Debate:
Asia Does Not Need Advanced Hemodialysis Technologies

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Singapore General Hospital
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Disclosure

- No disclosures relevant to this talk

Acknowledgement

- Professor Vivekanand Jha

  - President, International Society of Nephrology
  - Executive Director, The George Institute for Global Health India
    Professor of Nephrology and James Martin Fellow, University of Oxford

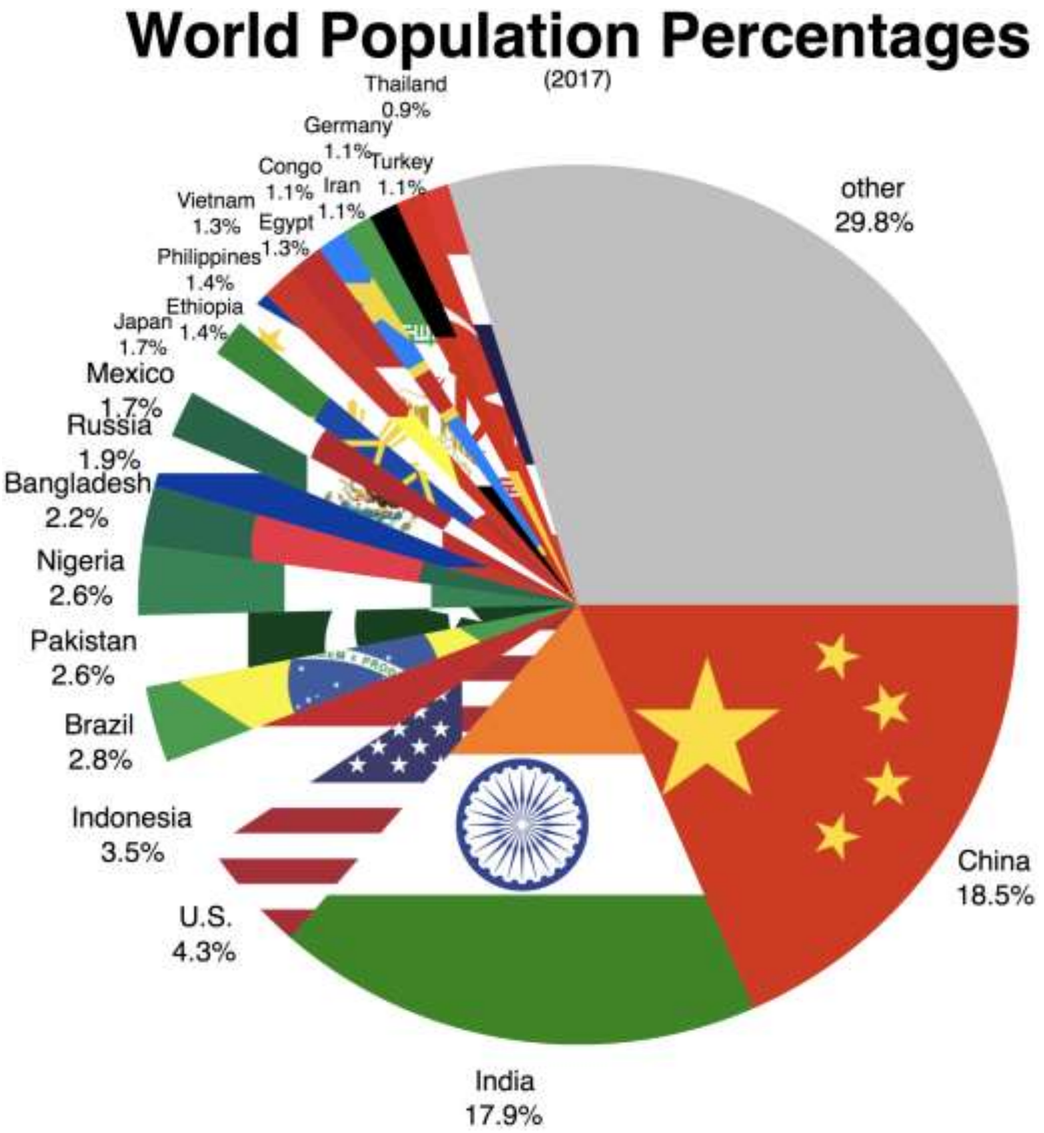
- The George Institute was first founded in Australia in 1999 with the aim of reducing the escalating burden of non-communicable diseases and injury around the world

Agenda

- Unique challenges for delivery of hemodialysis (HD) in Asia
- Advanced technologies in HD and their impact on care and outcomes
- Improvement in care and outcomes is possible by extending use of existing technology to fill the gaps in HD delivery in Asia

Unique challenges of delivery of hemodialysis (HD) in Asia

Asia in numbers



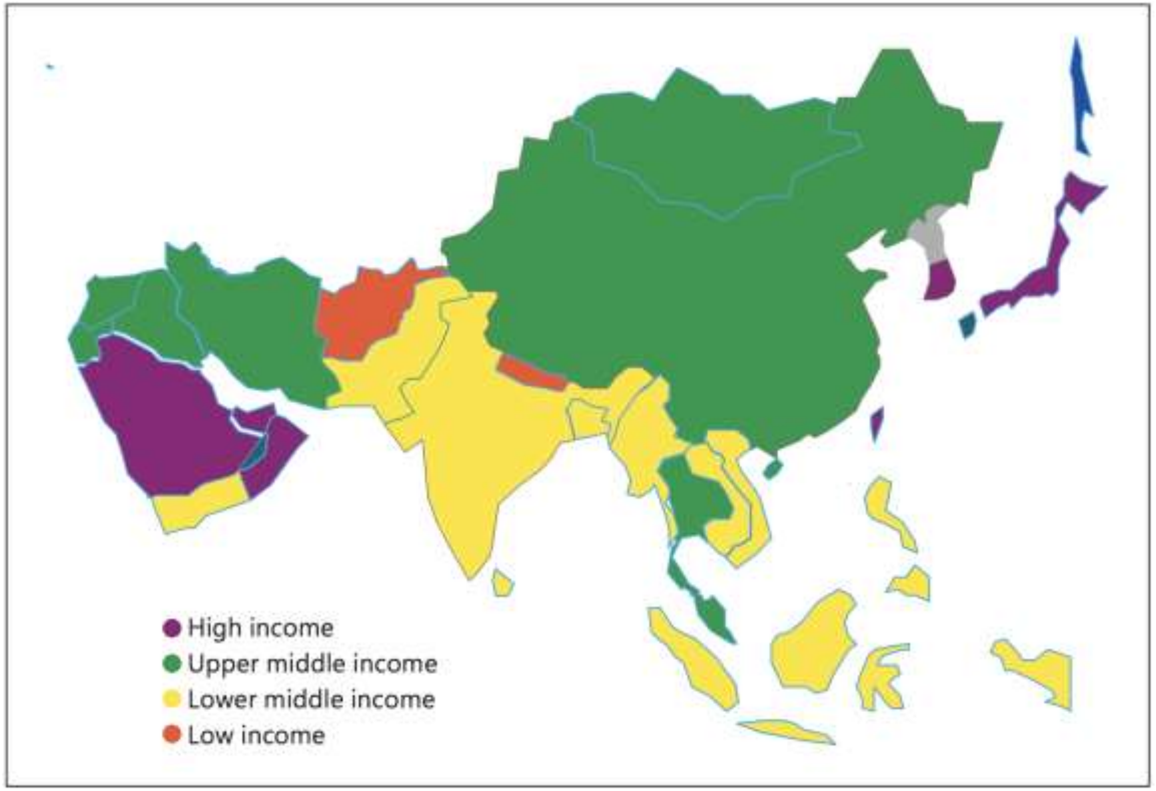
3.3% of world's land mass

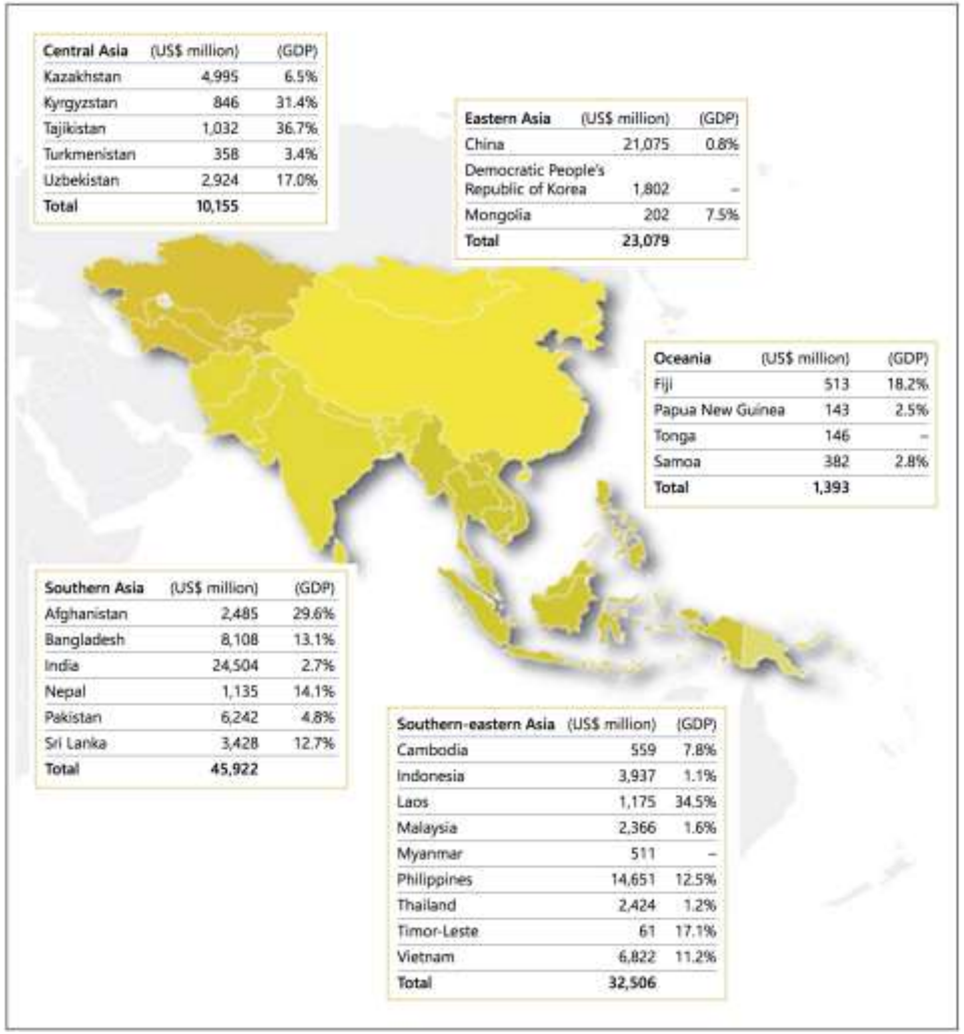
25% of the world's population

Majority below poverty line earning <2 USD per day

Kumar V, Clin Nephrol 2016; 86 (Suppl 1);S23-S26

Heterogeneity in Asian economies





Central Asia	(US$ million)	(GDP)
Kazakhstan	4,995	6.5%
Kyrgyzstan	846	31.4%
Tajikistan	1,032	36.7%
Turkmenistan	358	3.4%
Uzbekistan	2,924	17.0%
Total	10,155	

