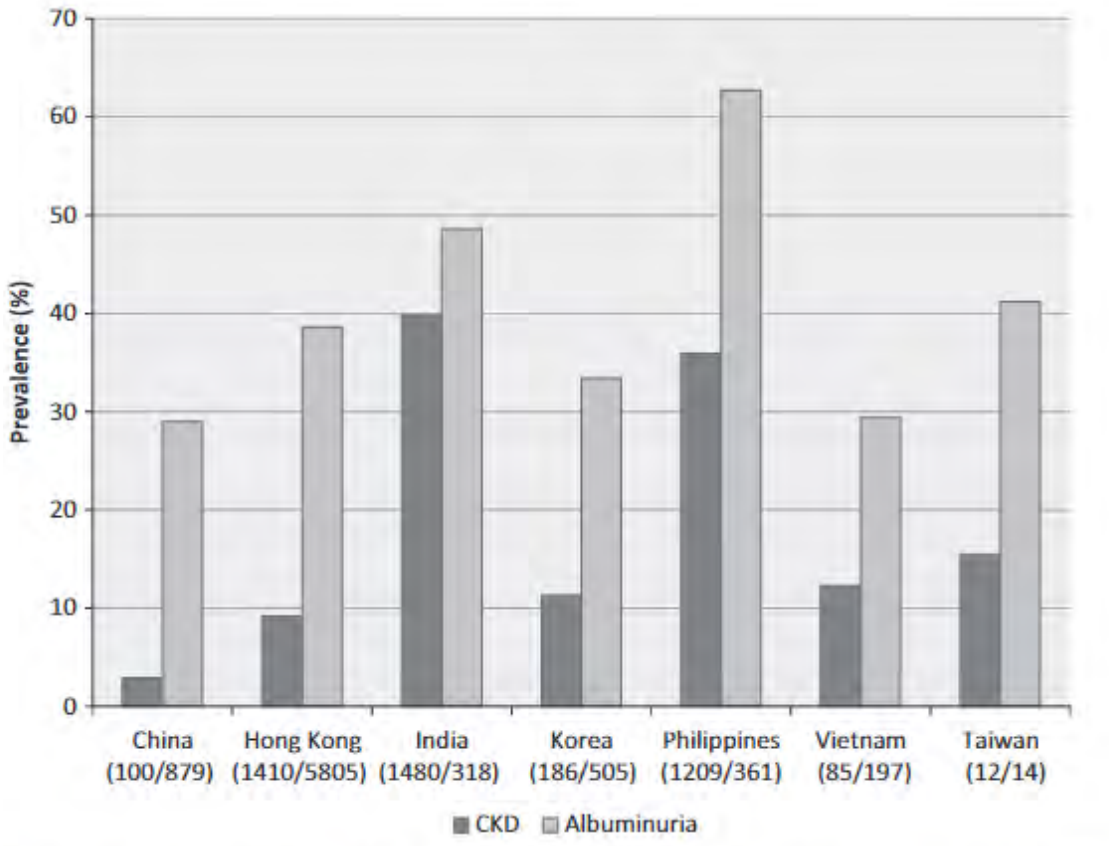
1 nurse-HCA team supervised by a doctor: ~600-800 patients

Chan JC et al Lancet 2020

High prevalence of albuminuria and CKD in Asia

- JADE Asia cross-sectional cohort of 28,110 people with type 2 diabetes in Asia
- 1 in 5 adults with T2D diagnosed before the age of 40 1

Proportion of people with type 2 diabetes with albuminuria and CKD



- Frequency of albuminuria ranged from 29% in China to 63% in Philippines
- Frequency of CKD ranged from 3% in China to 40% in India
- In Hong Kong, 10% of people with type 2 diabetes had CKD and 40% had albuminuria

