Models of Chronic Kidney Disease Care and Initiation of Dialysis

Dr Paul Stevens
Kent Kidney Care Centre
East Kent Hospitals, UK

Early Crash Landings

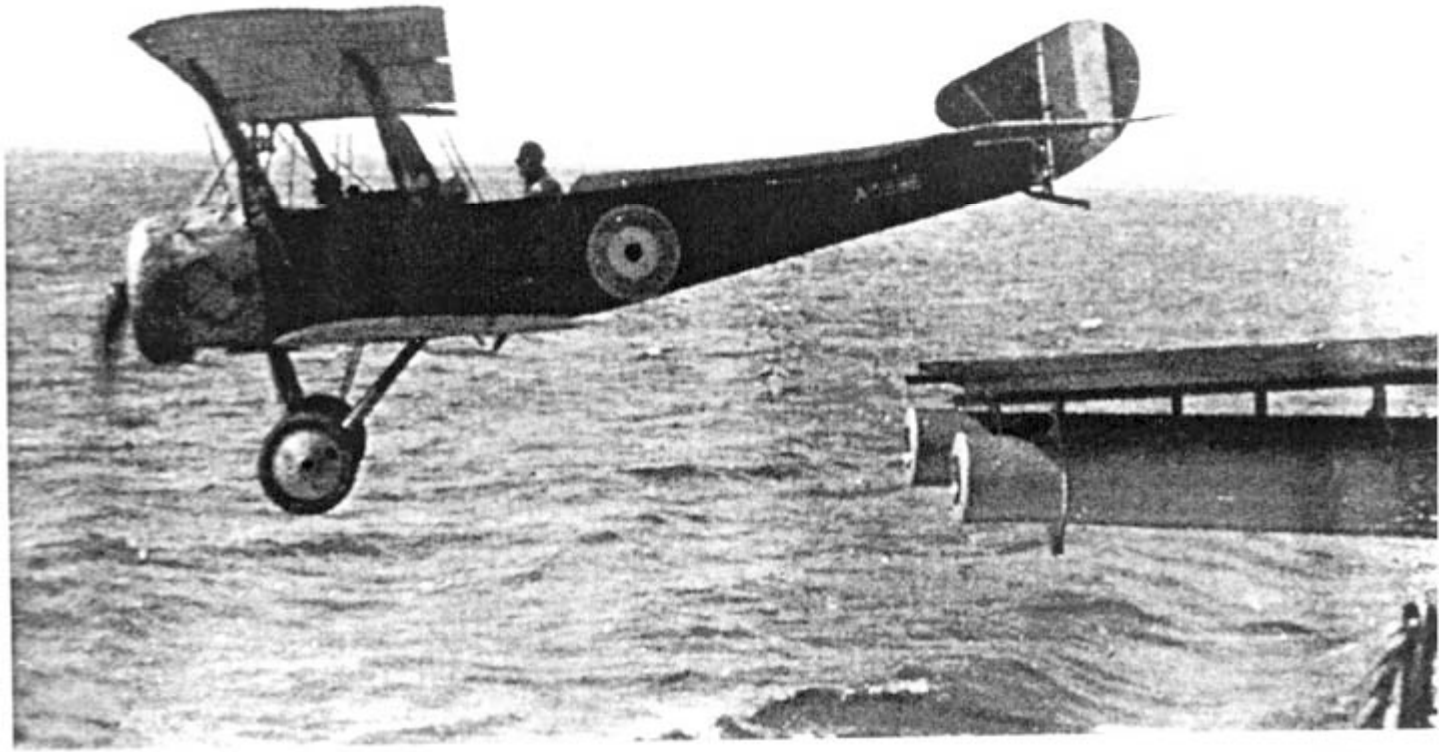
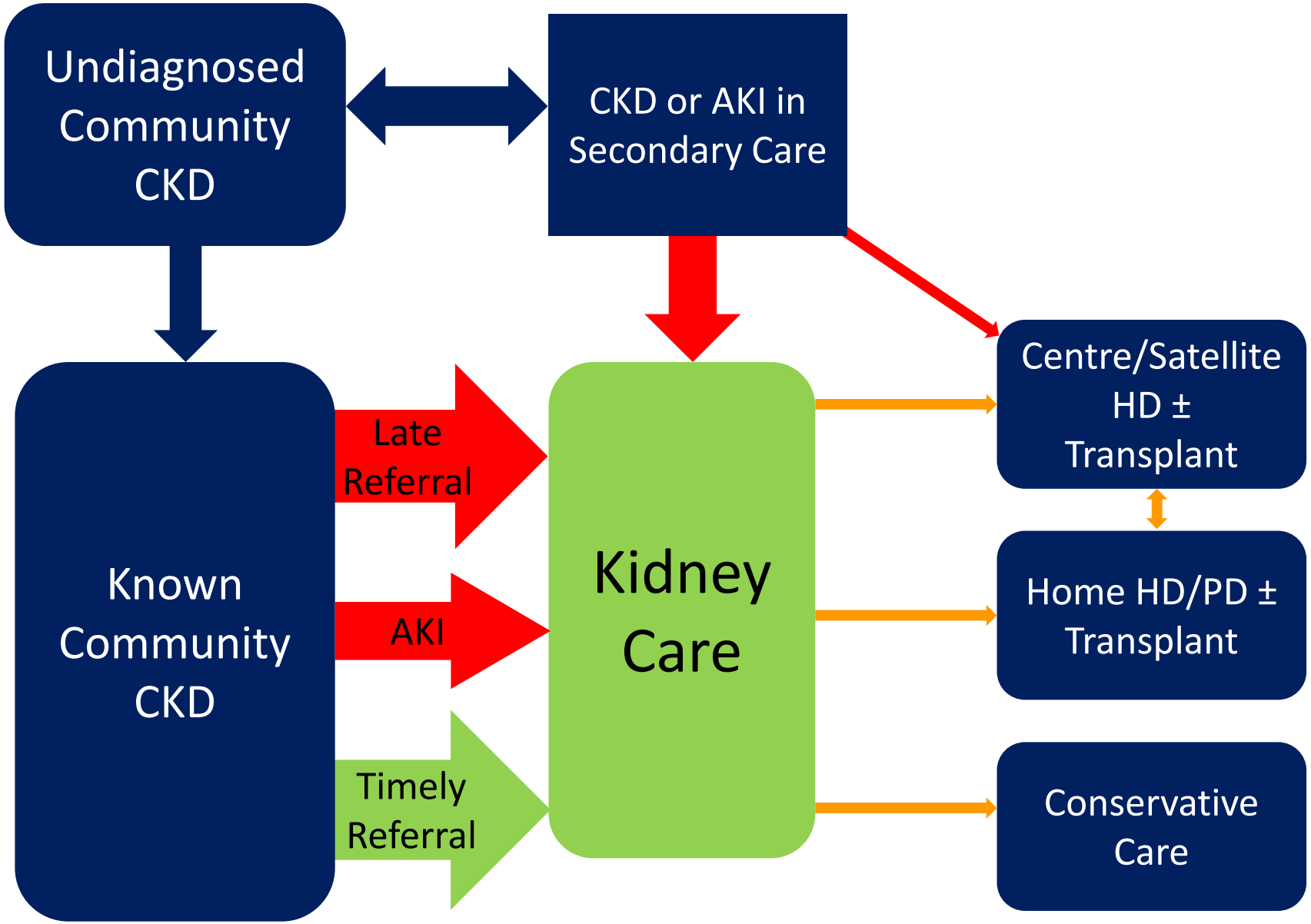


FIGURE 1. R.A. McCance flying off the midship gun turrets of the *Indomitable* in 1918.