Eastern Asia	(US$ million)	(GDP)
China	21,075	0.8%
Democratic People's Republic of Korea	1,802	–
Mongolia	202	7.5%
Total	23,079	

Oceania	(US$ million)	(GDP)
Fiji	513	18.2%
Papua New Guinea	143	2.5%
Tonga	146	–
Samoa	382	2.8%
Total	1,393	

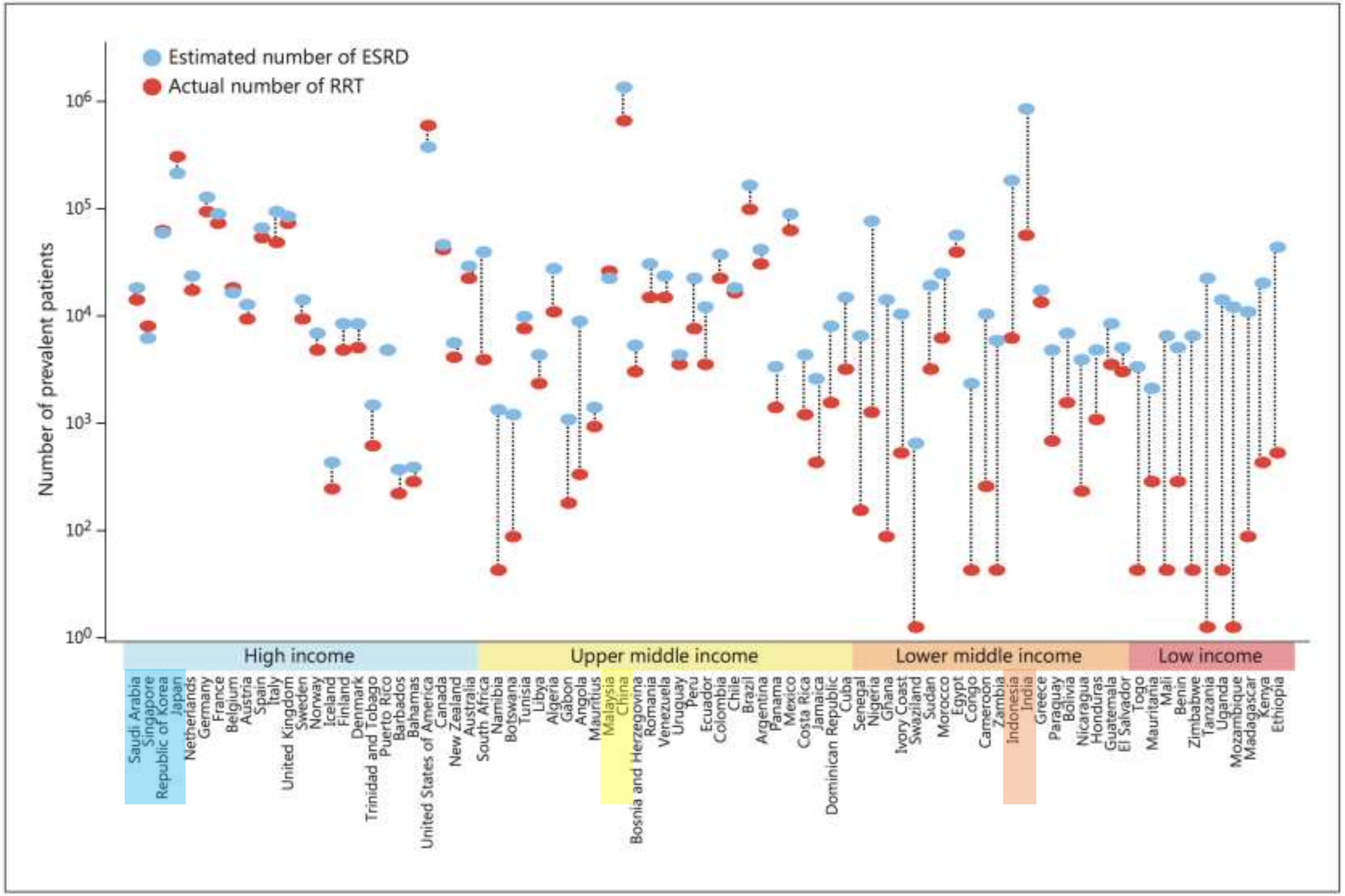
Southern Asia	(US$ million)	(GDP)
Afghanistan	2,485	29.6%
Bangladesh	8,108	13.1%
India	24,504	2.7%
Nepal	1,135	14.1%
Pakistan	6,242	4.8%
Sri Lanka	3,428	12.7%
Total	45,922	

Southern-eastern Asia	(US$ million)	(GDP)
Cambodia	559	7.8%
Indonesia	3,937	1.1%
Laos	1,175	34.5%
Malaysia	2,366	1.6%
Myanmar	511	–
Philippines	14,651	12.5%
Thailand	2,424	1.2%
Timor-Leste	61	17.1%
Vietnam	6,822	11.2%
Total	32,506	

Any review of Asia's dialysis practices or plans for developing or improving care of CKD/ ESKD should take into account these economic contrasts

Navva PKR, Blood Purif 2015; 40:280-287
Prasad N, Kidney Dis 2015; 1:165-177

Dialysis Gap: Actual numbers of RRT versus ESKD



Prasad N, Kidney Dis 2015; 1:165-177

Dialysis in Asian Countries: Challenges

Pre HD Care

Accessibility to HD
Affordability of HD: financial models of coverage

Poor patient knowledge
Screening and early diagnosis
High % of CKDu
Late referral to Nephrologist

HD Care

Shortage of HD facilities and manpower
Unequal/ preferential delivery of HD
Quality assurance: vascular access, adequacy, water quality, maintenance etc.
Dialyzer reuse
High drop out rates and lost to follow up

Evaluation

No systematic recording, evaluation and reporting of HD in Asia

Accessibility to dialysis in Asia

- 75% referred late for ESKD: associated with worse outcomes
- Not enough dialysis facilities or over burdened facilities
- Prefer to dialyze patients who are transplant candidates
- Dialysis centers available in urban pockets

Navva PKR, Blood Purif 2015; 40:280-287

State of Nephrology in SEA

Indicator	Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri Lanka
Population (millions)	34.7	162.5	0.8	1324.2	0.4	29	193.2	21.2
Percentage of rural population	73	65	61	67	53	81	61	82
Number of physicians (per 1000 people)	0.3	0.5	0.4	0.8	3.6	0.6	1	0.9

Indicator	Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri Lanka
Number of nephrologists	<10	123	1	1,639	<5	50	151	30
What proportion of patients who need it are able to get dialysis for ESKD?	<5%	25%	100%	5%–100%	Not known	20%	5%–15%	2%–12%
Number of dialysis units	<10	101	3	1584	<5	53	121	29
Number of dialysis machines	200	1179	8	12,881	<40	410	481	274
Number of transplant centers	1	6	0	233	0	4, all in 1 province	16	7
Funding for dialysis	Private	Mixed	State-funded	Mixed[a]	Private	State-funded	Mixed	State-funded

Jha V, Kidney Int 2019; 95:31-37

Accessibility to dialysis

Country	No. of patients	Percentage of population	No. of facilities
Cambodia	200	0.001	10
Myanmar	600	0.001	28
Philippines	10,000	0.011	270
Vietnam	14,000	0.015	130
Malaysia	23,500	0.083	600
Thailand	29,500	0.044	500
Korea	45,009	0.093	614
Taiwan	63,655	0.275	552
China	272,000	0.020	3,500
Japan	297,126	0.232	4,152

Unequal accessibility to dialysis

Table 1 The number of HD centres in districts is greater than in Yangon (machines numbers are similar), the majority of patients (925/1284 [72%]) are in Yangon

	Yangon			Districts		
	Government	Private	Total	Government	Private	Total
Centres	4	13	(17)	15	16	(31)
HD machines	35	101	(136)	49	60	(109)
Patients	183	742	(925)	179	180	(359)