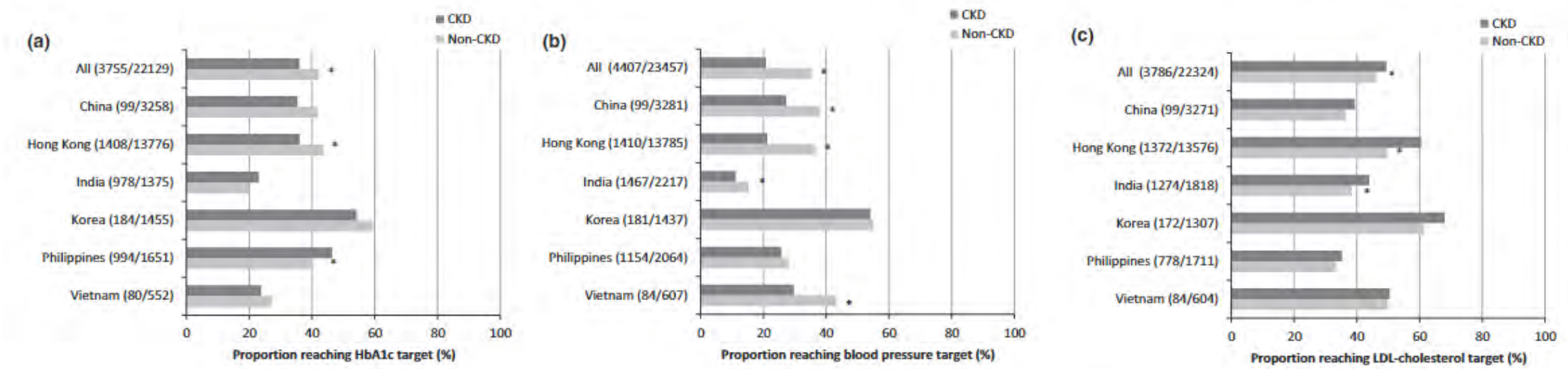
Luk A et al. Diabet Med 2016

Low proportion of patients with CKD attained glucose and blood pressure targets in Asia

36% in CKD vs 42% in non-CKD reached HbA1c target

21% in CKD vs 35% in non-CKD reached BP target

50% in CKD vs 46% in non-CKD reached LDL-C target



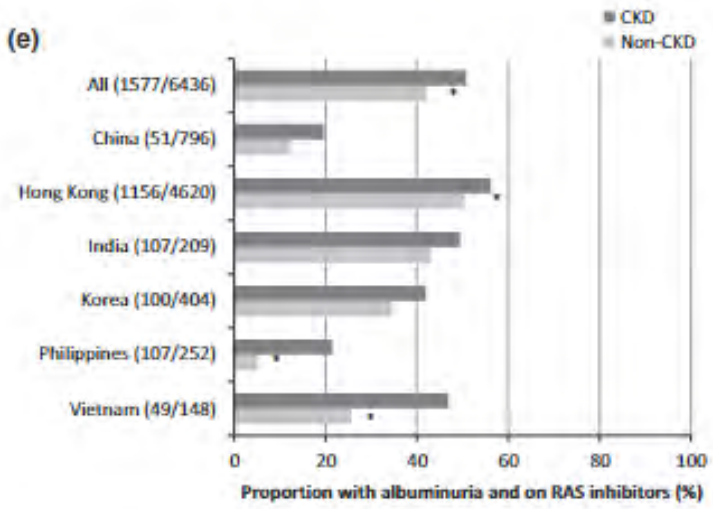
Target definition: HbA1c <7.0% (53 mmol/mol), blood pressure <130/80 mmHg, LDL-cholesterol <2.6 mmol/L

4% in CKD vs 8% in non-CKD reached all three targets

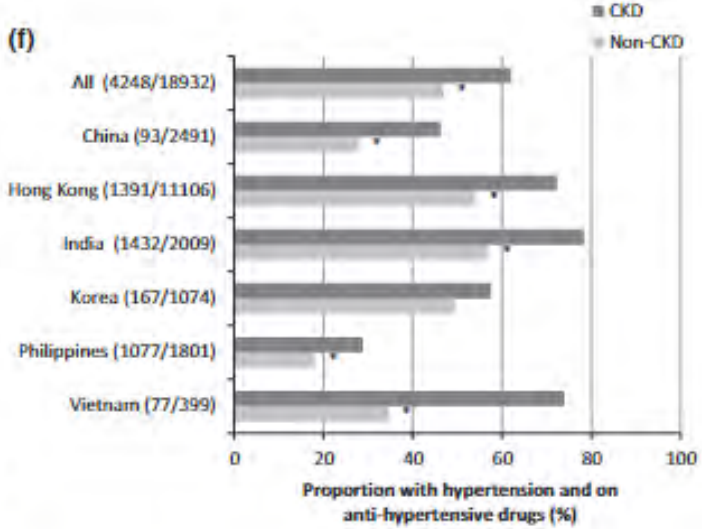
Luk A et al. Diabet Med 2016

Under-utilisation of RAAS inhibitors, anti-hypertensive drugs and statins in patients with CKD