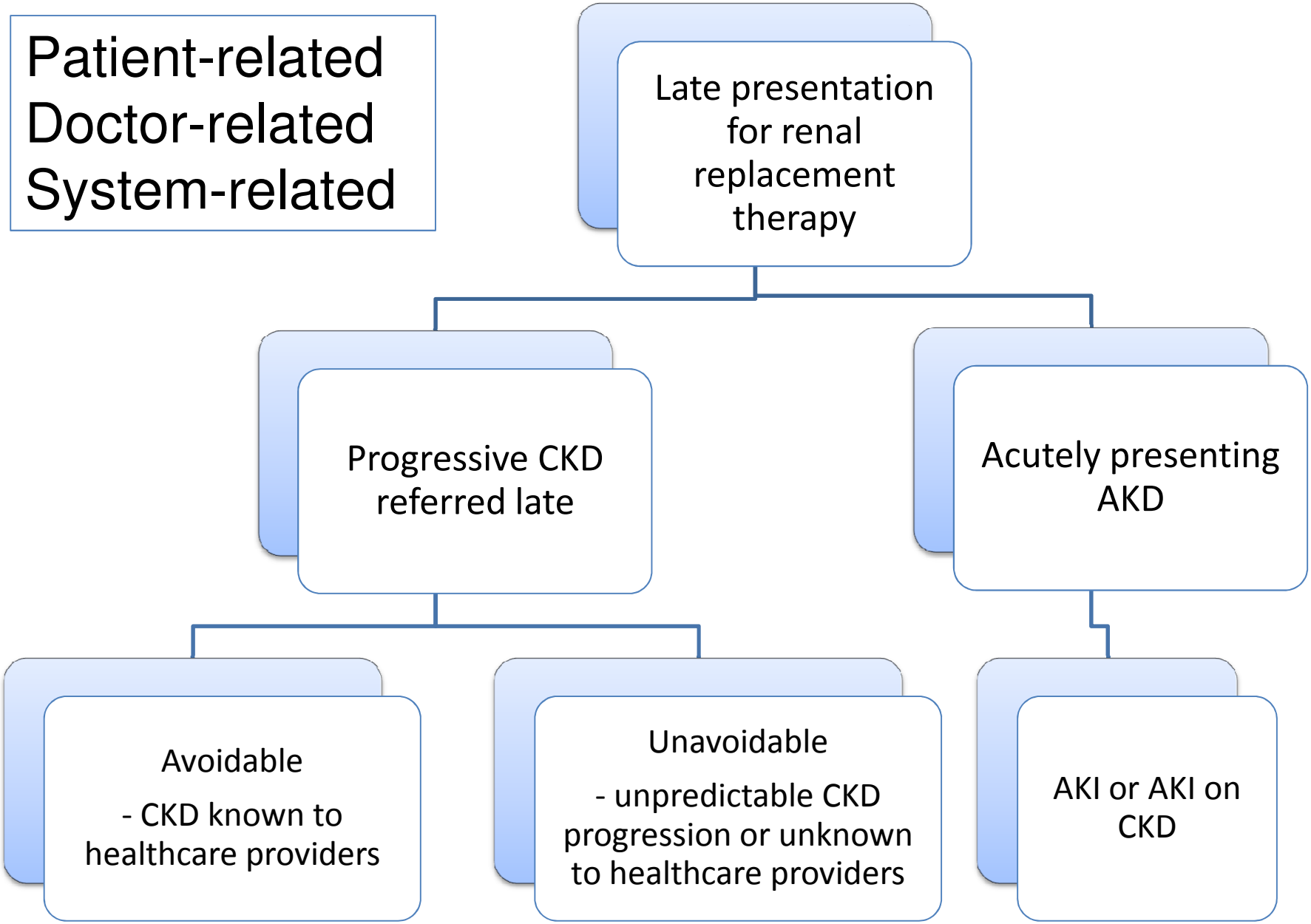
Talk Outline

- Pathways & Definitions
- Guideline recommendations
- Some trends over time
- Late referral versus early referral
- Early dialysis initiation versus late
- Models of CKD care

Pathways to Renal Replacement Therapy



Patient-related
Doctor-related
System-related

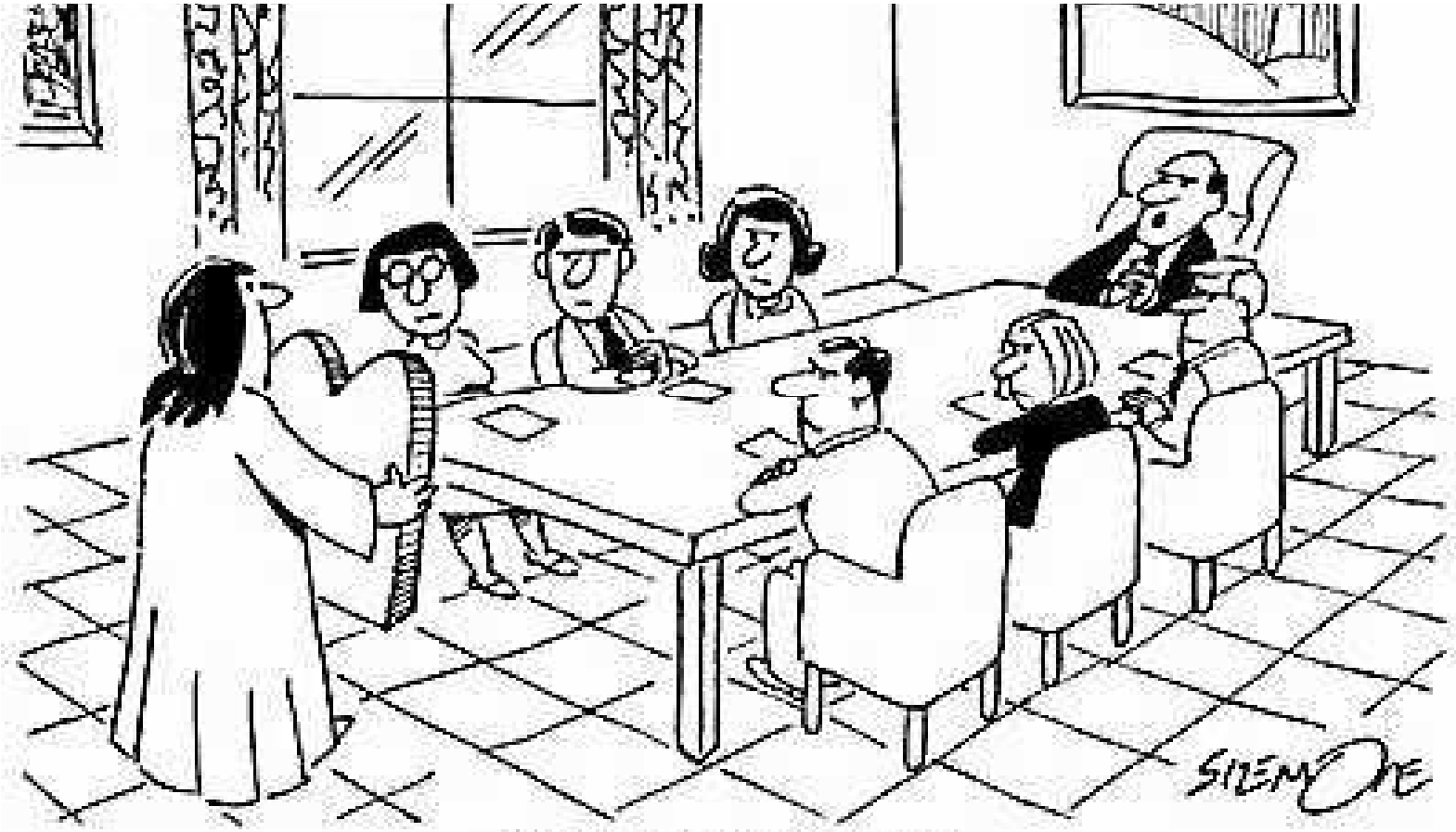


Adapted from Udayaraj et al NDT 2011

Guideline Recommendations

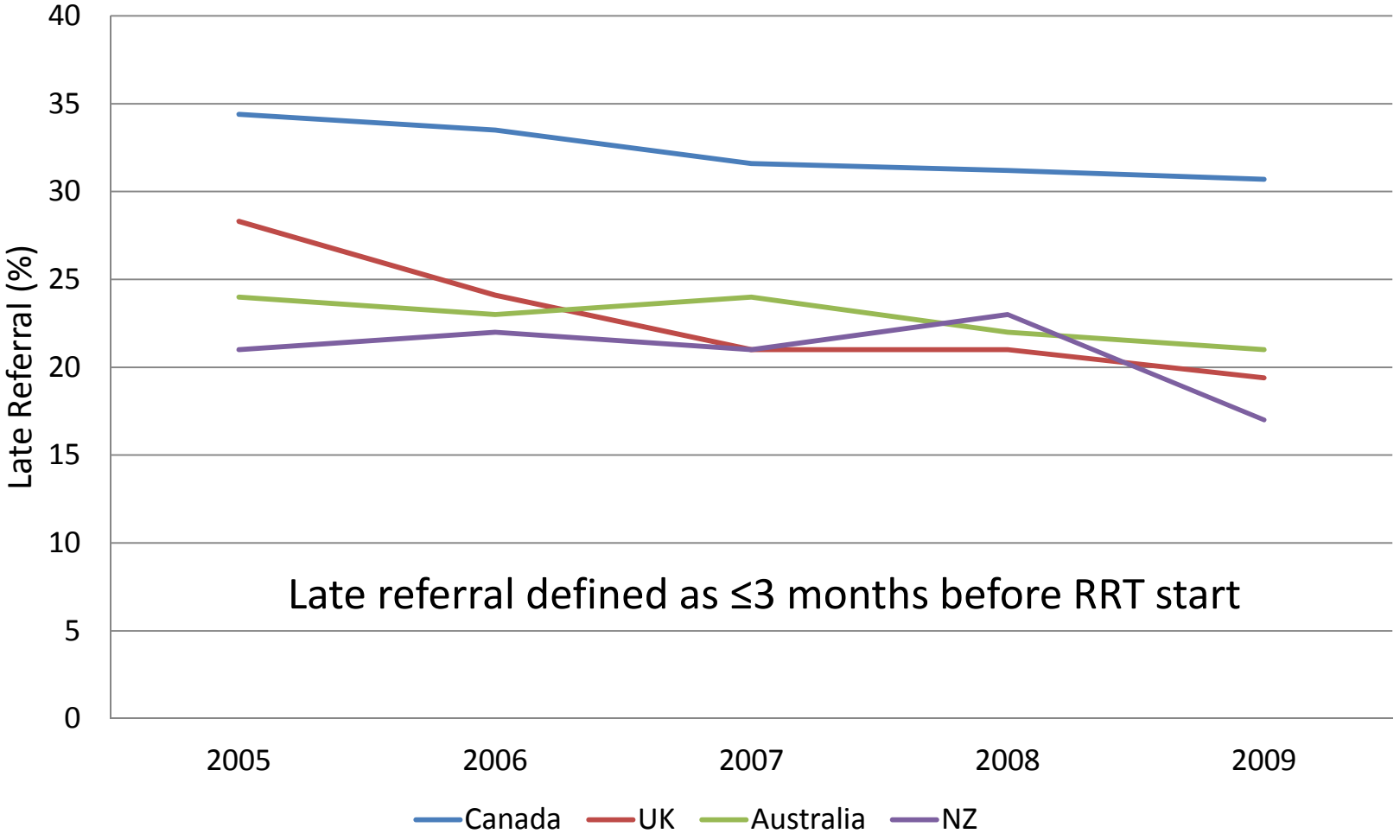
Guideline Groups	1. Referral Guidance
EBPG (2002), KDOQI (2006), CSN (2008), UK RA (2009), CARI (2010)	GFR <30 ml/min & declining → nephrologist care & RRT preparation (choice of modality & location, discussion with patients & carers, psychosocial support)
	2. Early Dialysis Initiation
CSN (2008)	Consider if GFR <20 mL/min plus clinical indications
EBPG (2002), KDOQI (2006), UKRA (2009)	Evaluate risks, benefits etc at GFR <15 mL/min when clinical indications are present
CARI (2005)	GFR <10 mL/min plus clinical indications
	3. Late Dialysis Initiation
EBPG (2002), UK RA (2009), CARI (2005)	Before GFR <6 mL/min even if asymptomatic

Should We Follow Guidelines?