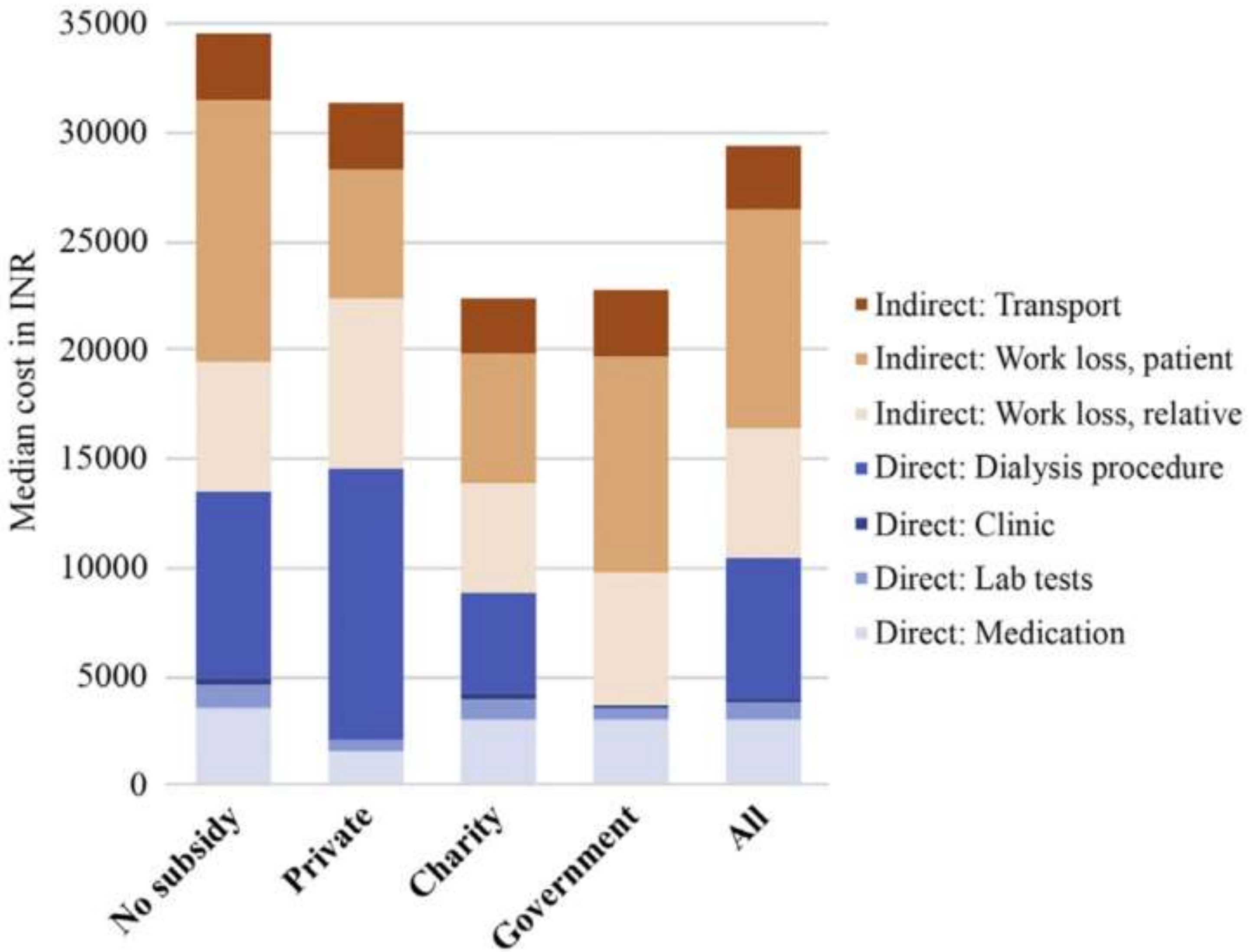
Hyodo T, Renal Replac Ther 2017; 3:11

Affordability of dialysis

- Various models of funding
- Government funding: not inclusive of all
- Insurance coverage is poor
- Dialyzer reuse: 98% in Vietnam
- In a cohort of 463 patients enrolling in to a MHD program 60% left with 3 months

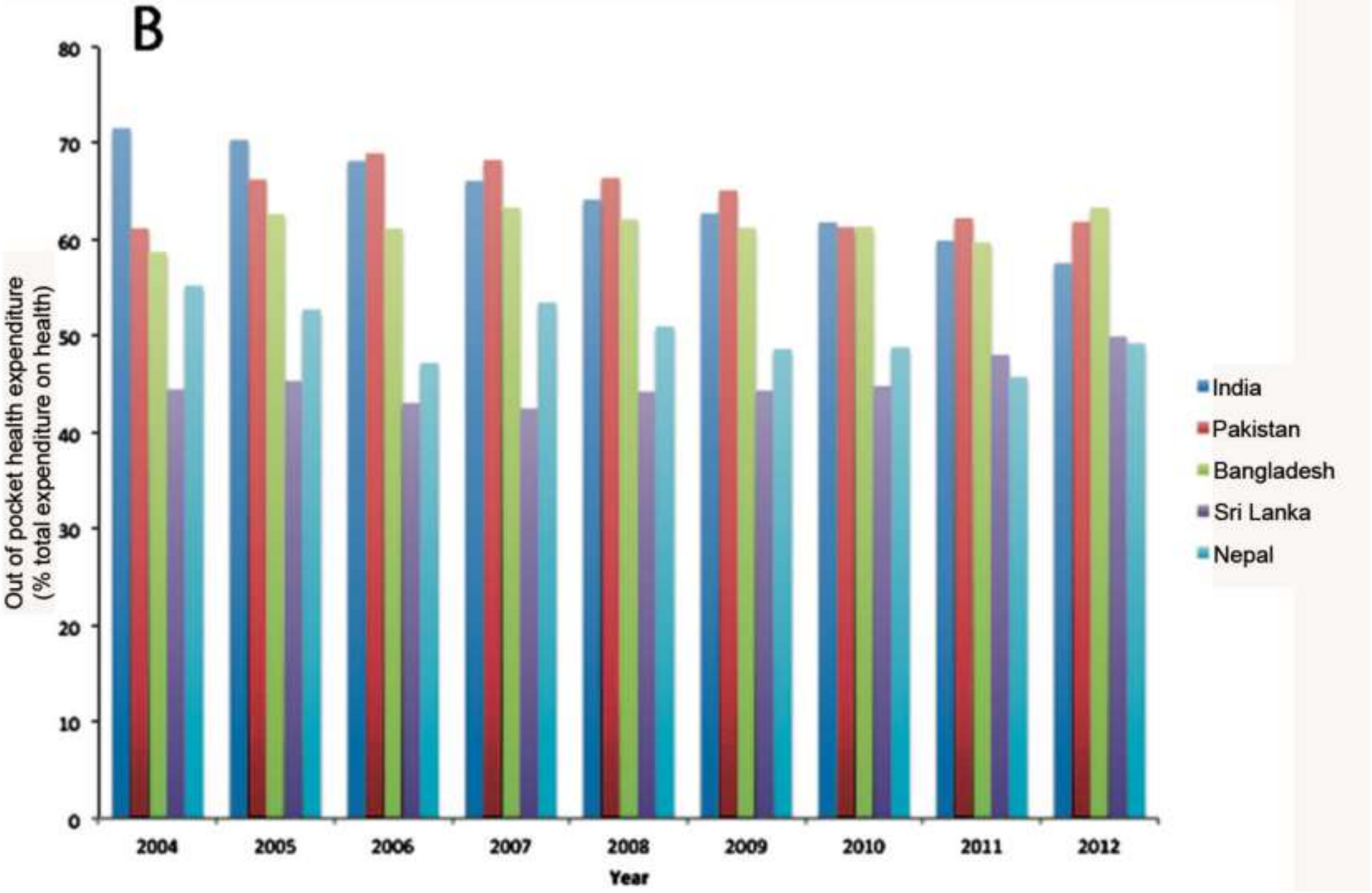
Parameswaran S, Narl Med J India 2011; 24:208-214
Navva PKR, Blood Purif 2015; 40:280-287
Hyodo T, Renal Replac Ther 2017; 3:11

Breakdown of monthly dialysis-related expenses



Bradshaw C, Kidney Int Rep 2019; 4:390-398

Out of pocket expenditure



Jha V, Clini Nephrol 2015; 83 (Suppl 1):S7-S10

Delivery of Dialysis

Rates of fulfillment for the target test frequency per year

	Hospital A	Hospital B	Hospital C
Hb (6 times/year)	39.85	44.92	32.73
Ferritin (3 times/year)	0.77	33.45	33.91
Ca (6 times/year)	36.25	35.41	27.35
Phosphorus (6 times/year)	35.99	35.39	26.85
iPTH (4 times/year)	18.51	24.84	25.28
Alb (4 times/year)	24.16	25.97	22.14
Kt/V (4 times/y)	24.16	25.97	22.14
Urea reduction rate (4 times/year)	28.53	34.86	19.82

Rates of fulfillment for the target level of each test

	Hospital A	Hospital B	Hospital C
Traget level			
Hb (100–130 g/L)	54.24	66.00	59.51
Ferritin (100–500 ng/dL)	6.66	39.69	34.64
Ca (2.1–2.5 mmol/L)	37.53	55.72	51.33
Phosphorus (1.13–1.78 mmol/L)	28.02	38.95	36.93
iPTH (150–300 ng/mL)	16.20	23.07	21.56
Alb (>35 g/L)	30.08	35.53	35.17
Kt/V (>1.3)	30.08	35.53	35.17
Urea reduction rate (>67.5%)	29.82	38.66	31.10

Hyodo T, Renal Replac Ther 2017; 3:11

Water quality for dialysis

- Tropical climate: high temperatures, heavy precipitation, floods, water-logging
- Quality of feed water is variable
- Treatment systems not optimized to deliver consistent supply and quality of water of acceptable standards
- Testing frequencies are low and the documentation is poor

Jha V, Clini Nephrol 2015; 83 (Suppl 1):S7-S10

Water quality in SEA

	ET, EU/l	Bacteria, CFU/ml
Facility A		
Tap water	8,076	200
RO water	57	100
Dialysate 1	741	500
Dialysate 2	903	800
Facility B		
Tap water	378	70
RO water	2.9	300
Dialysate 1	38	150
Dialysate 2	49	100
Facility C		
Tap water	1,468	110
RO water	94	22
Dialysate 1	201	600
Dialysate 2	395	1,000
Dialysate 3[a]	2,295	1,000
Facility D		
Tap water	1,663	110
RO water 1	7.3	120
RO water 2	7.8	100
Dialysate 1	309	800
Dialysate 2	246	800

[a] At a console with an ET-retentive filter.

4 centres in Vietnam and Cambodia

The ET levels in standard dialysates were satisfactory at 2 facilities

The bacterial counts in dialysates were not acceptable at any of the facilities investigated

Naramura T, Nephron Extra 2014; 4:64-69

Dialysis in Asian Countries: Challenges

Challenges going forward for Cambodia (2017)

- No fund exists to help patients pay for HD treatment.
- Dialysis sessions and checkup appointments are often missed.
- Time and money needed for transportation, accommodation, and treatment is especially high for patients in the provinces.
- There are fewer than 10 nephrologists for a population of over 15 million.
- Dialysis centers are available only in Phnom Penh, Battambang, and Siem Reap.