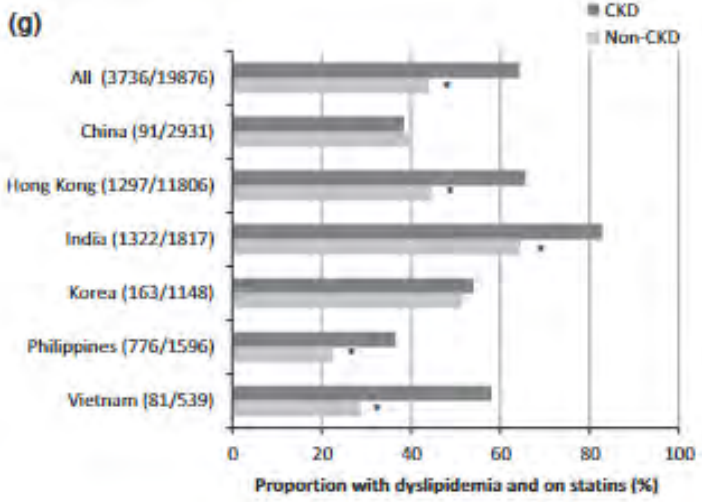
51% of patients with albuminuria were prescribed RAAS inhibitors



62% of patients with hypertension were prescribed anti-hypertensive drugs



64% of patients with dyslipidaemia were prescribed statins



Luk A et al. Diabet Med 2016

Asia: 300 healthcare professionals from 11 countries to systematically collect data during routine practice to promote QI and gather RWE

Using a doctor-nurse-clerk trio team to set up a register in 10 regions
(China,, Taiwan, Thailand, Singapore,Malaysia, Vietnam, Hong Kong, India, Indonesia, Korea)
Over 120,000 patients enrolled by over 300 doctor-nurse pairs

A multicentre demonstration project to evaluate the effectiveness and acceptability of the web-based Joint Asia Diabetes Evaluation (JADE) programme with or without nurse support in Chinese patients with Type 2 diabetes

Tutino G et al Diabetic Med 2017

Effect of a Web-Based Management Guide on Risk Factors in Patients With Type 2 Diabetes and Diabetic Kidney Disease
A JADE Randomized Clinical Trial

Chan JC et al JAMA Network Open 2022

Effects of a Technology-Assisted Integrated Diabetes Care Program on Cardiometabolic Risk Factors Among Patients With Type 2 Diabetes in the Asia-Pacific Region
The JADE Program Randomized Clinical Trial

Lim LL et JAMA Network Open 2022

Association of technologically assisted integrated care with clinical outcomes in type 2 diabetes in Hong Kong using the prospective JADE Program: A retrospective cohort analysis

Lim LL et PLoS Medicine 2018

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

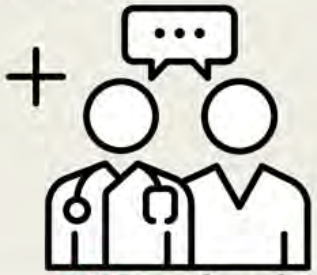
13 Hospital-based diabetes centers, 8 countries or regions

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



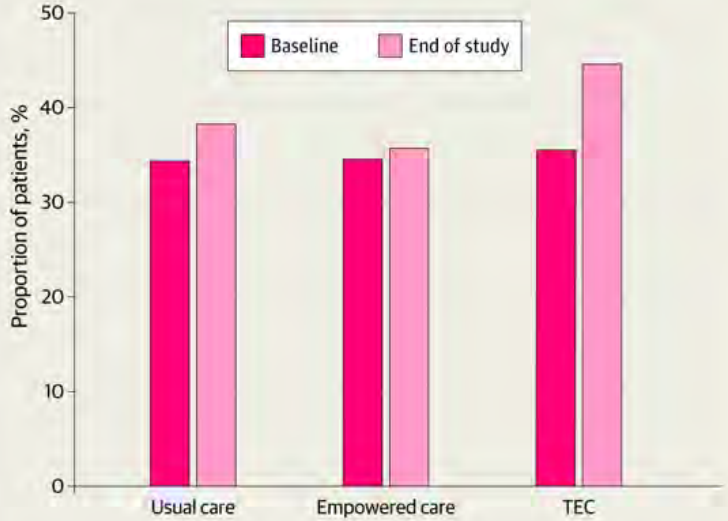
796 Team-based empowered care (TEC)
EC care and 3 monthly face-to-face reviews by a physician-nurse team