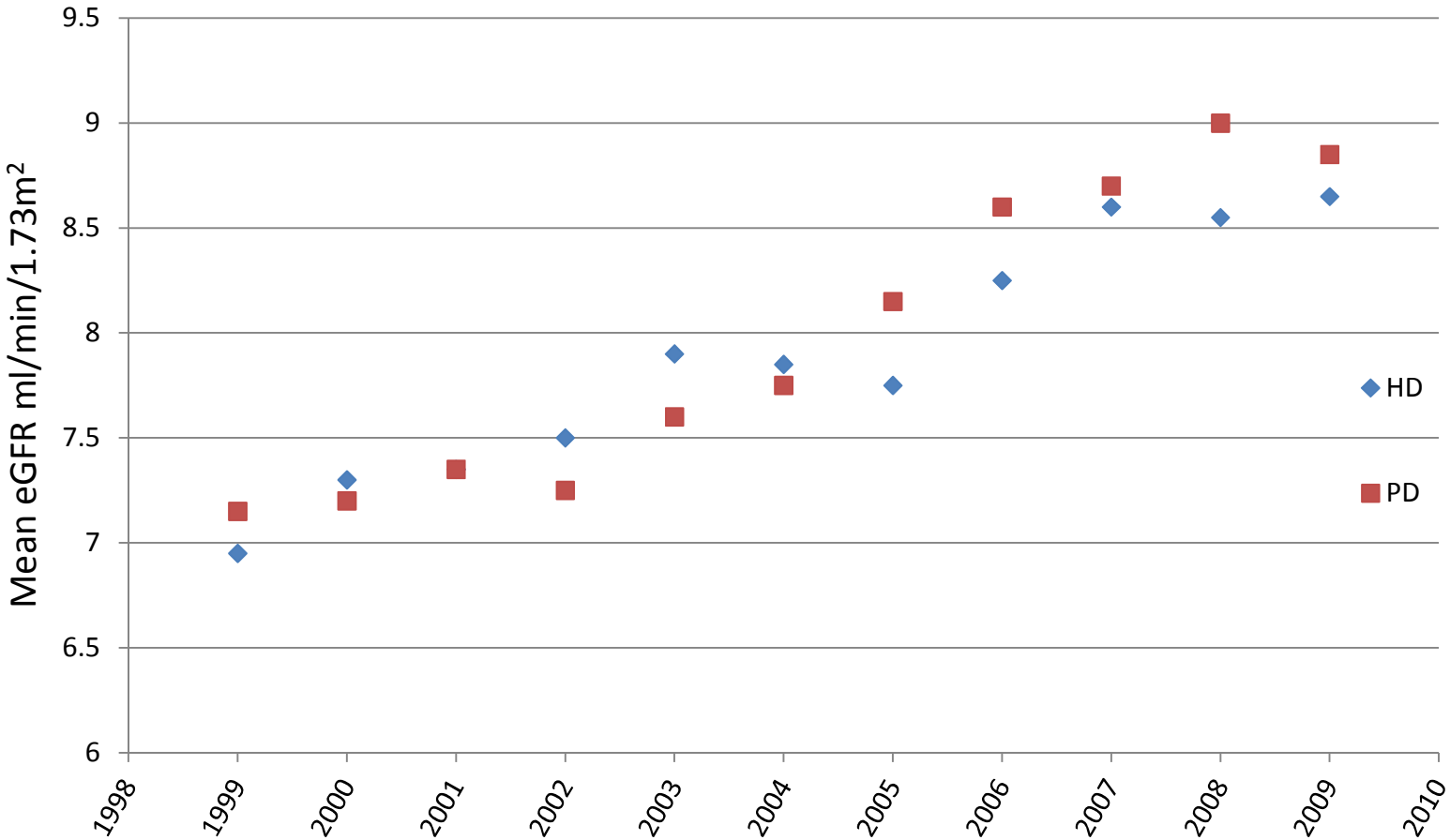
“We’ll think about it.”

Trends in Late Referral by Year



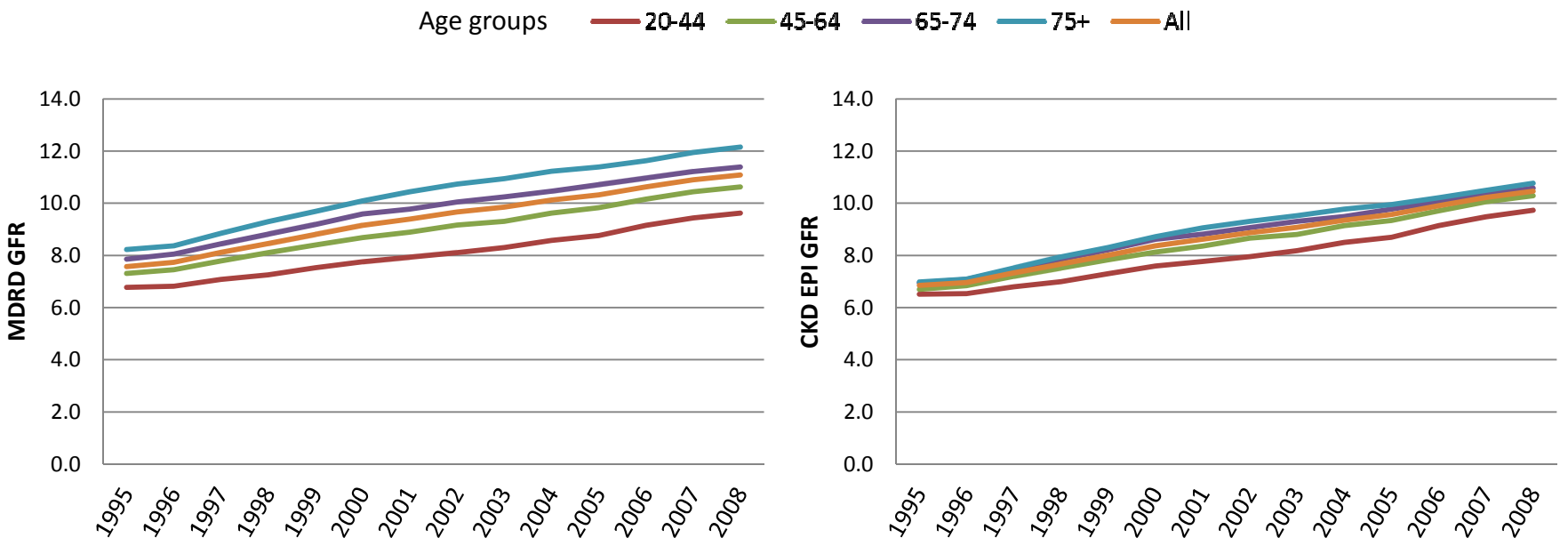
Data from Canadian, UK and ANZDATA Renal Registries