Challenges going forward for India (2017)

- Most dialysis care is provided by the private sector.
- There is very little insurance coverage for HD and CAPD.
- Nearly 45% of children present with CKD stage 4 or 5, and less than 50% of children presenting with ESRD receive continuous dialysis.
- 63.4% of CKD stage 5 patients do not receive any form of RRT.

Masuda T, Blood Purif 2017; 44 (Suppl 1):3-18

Dialysis in Asian Countries: Challenges

Challenges going forward for Lao PDR (2017)

- Dialysis treatment is not covered by health insurance, resulting in irregular treatment.
- Kidney biopsy is not available in the country yet, so patients must travel to Thailand for biopsy and bear all costs.
- No regulatory body or association for kidney disease has been established yet in Lao PDR.
- There are no technicians to repair dialysis machines, so representatives are hired from companies, increasing costs and reducing efficiency.
- Water systems for dialysis are not regularly inspected.

Challenges going forward for RRT in Mongolia (2017)

- Monitoring and health education is inadequate, resulting in rapid progression to ESRD.
- Government financing for treatment, equipment, and infrastructure is insufficient.
- Mongolia does not provide training of HD engineers.
- Availability of AVF at time of first HD session is rare.
- Health insurance does not cover erythropoietin, phosphate-binders, vitamin D, or calcimimetic preparations.
- 43% of patients receive only 4-8 hours of HD per week due to the limited number of HD machines.

Masuda T, Blood Purif 2017; 44 (Suppl 1):3-18

Dialysis in Asian Countries: Challenges

Challenges going forward for Myanmar (2017)

- Financial allocation to the health sector has increased, but the percentage of out-of-pocket expenditure remains high.
- The ratio of nephrologists to patients for the whole population is low.
- Patient knowledge of health care needs to be improved.
- There is currently no national kidney foundation to monitor or foster advancement of HD centers.
- Maintenance checks for dialysis fluid systems and equipment are irregular because there are no clinical engineers.
- National guidelines for HD are not yet fully established.

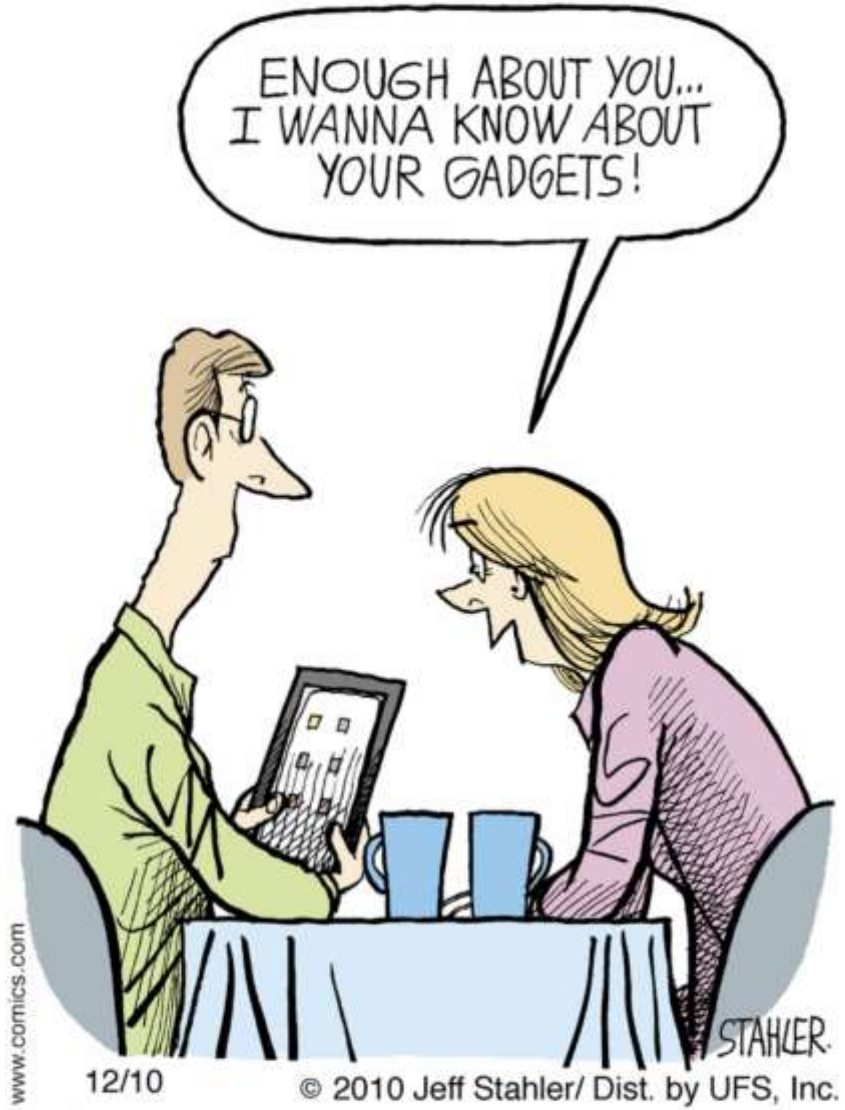
Challenges going forward in Vietnam (2017)

- Only 21,000 of 90,000 patients in need of RRT are receiving treatment, and all HD facilities are overloaded.
- Low- rather than high-flux dialyzers are used, and dialyzers are reused many times (because the cost of a dialyzer is reimbursed only after 6 uses).
- Most patients are covered by health insurance, but HD is not always affordable due to extra treatment costs at many public and all private hospitals.
- Modern dialysis machines are available, but water quality for dialysis is questionable.
- There is also a major shortage of qualified health care providers.

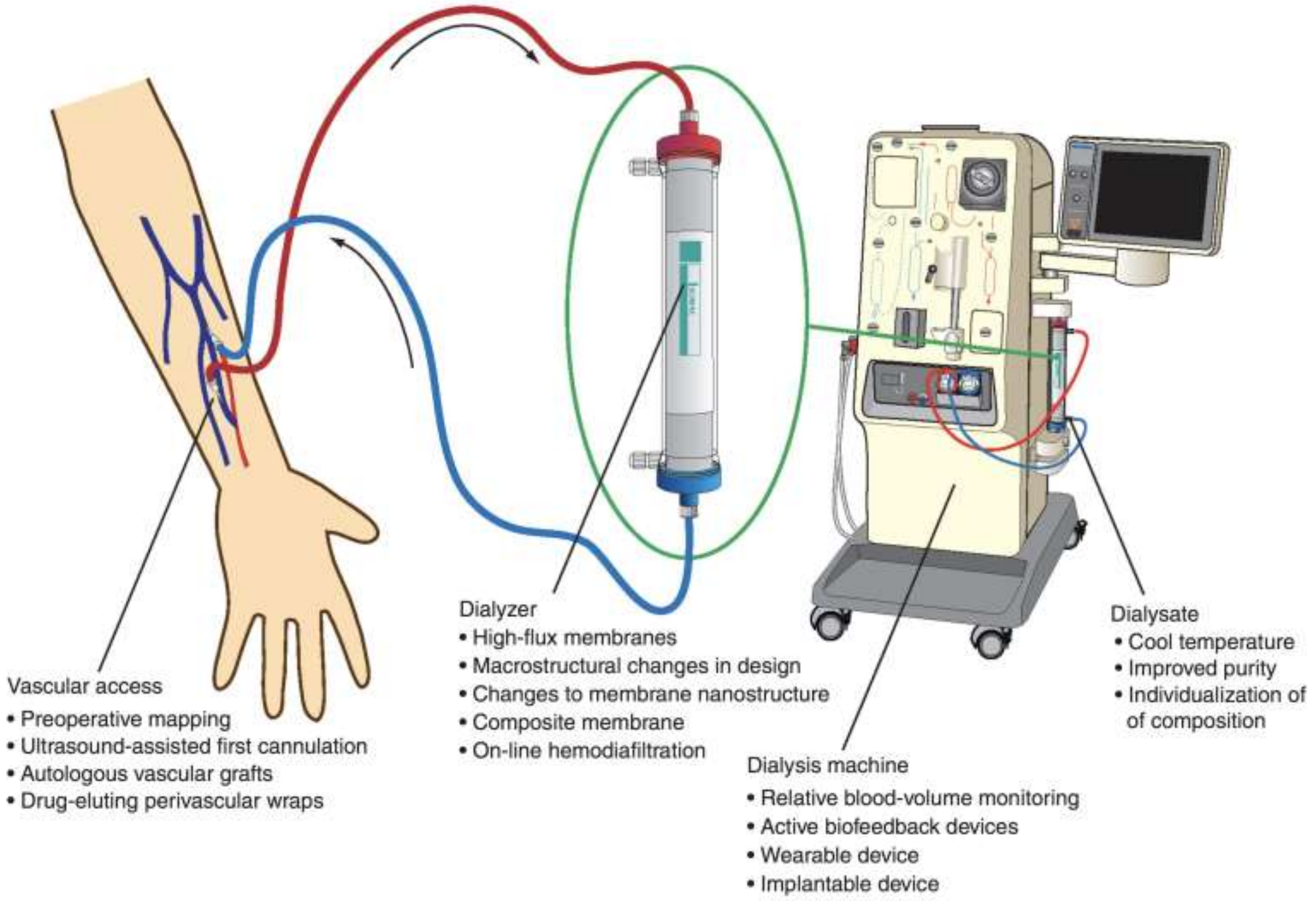
Masuda T, Blood Purif 2017; 44 (Suppl 1):3-18

Advanced technologies in HD and their impact on care and outcomes

Technology advances and us



Advanced Hemodialysis Technologies



Chan CT, Kidney Int 2013; 83:359-371

Advanced dialysis technologies

Did 20 Years of Technological Innovations in Hemodialysis Contribute to Better Patient Outcomes?