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

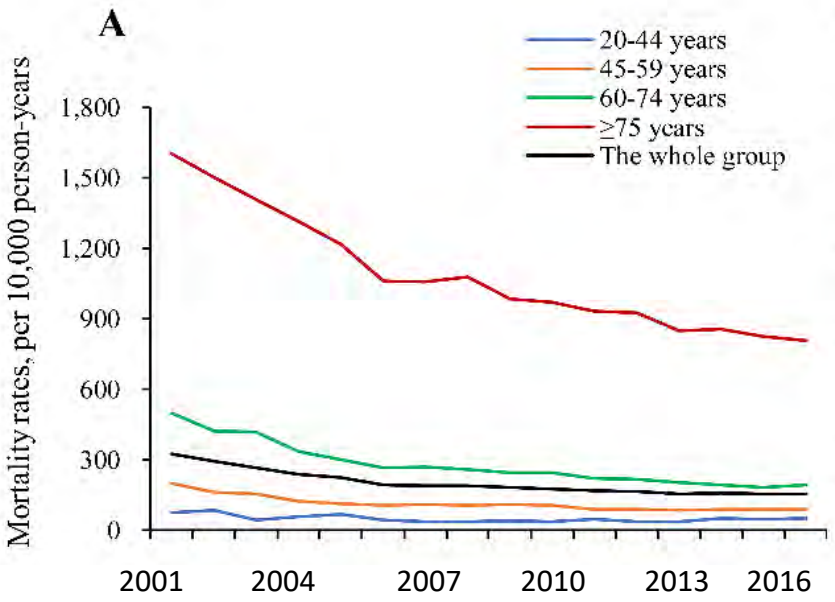


TEC vs UC: RR, 1.17 (95% CI, 1.00-1.37); *P* = .04
EC vs UC: RR, 0.94 (95% CI, 0.79-1.11); *P* = .45
TEC vs EC: RR, 1.25 (95% CI, 1.06-1.48); *P* = .007

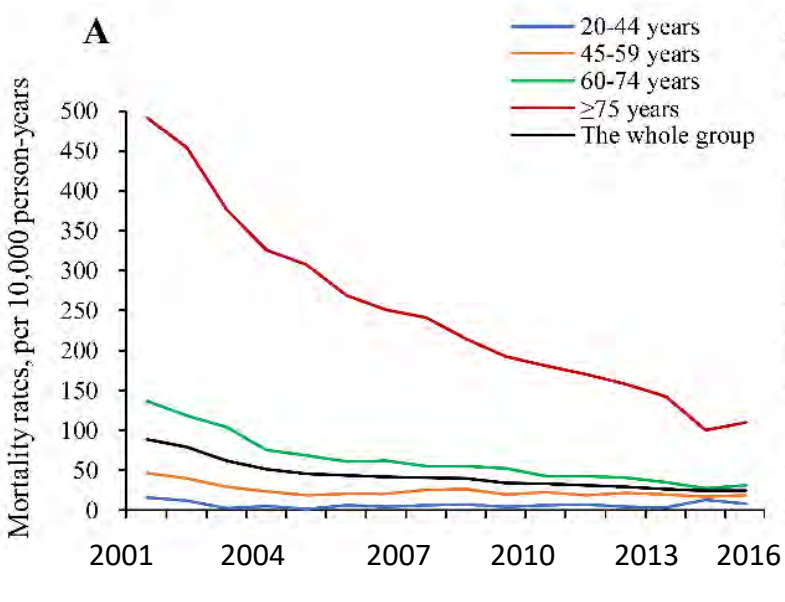
Chan JC et al JAMA Network Open 2022

Declining incidence of all-cause death and major complications in Hong Kong (2001-2016)

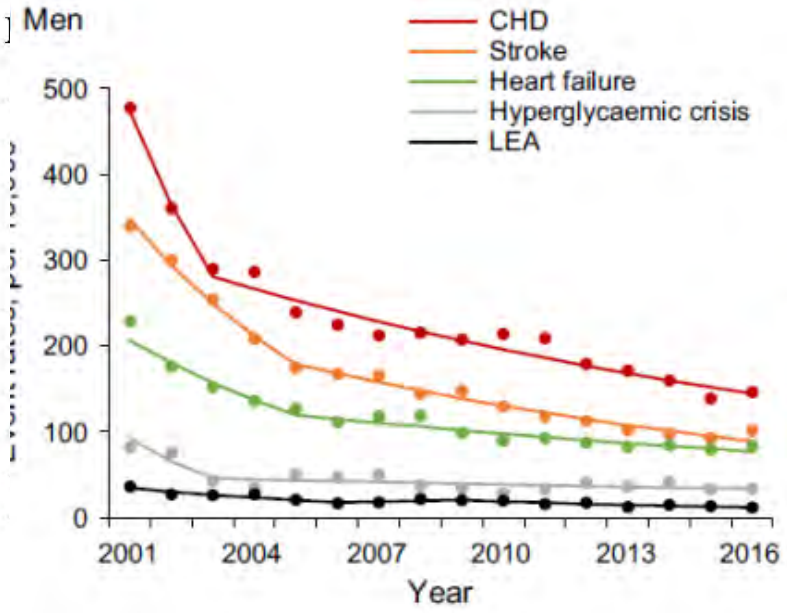
All cause death (men)