GFR at Initiation of HD & PD by Year: UK



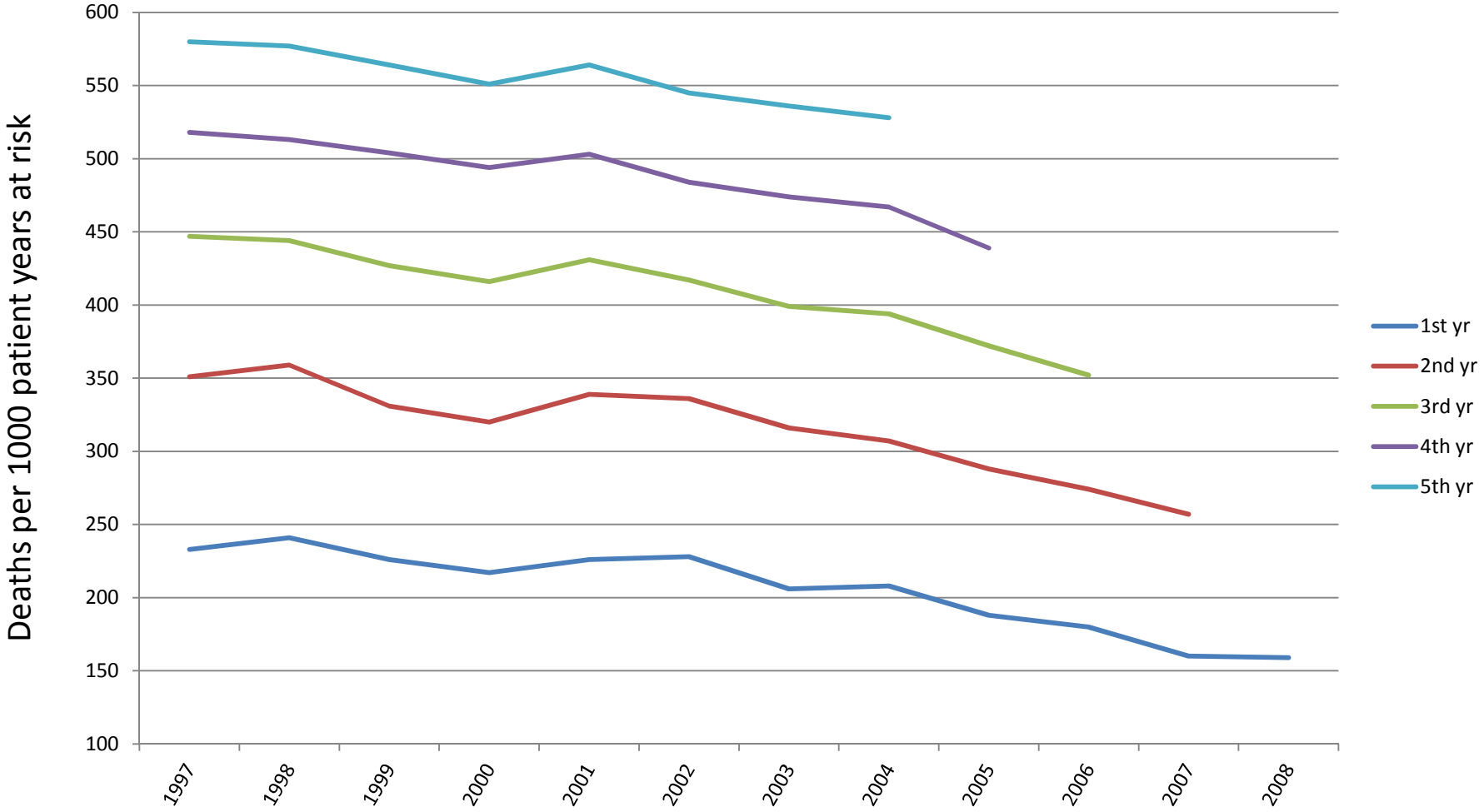
UK Renal Registry 13th Annual Report

GFR at Initiation of Dialysis by Year: USA



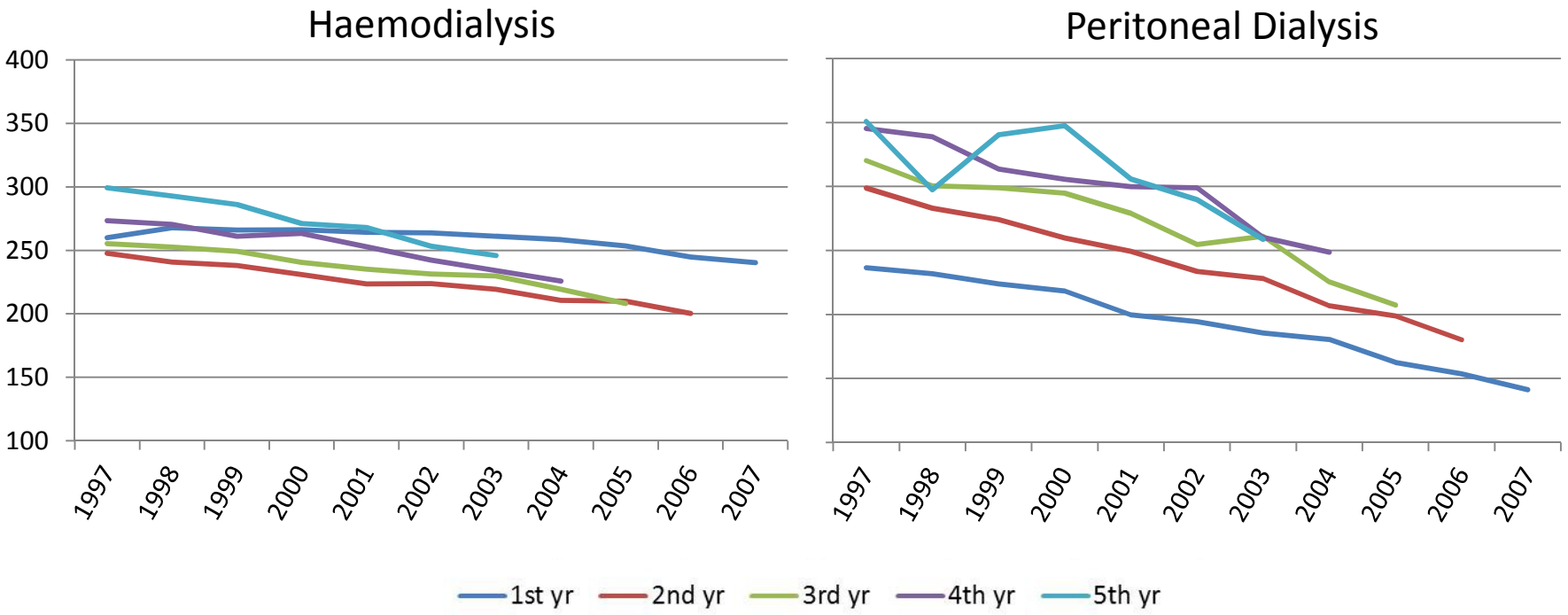
USRDS ADR 2010

Unadjusted UK Incident HD & PD Mortality



UKRR Report 2010

Adjusted US Incident ESRD Mortality



Adjusted for age, gender, race and primary diagnosis

USRDS ADR 2010

Early Referral Versus Late Referral

Consequences of Late Referral	Benefits of Early Referral
Anaemia and bone disease	Delay need to initiate RRT
Severe hypertension & fluid overload	↑ proportion with permanent access
Low prevalence of permanent access	Greater choice of treatment options
Delayed referral for transplant	↓ need for urgent dialysis
↑ initial hospitalisation rate	↓ hospital LOS and costs
↑ 1-year mortality rate	Improved nutritional status
↓ patient choice of RRT modality	Better CVD and comorbid condition management
Worse psychosocial adjustment	↑ patient survival

Studies Comparing Early & Late Referral (1)

Definition, Studies & Number of patients	Mortality: LR vs ER	Temporary Access & Hospitalisation: LR vs. ER
≤ 3 months pre-RRT 21 studies, n=15,655 25-57% late referral	26-40% vs. 13-28% HR for LR 1.19-2.77	Temp. access 34-70% vs. 6-48% HR for LR 1.42-2.89 LOS: 25-31 d vs. 7-15.1 d HR for LR 1.56-3.51
≤ 4 months pre-RRT 10 studies, n=10,142 22-49% late referral	28-35% vs. 6-16% HR for LR 1.37-2.7*	Temp. access 34% vs. 6% LOS: 16-18 d vs. 10-11 d

*2 studies recorded no significant difference in mortality

Studies Comparing Early & Late Referral (2)

Definition, Studies & Number of patients	Mortality: LR vs ER	Temporary Access & Hospitalisation: LR vs. ER
≤ 6 months pre-RRT 9 studies, n=141,565 30-72% late referral	37-65% vs. 21-28% HR for LR 1.50-1.58	Temp. access 83% vs. 45% HR for LR 1.48 LOS: 18 d vs. 4 d
Not specified 16 studies, n=7,161 22-58% late referral	12-45% vs. 5-24% HR for LR 1.2-1.52*	Temp. access 69-96% vs. 17-36% HR for LR 1.67 LOS 17-25 d vs. 3-12 d