Norbert Lameire, Wim Van Biesen, and Raymond Vanholder

Renal Division, Department of Medicine, University Hospital, Gent, Belgium

Clin J Am Soc Nephrol 4: S30–S40, 2009. doi: 10.2215/CJN.04000609

Adequacy of dialysis

- Current method: KT/V
- Different ways to express KT/V
- Reflects the behavior of urea only
- Presumes changing KT/V by changing K or changing T achieves equal changes in solute removal or outcomes

Lamiere N, cJASN 2009; 4:530-540

Delivery of dialysis

KT/V

K: Dialyzer clearance for urea
T: Time of dialysis therapy session
V: Volume of distribution of urea

Bellomo R, The Lancet 2012; 380:756-766

Delivery of dialysis

KT/V

Bellomo R, The Lancet 2012; 380:756-766

Delivery of dialysis

KT/V

Bellomo R, The Lancet 2012; 380:756-766

Delivery of dialysis

KT/V

Membrane flux
Online Clearance Monitor (OCM)
On-line HDF

Bellomo R, The Lancet 2012; 380:756-766

Membrane Flux and outcomes

- HEMO Study: in prevalent HD patients
  - no significant survival difference between the high-flux and the low-flux membrane types at primary analysis
  - secondary analyses showed that, compared with the low-flux group, there were significant reductions in the risk for death from cardiac causes and the combined outcome of first hospitalizations or death from a cardiac cause in the high-flux group
  - *post hoc* analyses showed an outcome benefit for high-flux membranes on the risk for cerebrovascular accidents and on overall mortality risk for patients who were enrolled in the study after 3.7 years of maintenance dialysis (the median time on dialysis for the entire population)

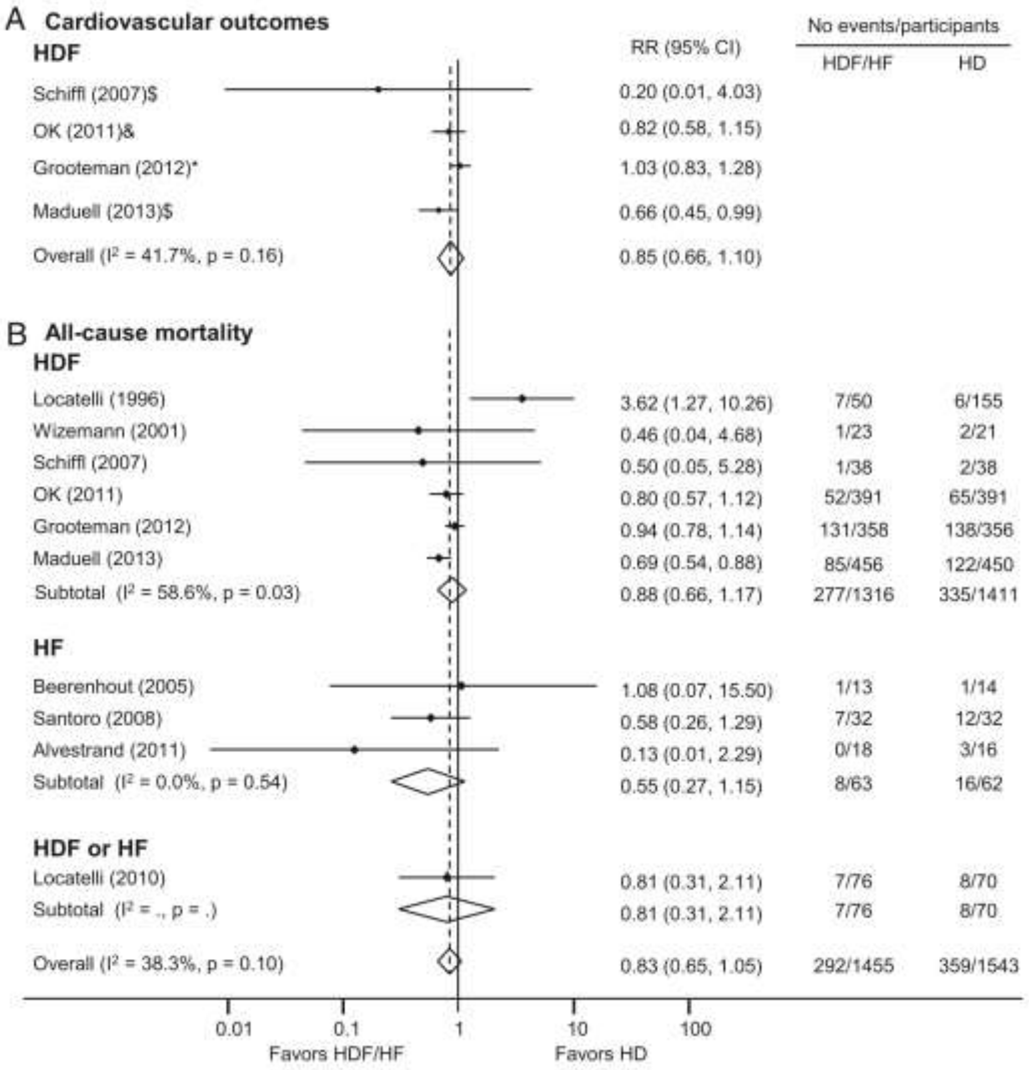
Lamiere N, cJASN 2009; 4:530-540

Membrane Flux and outcomes

- MPO Study: in incident HD patients
  - high-flux dialysis showed a significant survival benefit of 37%, after adjustment, of patients with a low serum albumin
  - in a sub-analysis including patients with diabetes, high-flux dialysis was associated with improved survival
  - in patients with a serum albumin level 4 g/dl, no survival benefit could be observed with the use of high-flux membranes

Lamiere N, cJASN 2009; 4:530-540

OL-HDF versus HD/ HFHD

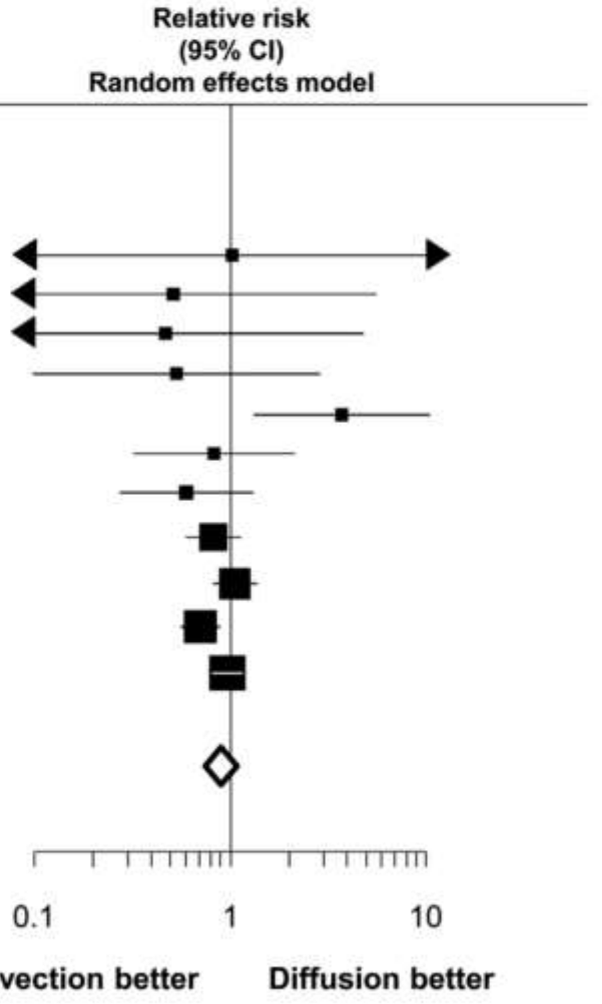


Wang AY, AJKD 2014; 63(6):968-978

OL-HDF versus HD/ HFHD

	No. of events/ No. of participants		Relative risk (95% CI)	
	Convection	Diffusion	Random effects model	Weight
All-cause mortality				
Beerenhout et al, 2005	1/20	1/20	1.00 (0.07 to 14.9)	0.47%
Schiffl, 2007	1/38	2/38	0.50 (0.05 to 5.28)	0.62%
Wizemann et al, 2000	1/23	2/21	0.46 (0.04 to 4.68)	0.63%
PROFIL study, 2011	2/27	3/21	0.52 (0.10 to 2.83)	1.17%
Locatelli et al, 1996	7/50	6/155	3.62 (1.27 to 10.26)	2.94%
Locatelli et al, 2010	7/76	8/70	0.81 (0.31 to 2.11)	3.41%
Santoro et al, 2008	7/32	12/32	0.58 (0.26 to 1.29)	4.80%
TURKISH OL-HDF study, 2013	52/391	65/391	0.80 (0.57 to 1.12)	16.62%
Tessitore et al, 2012	65/177	69/194	1.03 (0.79 to 1.35)	20.56%
ESHOL study, 2013	85/456	122/450	0.69 (0.54 to 0.88)	22.34%
CONTRAST study, 2012	131/358	138/356	0.94 (0.78 to 1.14)	26.43%
Total	**359/1648**	**428/1748**	**0.87 (0.70 to 1.07)**	**100.0%**

Heterogeneity: χ^2_{10}= 15.1; P = 0.1; I^2 = 34%



Nistor I, AJKD 2014; 63(6):954-967

Delivery of dialysis

KT/V

Blood Volume Monitor (BVM)