CV-death (men)

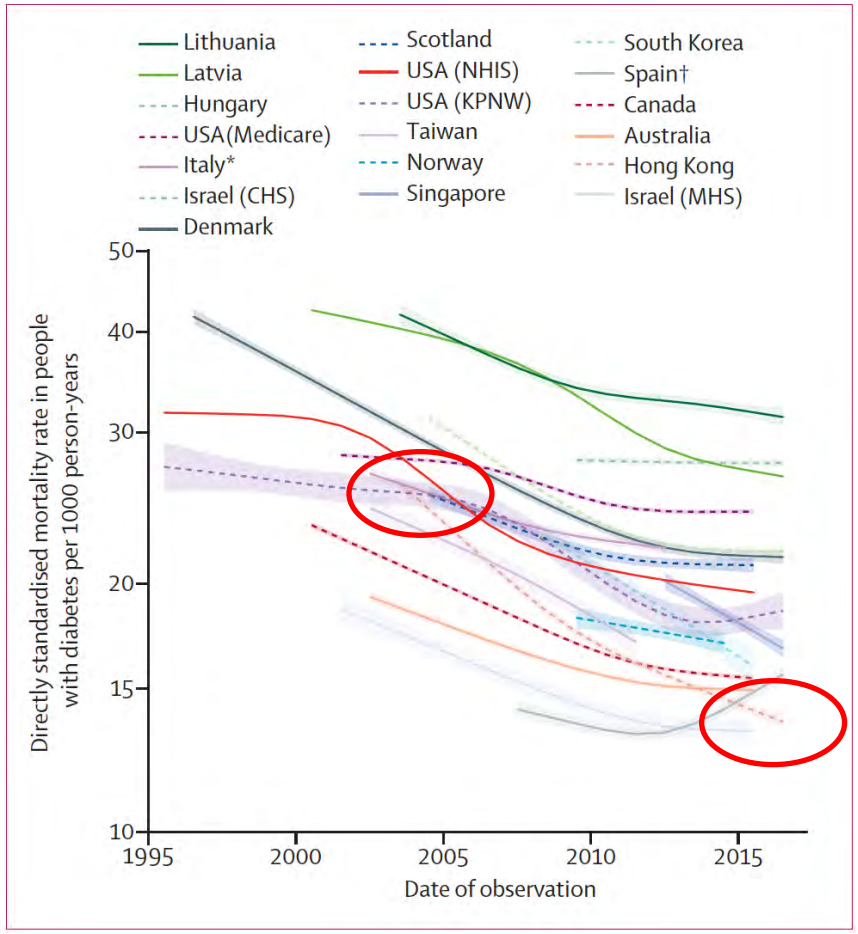


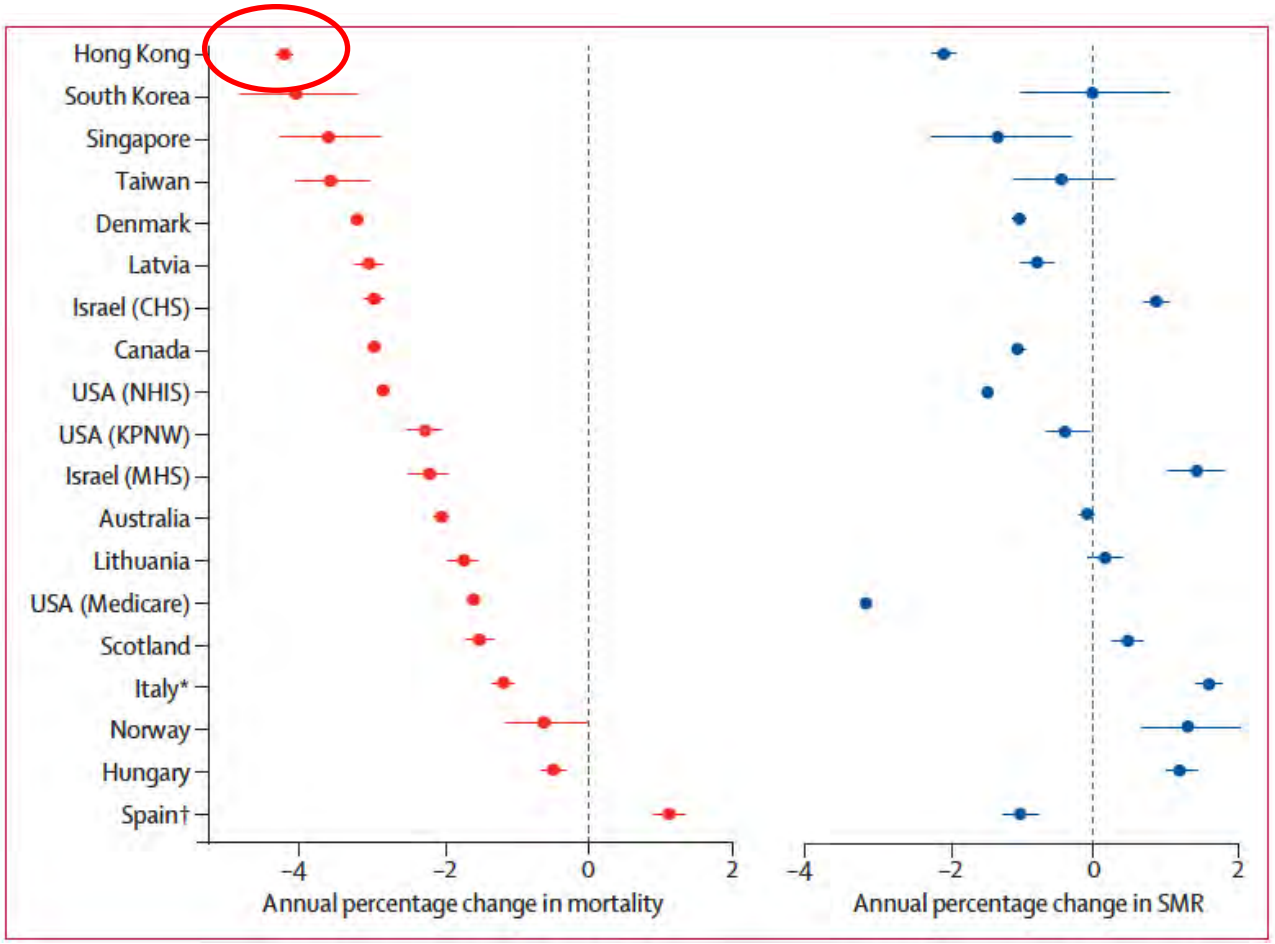
Other major events (men)



Wu HJ et al Diabetologia 2020
Wu HJ et al. Cardiovasc Diabetol 2020

1995-2016: Hong Kong and Asia have the largest decrement in diabetes-associated death rate (>70%) amongst 0.5 billion patient-years from 16 high income countries/areas





Public health policy, universal health coverage, public awareness, PPP, registers, data-driven team-based care, self management support program, surveillance and feedback ……

Magliano DJ et al, Lancet D and E 2022

Using Register to link patient to multiple care providers

Empower patient with their own health records showing risks, targets, trends, decision support

Family members ⟷ **Patient**

- Opportunities for screening

Personal check list

- ✓ Age, sex, age of onset
- ✓ ABC, BW, WC
- ✓ eGFR, ACR
- ✓ CVD, cancer
- ✓ Organ protective drugs
- ✓ Metformin, insulin, RASi, statin, SGLT2i...
- ✓ Self care

Nurse ⟷ **Endocrinologist**

- Educate
- Empower
- Engage

- Structured assessment
- Quality assurance
- Difficult and atypical cases (e.g. YOD, DKD, severe obesity)

Trained family doctor

- Test, track and treat
- Maintain stable condition
- Opportunistic screening (e.g. FH, obesity, metabolic syndrome, GDM, PCOS….)

Research and discovery

- Register
- EMR
- Cohorts
- Biobanks

Cardiologist

- Symptomatic IHD or PCA
- Atypical cases

Nephrologist

- Advanced CKD or ESKD
- Atypical cases

google image