*2 studies recorded no significant difference in mortality

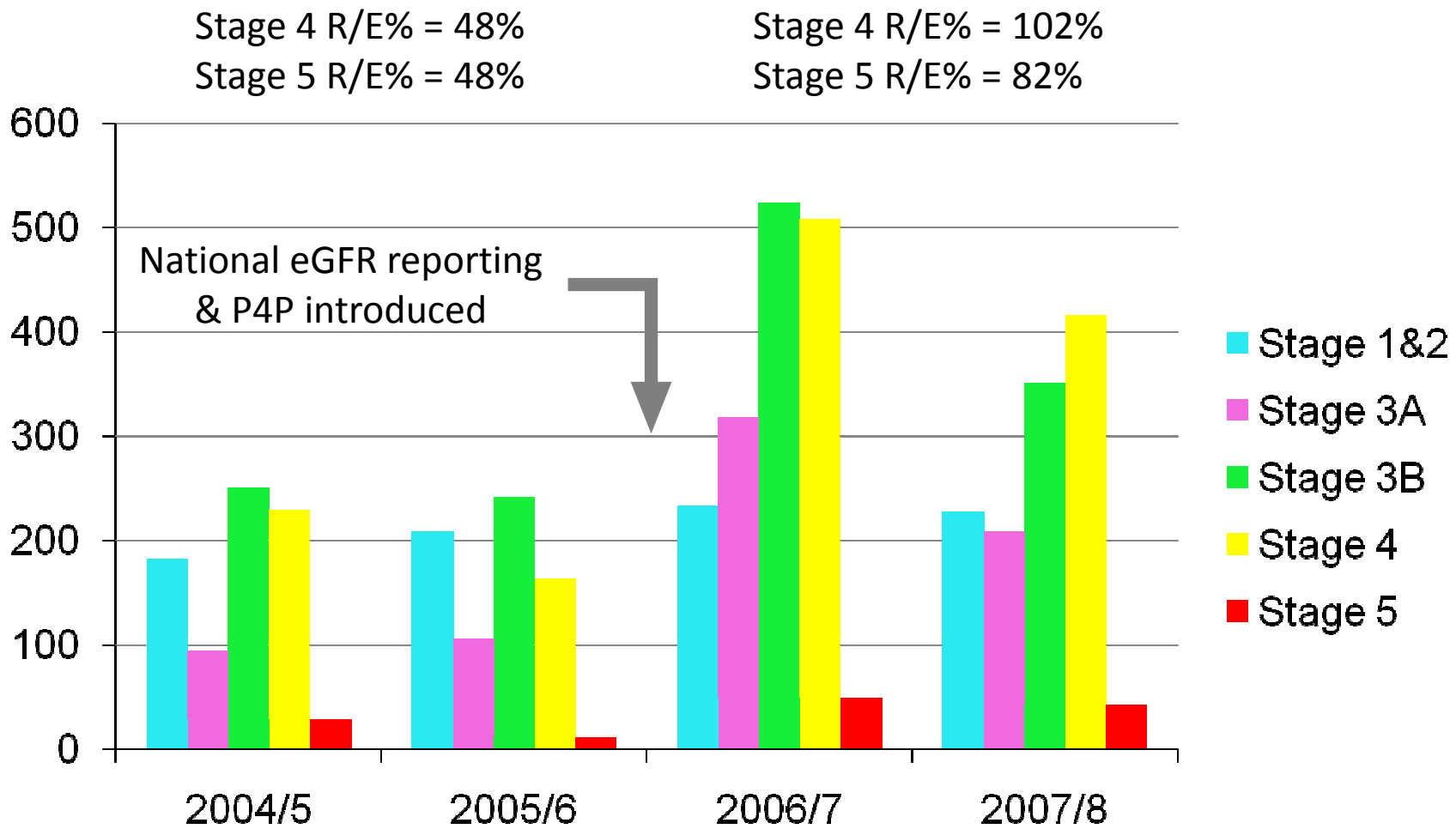
Meta-analysis of Late Referral

- 22 studies from 10 countries
- 7 <1/12, 8 <3/12, 5 <4/12, 2< 6/12 prior to RRT
- 12,749 subjects, age 55.6 y, 57.3% male

Variable	Early Referral	Late Referral	P value
Mortality, % (SD)	11 (3)	23 (4)	<0.0001
Hospital LOS, days (SD)	13.5 (2.2)	25.3 (3.8)	0.0007
Serum albumin, g/L (SD)	3.62 (0.05)	3.40 (0.03)	0.001
Haematocrit, % (SD)	30.54 (0.18)	29.71 (0.10)	0.013

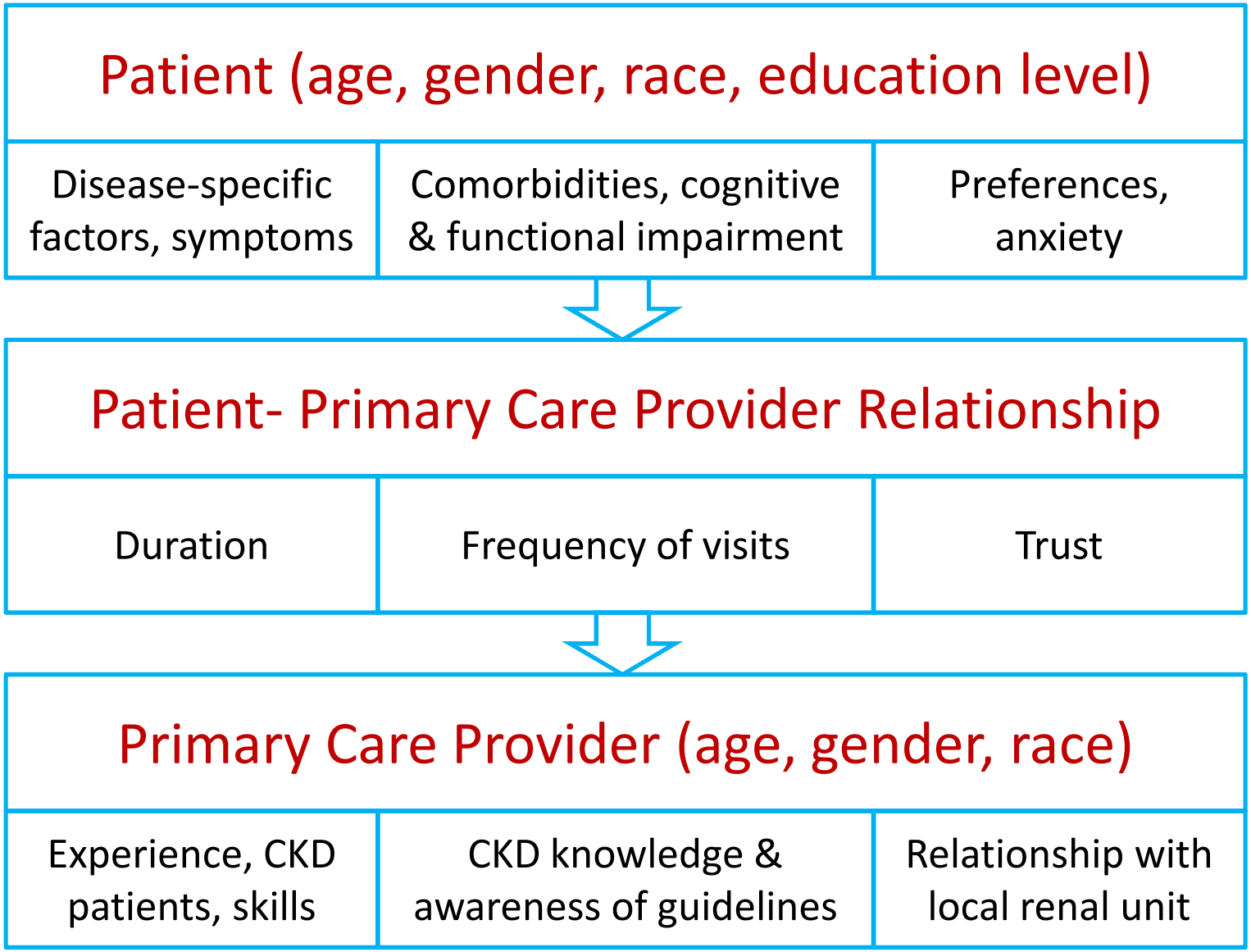
Chan et al. Am J Med 2007;120:1063-70

Kent New Referrals by CKD Stage



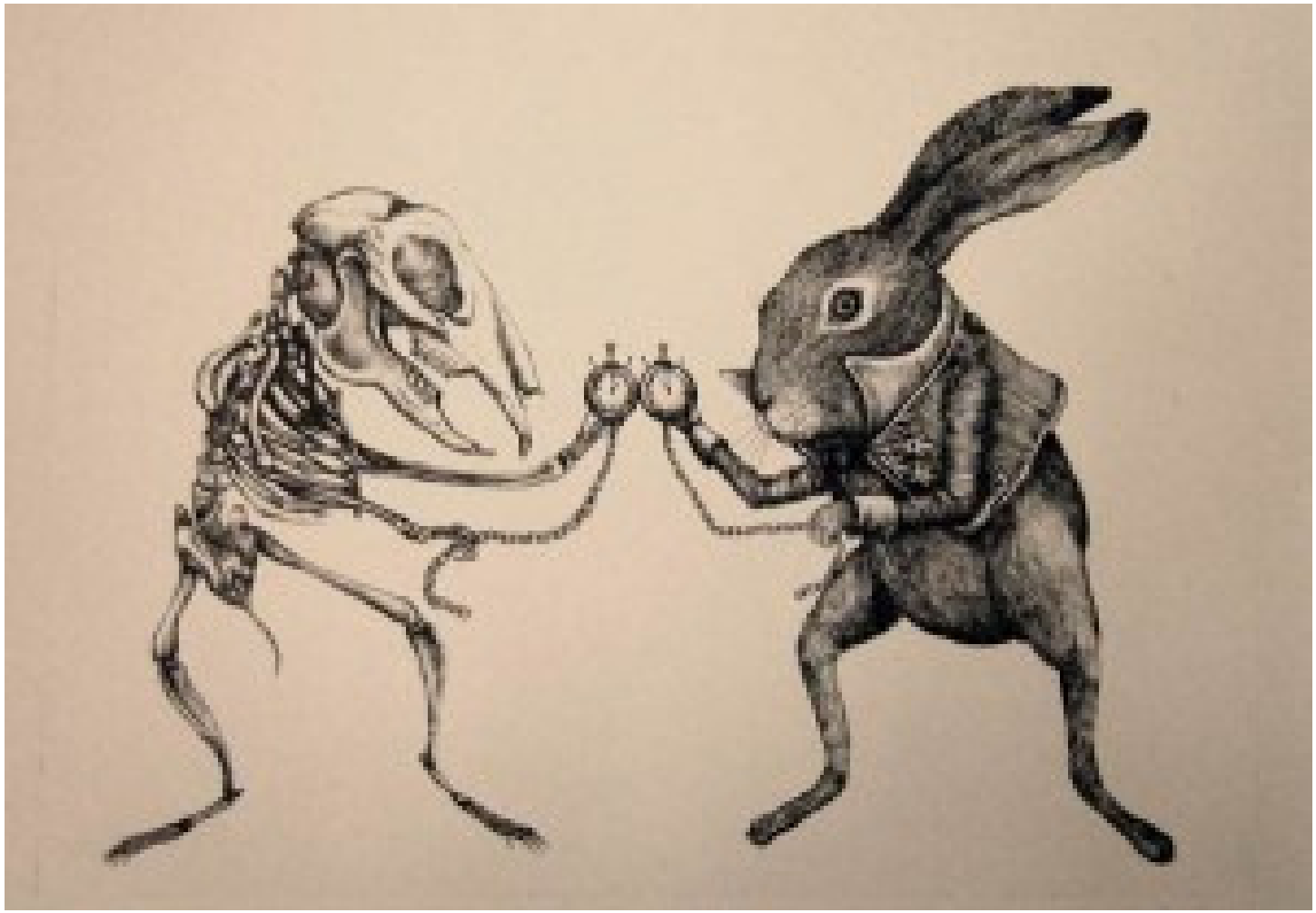
Hobbs et al, NDT 2009 Nov;24(11):3411-3419