Bellomo R, The Lancet 2012; 380:756-766

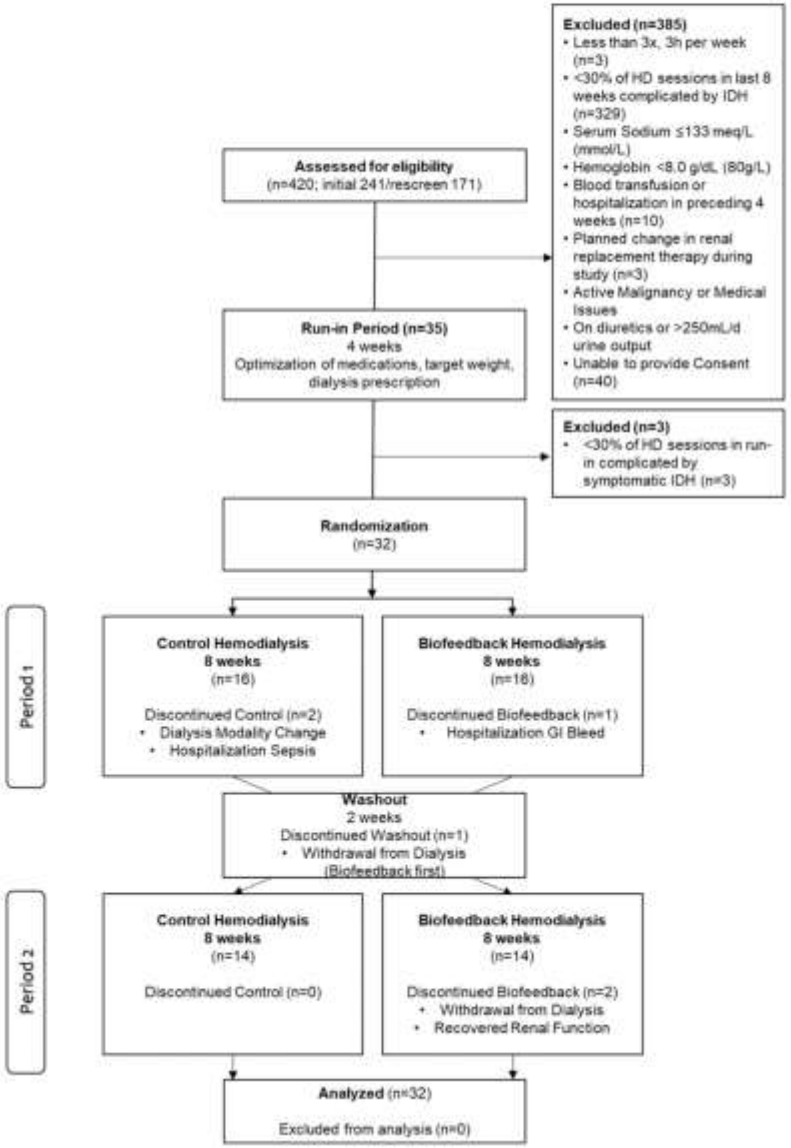
Biofeedback versus control HD

Randomized Crossover Trial of Blood Volume Monitoring–Guided Ultrafiltration Biofeedback to Reduce Intradialytic Hypotensive Episodes with Hemodialysis

Kelvin C.W. Leung, Robert R. Quinn,*† Pietro Ravani,*† Henry Duff,*‡ and Jennifer M. MacRae*‡*

Clin J Am Soc Nephrol 12: 1831–1840, 2017. doi: https://doi.org/10.2215/CJN.01030117

Biofeedback versus control HD



Biofeedback versus control HD

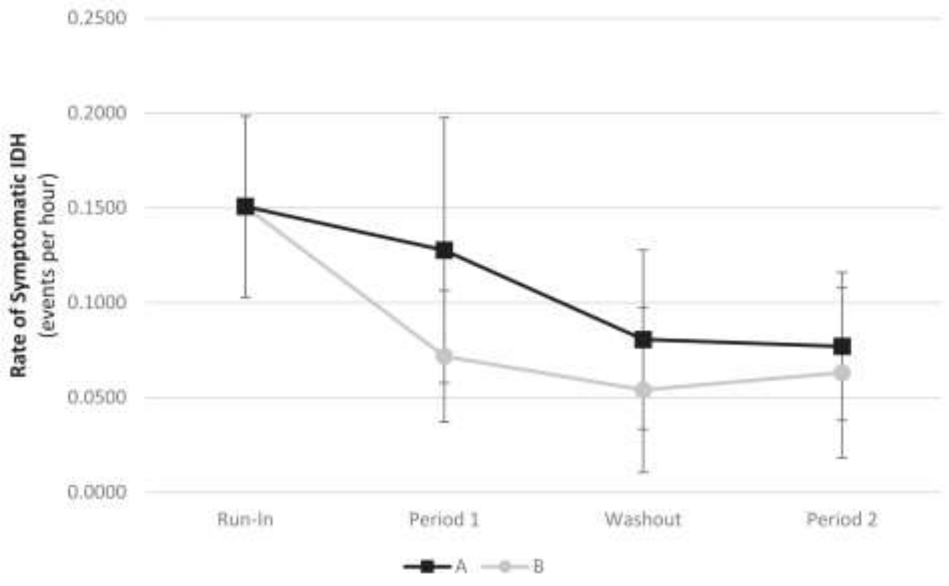


Figure 2. | The rate of symptomatic IDH did not differ in each period between the two randomization orders. In randomization order A, biofeedback in period 1 followed by control in period 2. In randomization order B, control in period 1 followed by biofeedback in period 2. IDH, intradialytic hypotension.

Table 3. Rates of symptomatic IDH, asymptomatic IDH, and symptoms alone by intervention

Variable	Symptomatic IDH Rate, Events/h	Asymptomatic IDH Rate, Events/h	Symptoms Alone Rate, Events/h
Run-in period	0.15 (0.10 to 0.20)	0.31 (0.25 to 0.37)	0.07 (0.04 to 0.10)
Biofeedback period	0.10 (0.06 to 0.14)	0.33 (0.24 to 0.41)	0.05 (0.03 to 0.06)
Start of period	0.15 (0.06 to 0.24)	0.36 (0.25 to 0.47)	
End of period	0.07 (0.03 to 0.10)	0.26 (0.16 to 0.36)	
Control period	0.07 (0.05 to 0.10)	0.30 (0.23 to 0.37)	0.06 (0.04 to 0.08)
Start of period	0.09 (0.04 to 0.13)	0.32 (0.25 to 0.40)	
End of period	0.11 (0.02 to 0.19)	0.33 (0.20 to 0.47)	

Values are expressed as mean (95% confidence interval) unless otherwise indicated. IDH, intradialytic hypotension

CLIMB Study

Intradialytic Blood Volume Monitoring in Ambulatory Hemodialysis Patients: A Randomized Trial

Donal N. Reddan,[*†‡] Lynda Anne Szczech,[*‡] Vic Hasselblad,[*] Edmund G. Lowrie,[§] Robert M. Lindsay,[‖] Jonathan Himmelfarb,[¶] Robert D. Toto,[#] John Stivelman,[**] James F. Winchester,[††‡‡] Linda A. Zillman,[*] Robert M. Califf,[*‡] and William F. Owen, Jr[‡§§]

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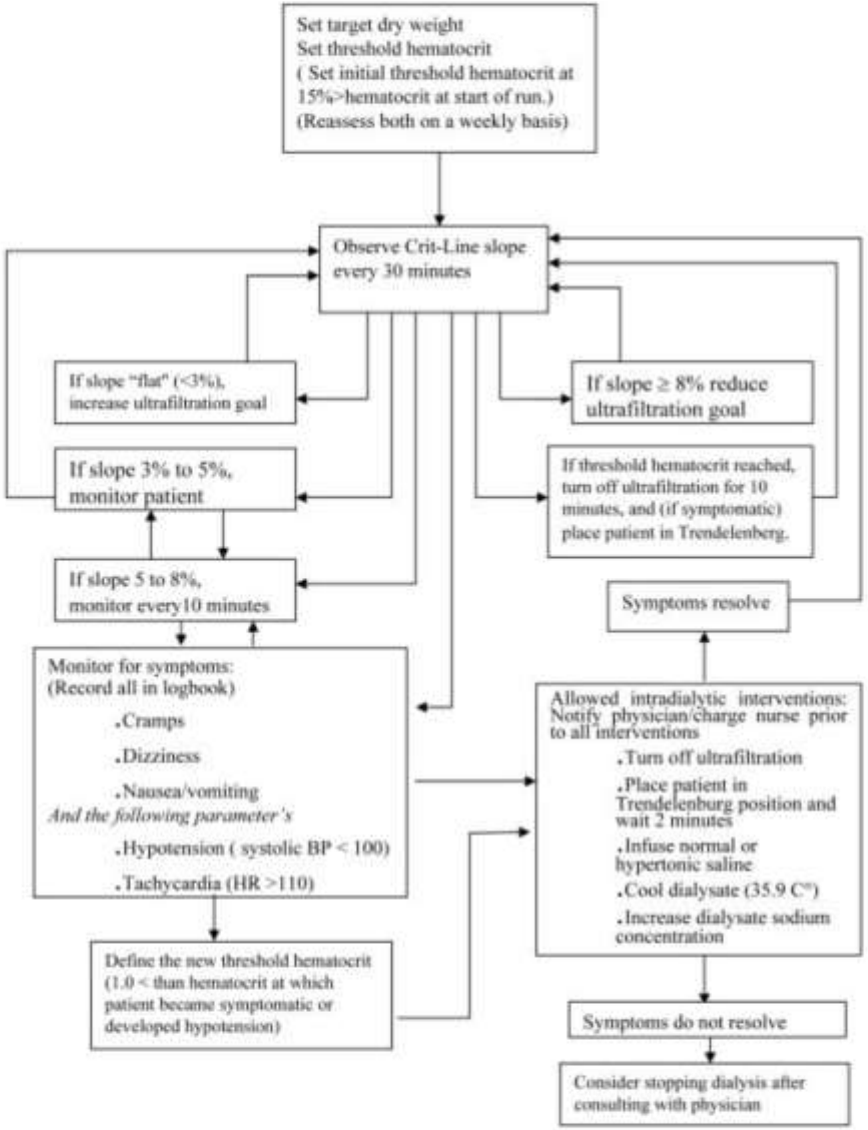
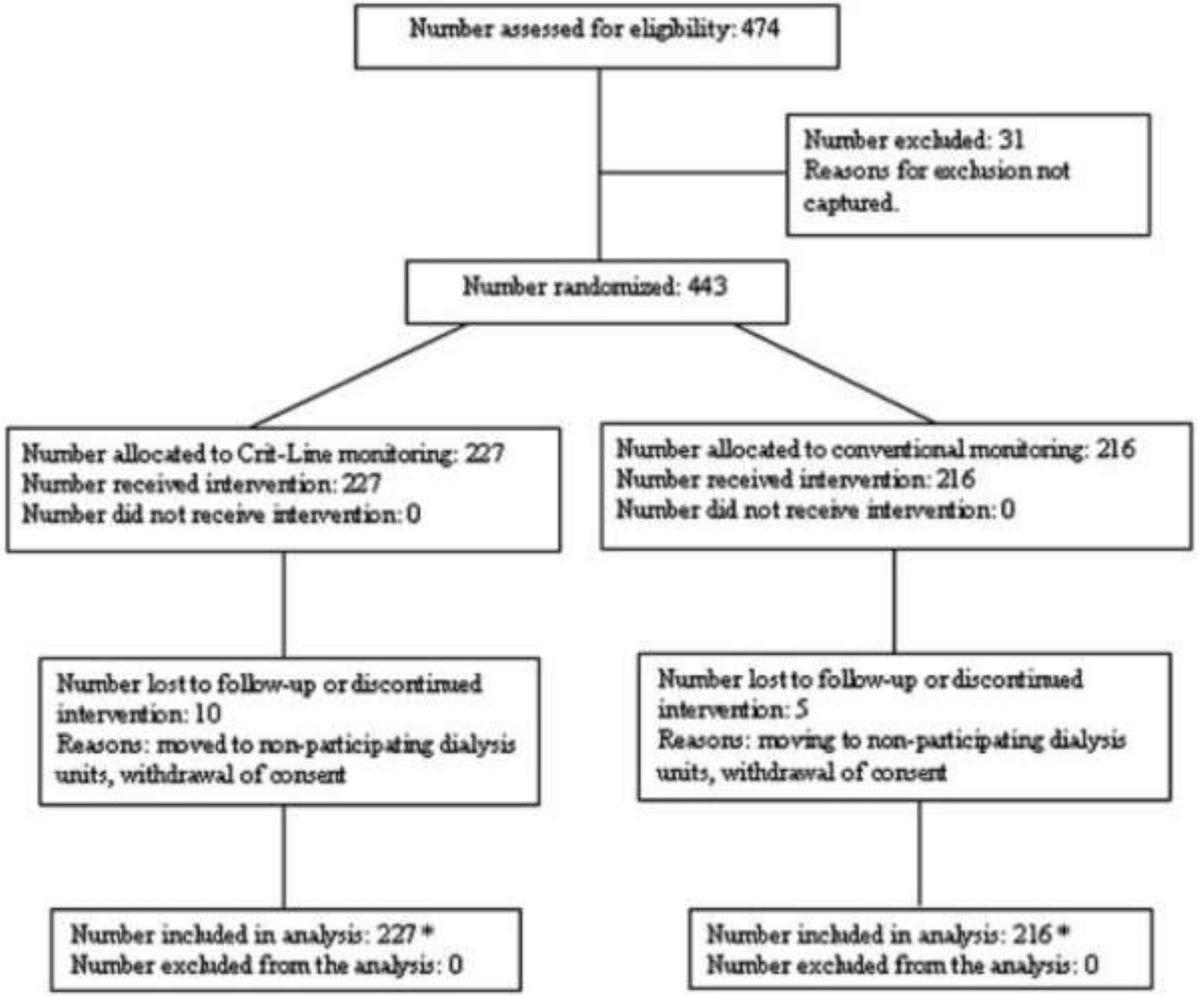
J Am Soc Nephrol 16: 2162–2169, 2005. doi: 10.1681/ASN.2004121053

CLIMB Study



Set target dry weight
Set threshold hematocrit
(Set initial threshold hematocrit at 15%>hematocrit at start of run.)
(Reassess both on a weekly basis)
Observe Crit-Line slope every 30 minutes
If slope "flat" (<3%), increase ultrafiltration goal
If slope ≥ 8% reduce ultrafiltration goal
If slope 3% to 5%, monitor patient
If threshold hematocrit reached, turn off ultrafiltration for 10 minutes, and (if symptomatic) place patient in Trendelenberg.
If slope 5 to 8%, monitor every10 minutes
Symptoms resolve
Monitor for symptoms: (Record all in logbook)
.Cramps
.Dizziness
.Nausea/vomiting
And the following parameter's
.Hypotension (systolic BP < 100)
.Tachycardia (HR >110)
Allowed intradialytic interventions: Notify physician/charge nurse prior to all interventions
.Turn off ultrafiltration
.Place patient in Trendelenburg position and wait 2 minutes
.Infuse normal or hypertonic saline
.Cool dialysate (35.9 C°)
.Increase dialysate sodium concentration
Define the new threshold hematocrit (1.0 < than hematocrit at which patient became symptomatic or developed hypotension)
Symptoms do not resolve
Consider stopping dialysis after consulting with physician



Number assessed for eligibility: 474
Number excluded: 31
Reasons for exclusion not captured.
Number randomized: 443
Number allocated to Crit-Line monitoring: 227
Number received intervention: 227
Number did not receive intervention: 0
Number allocated to conventional monitoring: 216
Number received intervention: 216
Number did not receive intervention: 0
Number lost to follow-up or discontinued intervention: 10
Reasons: moved to non-participating dialysis units, withdrawal of consent
Number lost to follow-up or discontinued intervention: 5
Reasons: moving to non-participating dialysis units, withdrawal of consent
Number included in analysis: 227 *
Number excluded from the analysis: 0
Number included in analysis: 216 *
Number excluded from the analysis: 0

CLIMB Study

Rate of fluid removal before and after intervention by treatment group

	Crit-Line Monitoring Group	Conventional Monitoring Group
Preintervention profiles (per hour)		
<3%	54 (24%)	66 (32%)
≥3 and <8%	155 (69%)	125 (60%)
≥8%	17 (8%)	16 (8%)
total patients	226	207
Postintervention profiles		
<3%	41 (23%)	37 (23%)
≥3 and <8%	121 (68%)	103 (65%)
≥8%	16 (9%)	18 (11%)
total patients	178	158

Comparison of mortality by treatment groups with USRDS date

	Crit-Line Group	Usual Care Group
Patients	227	216
Deaths		
observed	19	7
expected	24.7	26.8
Deaths/100 patient-years at risk		
observed	17.4	6.4
expected	22.6	24.6
Standardized mortality ratio	0.77	0.26
χ^2	1.3	14.6
P value	NS	<0.001

DRIP Study

Clinical Trial

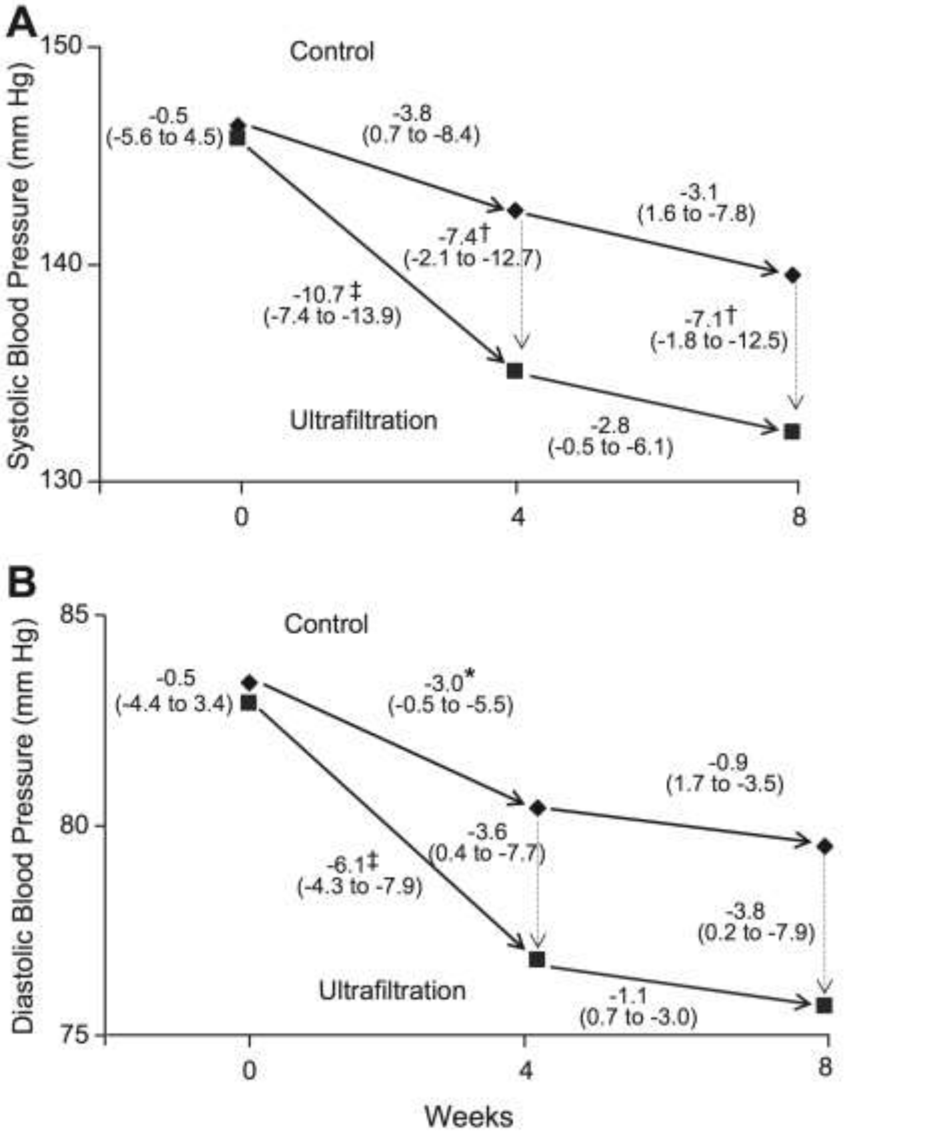
Dry-Weight Reduction in Hypertensive Hemodialysis Patients (DRIP)