Conceptual Model of Referral Decision Making



Health System Barriers

Early Versus Late Dialysis Initiation



Benefits of Early Dialysis Initiation

- Over a 15 y period 82 patients had ‘early start’ dialysis and 308 ‘late start’
- Mean CrCl at dialysis intitiation 12.9 ml/min (ES) vs. 2.1 ml/min (LS)
- 12 y survival 77% (ES) vs. 51% (LS)
- LOS 7 (ES) vs. 16 (LS) days/patient/y
- Employment 72% (ES) vs. 42% (LS)

Bonomini et al. Kidney Int 1985;28:S57-S59

Protein Malnutrition and Progression of Renal Failure

- Spontaneous decline in DPI
  - 1.1 g/kg/d above CrCl 50 ml/min
  - 0.85 g/kg/d at CrCl 25-50 ml/min
  - 0.7 g/kg/d at CrCl 10-25 ml/min
  - 0.54 g/kg/d below CrCl 10 ml/min
- Ideal body weight fell by 0.38% for each 10 ml/min fall in CrCl

Ikizler et al. JASN 1995;6:1386-1391

Early Dialysis Initiation vs Late

does
ere
QOL

"Studies that have examined the role of 'early' *versus* 'late' dialysis have consistently shown a better outcome in the patients starting early"

Hakim & Lazarus

JASN 1995;6:1319-1328

Age and comorbidity may explain the paradoxical association of an early dialysis start with poor survival

Mathilde Lassalle[1], Michel Labeeuw[2], Luc Frimat[3], Emmanuel Villar[2], Véronique Joyeux[4], Cécile Couchoud[1] and Bénédicte Stengel[5,6] on behalf of the REIN Registry

Kidney Int 2010;77:700–707

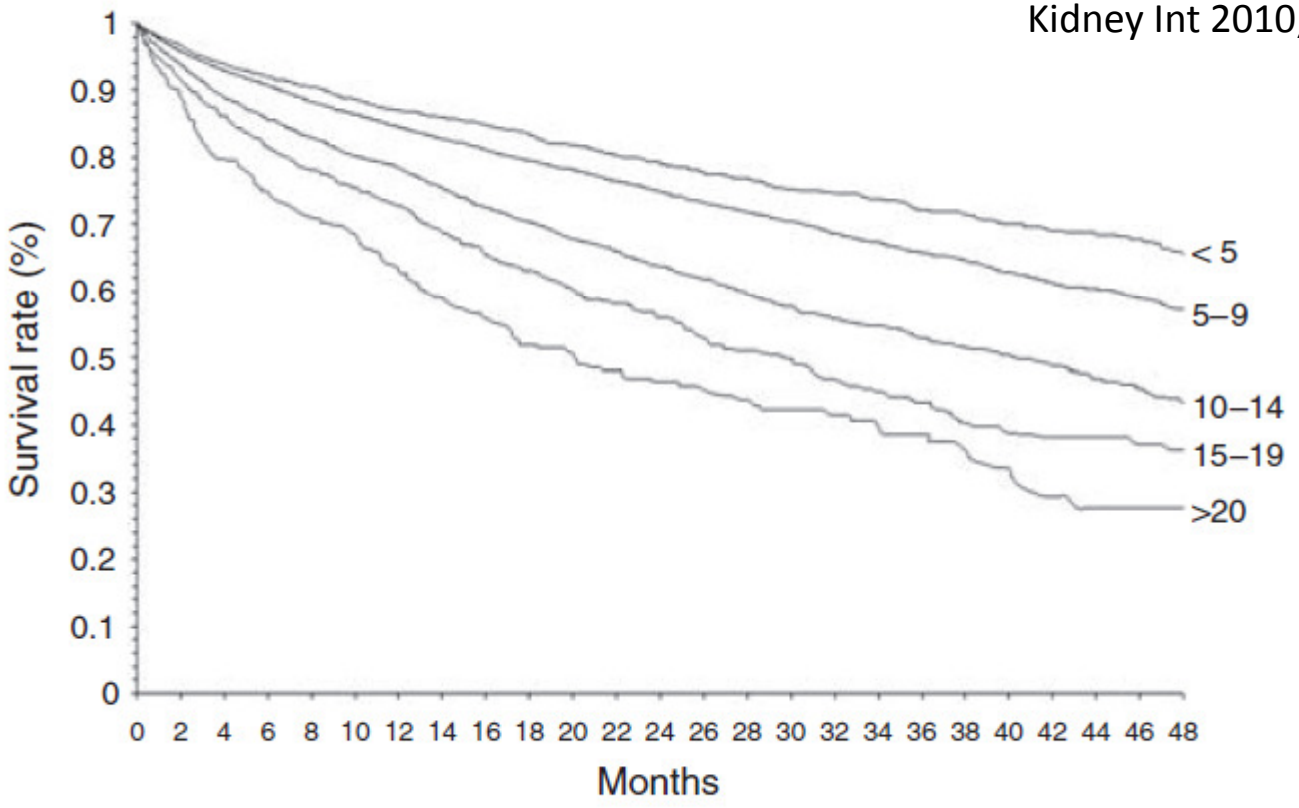


Figure 3 | Kaplan–Meier survival curves according to MDRD eGFR in ml/min per 1.73 m^2 at start of dialysis.

A Situation Far From IDEAL

- Lead time bias
  - Extra period of life gained by delaying dialysis not accounted for (biases results in favour of ES)
- Problems with estimating equations
  - Low muscle mass = low creatinine generation
  - Fluid overload dilutes serum creatinine
  - Both associated with greater comorbidity
- Symptoms and/or ↑comorbidity likely to result in early start
- Patient included when they started dialysis
  - those dying before start excluded = survivor bias

The NEW ENGLAND JOURNAL of MEDICINE

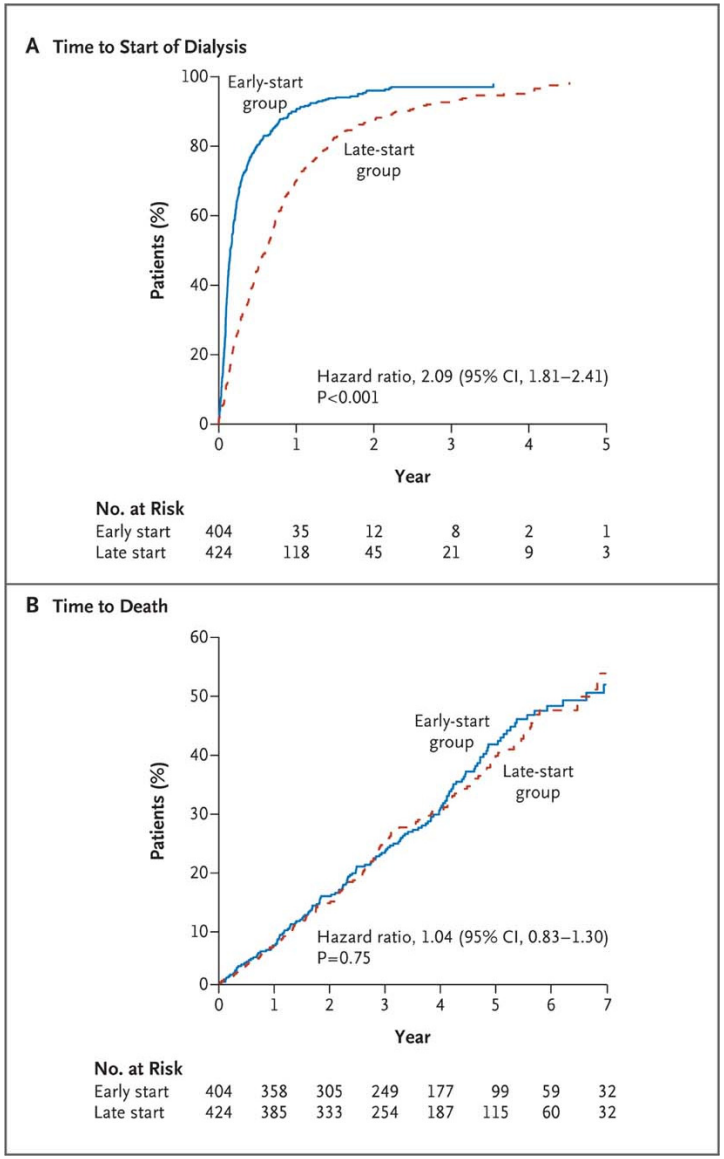
ESTABLISHED IN 1812 AUGUST 12, 2010 VOL. 363 NO. 7

A Randomized, Controlled Trial of Early versus Late Initiation of Dialysis

Bruce A. Cooper, M.B., B.S., Ph.D., Pauline Branley, B.Med., Ph.D., Liliana Bulfone, B.Pharm., M.B.A., John F. Collins, M.B., Ch.B., Jonathan C. Craig, M.B., Ch.B., Ph.D., Margaret B. Fraenkel, B.M., B.S., Ph.D., Anthony Harris, M.A., M.Sc., David W. Johnson, M.B., B.S., Ph.D., Joan Kesselhut, Jing Jing Li, B.Pharm., B.Com., Grant Luxton, M.B., B.S., Andrew Pilmore, B.Sc., David J. Tiller, M.B., B.S., David C. Harris, M.B., B.S., M.D., and Carol A. Pollock, M.B., B.S., Ph.D., for the IDEAL Study*

- 828 adults with progressive CKD and CrCl 10-15 ml/min/1.73m^2 randomly assigned to early or late initiation of dialysis

IDEAL Study



- 404 early (planned 10-14 ml/min) and 424 late (5-7 ml/min)initiation of dialysis
- Protocol allowed earlier start where clinically necessary
- PD/HD 195/118 (ES) vs. 171/215 (LS)
- Mean CrCl 12.0 (ES) vs 9.8 (LS) [MDRD 9.0 (ES) vs. 7.2 (LS)]
- HR for death (ES)1.04; 95% CI, 0.83 to 1.30; P = 0.75
- No difference in other outcomes

Update Guidance for Dialysis Initiation

- Guideline 1.3
  - Prepare for RRT/conservative care before symptoms develop, including access. Supervise in a dedicated clinic (1C, strong recommendation, low quality evidence)
  - GFR<15 ml/min consider dialysis when clinically indicated; note majority will be at 9-6 ml/min (1A, strong rec., high quality evidence)
  - High risk and rapidly deteriorating pts require closer supervision (1C)
  - Asymptomatic patients presenting with advanced CKD may benefit from delaying dialysis to allow adequate preparation (2C, weak rec., poor quality)

Tattersall et al On behalf of ERBP. NDT Advance Access May 5,2011

Multidisciplinary CKD Care

"Once exposed to a formal teaching program of the various types of dialysis and transplantation, patients are much less reluctant to start and experience a more positive result, both long and short term. The team approach, including a nephrology nurse, social worker, dietitian, transplant coordinator, and nephrologist, is essential to this process"

Hakim & Lazarus JASN 1995;6:1319-1328

CLINICS 2011;66(2):245-250 DOI:10.1590/S1807-59322011000200011

CLINICAL SCIENCE

Early nephrology care provided by the nephrologist alone is not sufficient to mitigate the social and psychological aspects of chronic kidney disease

Ana Amélia Fayer,[I] Rosemeire Nascimento,[II] Regina CRM Abdulkader[III]

[I]Discipline of Nephrology, Faculdade de Medicina da Universidade de São Paulo. [II]Division of Psychology,Hospital das Clínicas, Faculdade de Medicina da Universidade de São Paulo. [III]Laboratório de Fisiopatologia Renal-LIM16, Hospital das Clínicas Faculdade de Medicina da Universidade de São Paulo.

Multidisciplinary Team Care May Slow the Rate of Decline in Renal Function

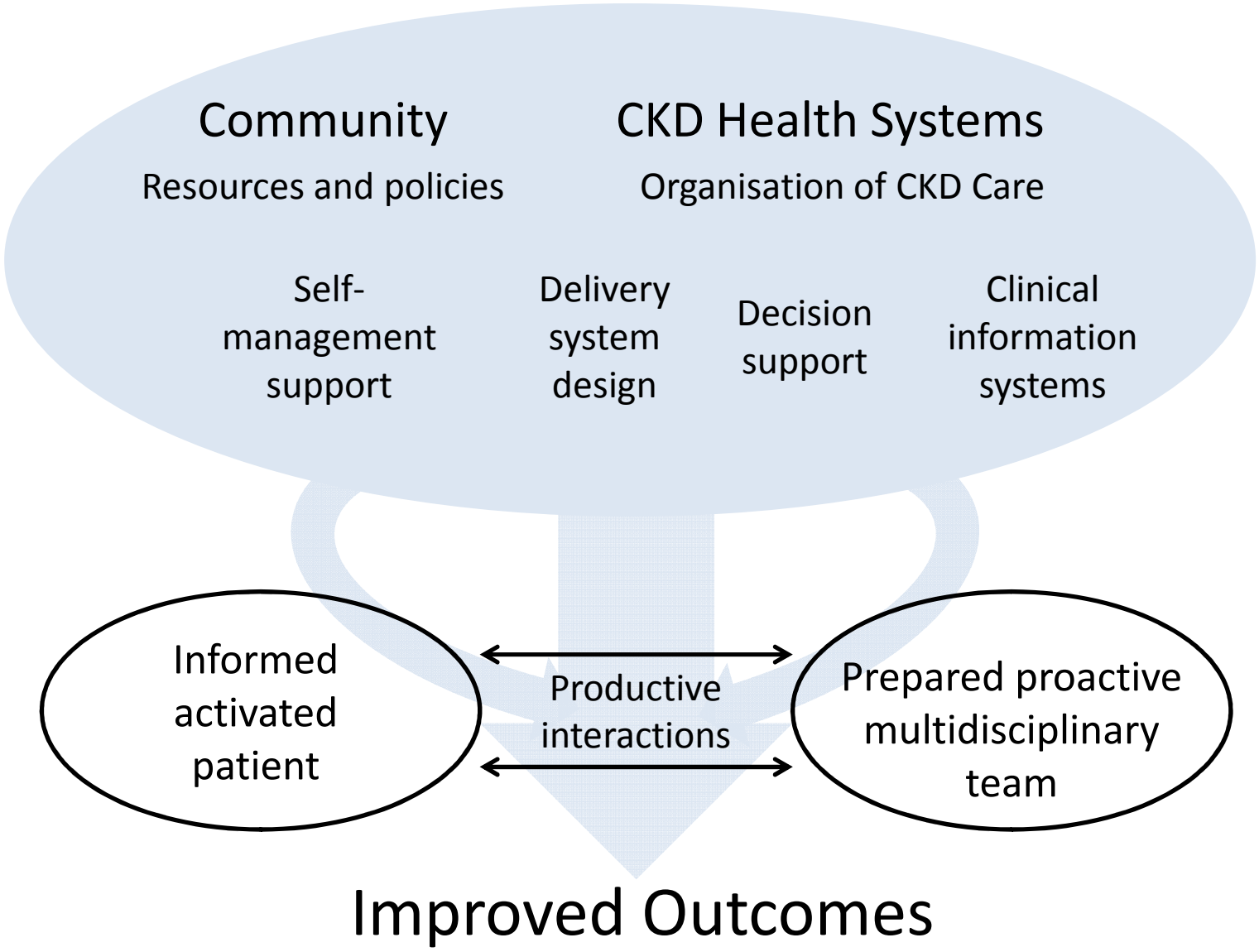
Elizabeth A. Bayliss,[†] Bharati Bhardwaja,[‡§] Colleen Ross,[*] Arne Beck,[*] and Diane M. Lanese[‖]*

Summary

Background and objectives A multidisciplinary team (MDT) approach to chronic kidney disease (CKD) may help optimize care of CKD and comorbidities. We implemented an MDT quality improvement project for persons with stage 3 CKD and comorbid diabetes and/or hypertension. Our objective was to decrease the rate of decline of GFR.

Clin J Am Soc Nephrol 6: 704–710, 2011

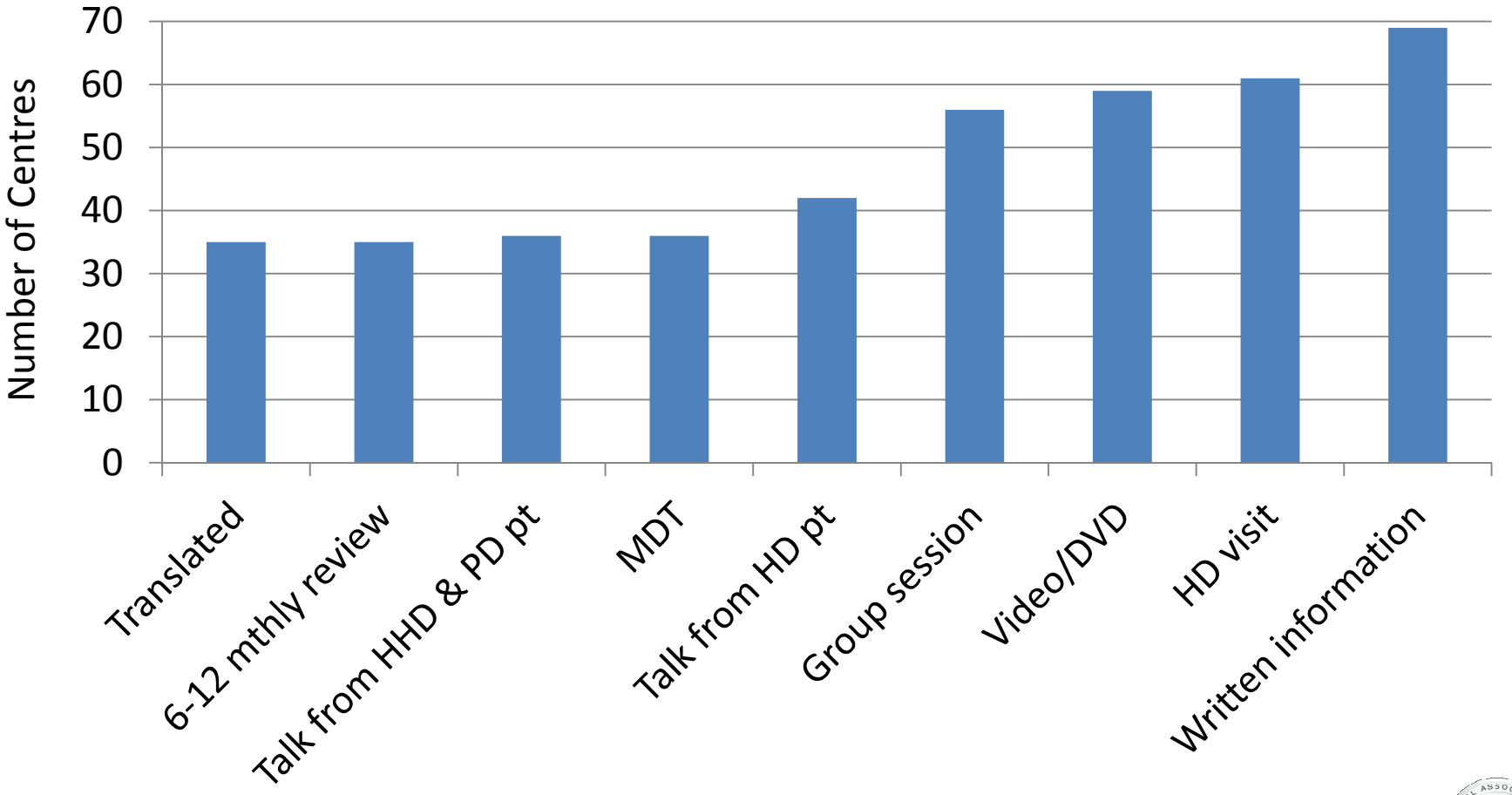
The CKD Chronic Care Model



CKD Models of Care

- Multidisciplinary team
  - dietician, educator, anaemia co-ordinator, pharmacist, social worker, access co-ordinator, counsellor, diabetic nurse, occupational therapist, psychologist, nephrologist
- Shared care scheme
- Low clearance clinics
- Pre-dialysis education programme

Components of Pre-Dialysis Education Programme Provided by 70 UK Centres



UK Renal Registry 13th Annual Report

NEPHROLOGY

Nephrology **15** (2010) 108–115

Original Article

Chronic kidney disease care program improves quality of pre-end-stage renal disease care and reduces medical costs

SHU-YI WEI,[1] YONG-YUAN CHANG,[2] LIH-WEN MAU,[3] MING-YEN LIN,[4] HERNG-CHIA CHIU,[3] JER-CHIA TSAI,[4,5] CHIH-JEN HUANG,[6,7] HUNG-CHUN CHEN[4,5] and SHANG-JYH HWANG[4,5]

[1]Division of Nephrology, Department of Internal Medicine, Kaohsiung Municipal United Hospital, [2]Graduate Institute of Public Health, [3]Graduate Institute of Health Administration, College of Health Science, Kaohsiung Medical University, [4]Division of Nephrology, Department of Internal Medicine, [6]Department of Radiation Oncology, Kaohsiung Medical University Hospital, [5]Faculty of Renal Care, and [7]Faculty of Medicine, College of Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan

"A CKD Care Program is found to help pre-ESRD patients prepare for dialysis initiation and is associated with a reduced probability of emergency dialysis and hospitalization and lowered medical costs"

7 Objectives of CKD Models of Care

1. Provide specific therapy based on diagnosis
2. Slow CKD progression where possible
3. Evaluate and manage co-morbid conditions
4. Prevent and manage CVD
5. Identify, prevent and manage CKD specific complications (e.g. malnutrition, anaemia, bone disease, acidosis)
6. Plan and prepare for RRT (e.g. choice of modality, access-placement and care, pre-emptive transplantation)
7. Psychosocial support and provide conservative care and palliative care options where required.

Some of the Questions

- What are the consequences of late referral and the benefits of early referral?
- What are the factors involved in late referral and how do we improve them?
- Is early dialysis initiation good or bad?
- What's changed?
- What are the best models of CKD care and how can they be implemented?
- Is there evidence for clinical and cost effectiveness?
- What about the international perspective?

Guidelines – EBPG 2002

Guideline I.2.3 – When to refer to a nephrology clinic

GFR <30 ml/min and declining should receive nephrologist care and be prepared for RRT (choice of modality & location, discussion with patients & carers, psychosocial support)

Guideline I.3 – When to start dialysis*

GFR <15 ml/min plus symptoms & signs, inability to control hydration status or blood pressure, progressive deterioration in nutritional status

GFR ≥6 ml/min, even if no symptoms and optimal pre-dialysis care, aim to start at 8-10 ml/min (*Evidence level: C*)

High-risk patients e.g. diabetics may benefit from an earlier start (*Evidence level: C*)

NDT Volume 17 suppl 7 July 2002

Guidelines – KDOQI 2006

1.1 Preparation for kidney failure

Patients who reach CKD stage 4 (estimated GFR < 30 mL/min/1.73 m^2) should receive timely education ….

Patients' family members and caregivers also should be educated about treatment choices for kidney failure. (B)

1.3 Timing of therapy

When patients reach stage 5 CKD (eGFR < 15 mL/min/1.73 m^2), nephrologists should evaluate the benefits, risks, and disadvantages of beginning kidney replacement therapy.

Particular clinical considerations and certain characteristic complications of kidney failure may prompt initiation of therapy before stage 5. (B)

Guidelines – CSN 2008

Components of care prior to initiation

Patients with eGFR <30 mL/min/1.73m^2 should receive care in a multidisciplinary setting that includes physicians, nurses, dietiticians and social workers (grade C)

Education program should include lifestyle modification, medication management, modality selection and vascular access as well as options for renal transplantation (grade D, opinion).

Timing of initiation

No evidence to recommend a GFR at which RRT should be initiated in the absence of CKD complications (grade D, opinion).

eGFR < 20 mL/min/1.73m^2 may require RRT initiation if symptoms, refractory metabolic complications, volume overload or a decline in nutritional status dictates (grade D, opinion).

CMAJ • NOVEMBER 18, 2008 • 179(11)

Guidelines – UK RA 2009

Guideline 1.1&1.2 - RRT: Timely nephrology referral

Refer CKD stage 4-5 or CKD stage 3 and rapidly deteriorating function for assessment by a nephrologist (1B)

Refer at least a year before anticipated RRT (2B)

Guideline 5.2 - RRT: Initiating RRT

Decision to start RRT in patients with CKD stage 5 (eGFR < 15ml/min/1.73m^2) based on discussion of risks and benefits of RRT considering symptoms & signs, nutritional status, co-morbidity, QoL, and the physical, psychological and social consequences of RRT (1D)

Guideline 5.3 - RRT: Initiating RRT

Start RRT when eGFR < 6ml/min/1.73m^2, even if the patient is asymptomatic (2C)

http://www.renal.org/Clinical/GuidelinesSection/RenalReplacementTherapy.aspx#S1

Guidelines – CARI 2005 & 2010

Referral to nephrology (2010)

Patients with an eGFR <30 mL/min per 1.73 m^2 should generally be referred to a nephrology service for assessment and multidisciplinary management of chronic kidney disease

Initiation of dialysis (2005)

GFR < 10 mL/min/1.73 m^2 and evidence of uraemia ± complications such as malnutrition (Level III evidence)

GFR ≤ 6 mL/min/1.73 m^2 if no symptoms or complications (Level III)

Educate patients and staff about the strength of the evidence (at best, cohort studies) regarding the rationale for 'early' dialysis initiation

http://www.cari.org.au/dialysis_accept_published.php

Providing up-to-date medical information for patients and healthcare professionals

Renal Patient*View* NHS

Home | Patient Details | Patient Info | About Me | Enter My... | Results | Medicines | Letters | Contact | Forum | Help

logged in as: **testgen** log out 11 Oct 2011

From the RPV blog

Problems?

Patient Details

Patient Details for RPVGEN TEST	
Last Name	TEST
First Name	RPVGEN
Date of Birth (yyyy-mm-dd)	1978-01-03
NHS Number	203011978X
Hospital Number	00000000C
Address	A nice Flat The Village Someplace
Postcode	G4 0SF
Telephone 1	010101010101010101010
Diagnosis	No diagnosis stated
Treatment	Haemodialysis
Transplant Status	No status uploaded (Explain this)
Other Conditions	

Disclaimer

Site Powered By Worth Solutions

www.renalpatientview.org

www.renalpatientview.org

International Perspective