A Randomized, Controlled Trial

Rajiv Agarwal, Pooneh Alborzi, Sangeetha Satyan, Robert P. Light

***Hypertension*. 2009;53:500-507.**

DRIP Study

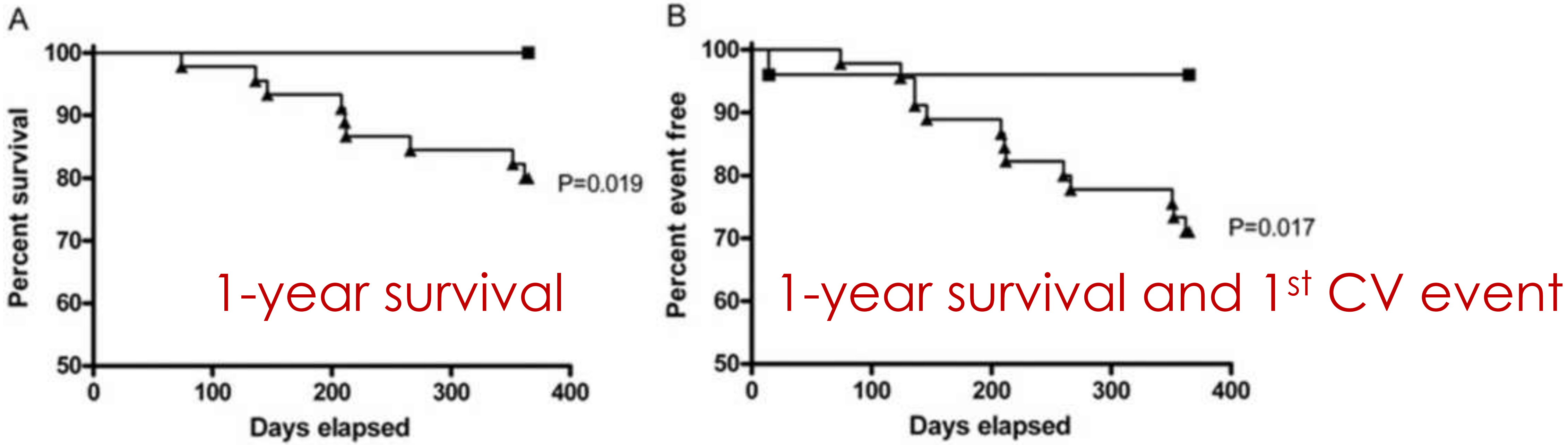


- In the UF group, an initial additional weight loss of 0.1 kg/10-kg body weight was prescribed per dialysis without increasing the time or frequency of dialysis. This additional weight loss was combined with the ultrafiltration volume required to remove interdialytic weight gain to achieve the desired reduction in dry weight
- If ultrafiltration was not tolerated based on symptoms and signs, such as muscle cramps, need for excessive saline, or symptomatic hypotension, the additional prescribed weight loss was reduced by 50%
- If ultrafiltration was still not tolerated, the additional weight loss was further reduced by 50% until even 0.2-kg incremental weight loss per dialysis was not tolerated. At this point, the patient was said to be at his or her dry weight
- Thus, by this protocol, each patient had to experience symptoms of volume depletion to be at dry weight.

Hemodialysis and myocardial injury

Effect on increasing UF and intra-dialysis hemodynamics on development of RWMA

Factor associated with presence of myocardial stunning	Odds Ratio	*P* value
UF volume during HD of 1L	5.1	0.007
UF volume during HD of 1.5L	11.6	
UF volume during HD of 2L	26.2	
Maximum SBP reduction during HD of 10 mmHg	1.8	0.002
Maximum SBP reduction during HD of 20 mmHg	3.3	
Maximum SBP reduction during HD of 30 mmHg	6.0	



Burton JO, cJASN 2009; 4:914-920

Improvement in care and outcomes is possible by extending the use of existing technology to fill the gaps in HD delivery in Asia

Improving outcomes on dialysis

Mortality Decrease Across Disease States in the U.S., 2006-2016*

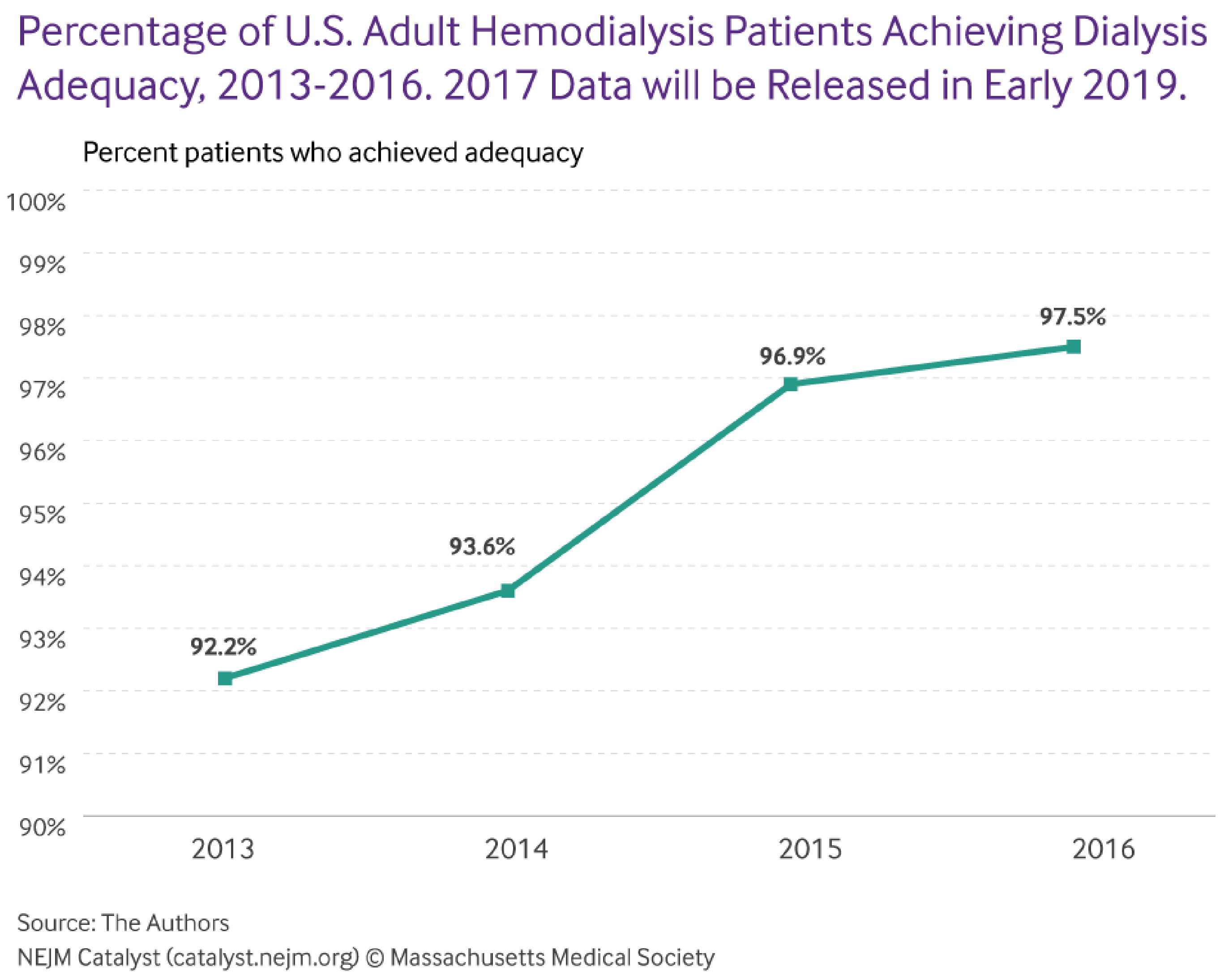
Disease	Mortality Decrease (%)
Kidney failure (dialysis)	20
Cancer	13
Diabetes	10
Congestive heart failure	2

*Calculated with data for patients ≥65 years of age.

Source: USRDS 2018 Annual Data Report, Chapter 5, Table F5.5
NEJM Catalyst (catalyst.nejm.org) © Massachusetts Medical Society

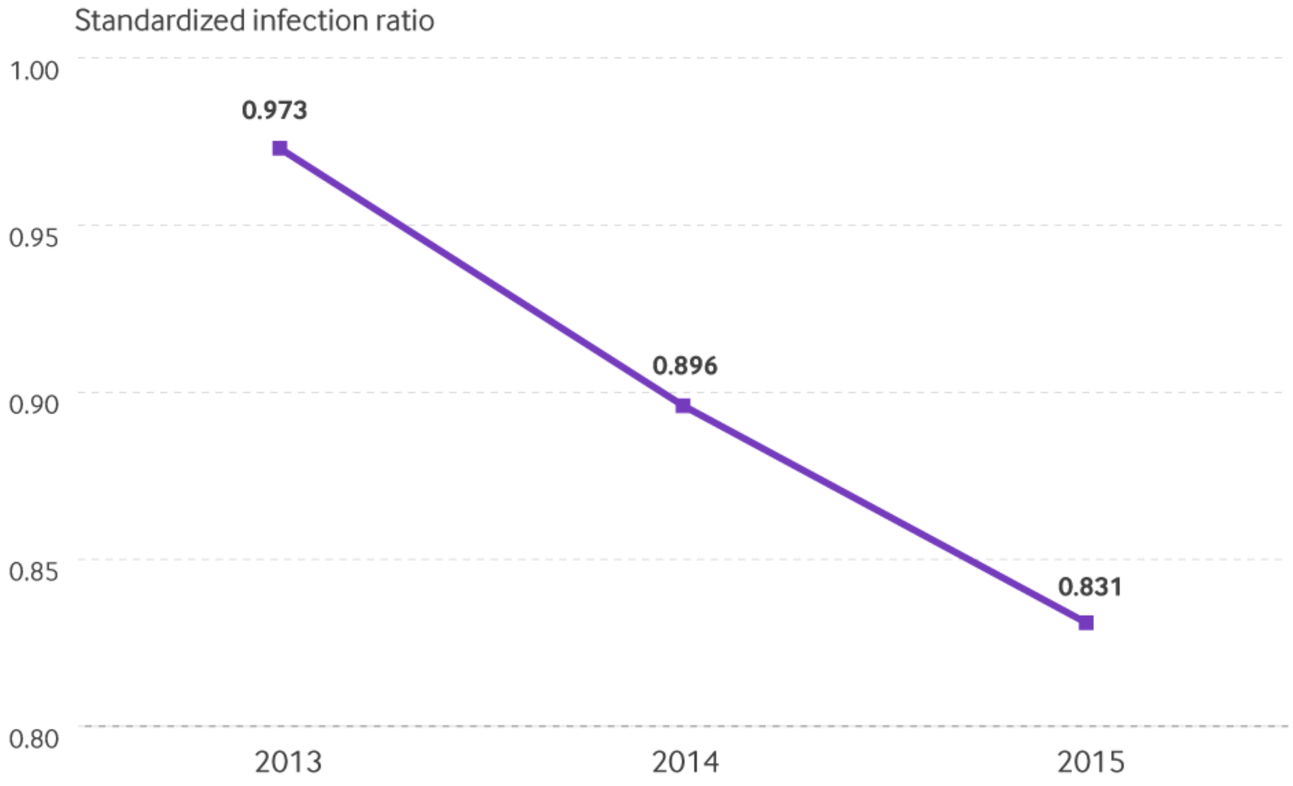
Mortality of Medicare HD patients decreased from 30.9% in 2006 to 24.7% in 2016

Improving outcomes on dialysis



Improving outcomes on dialysis

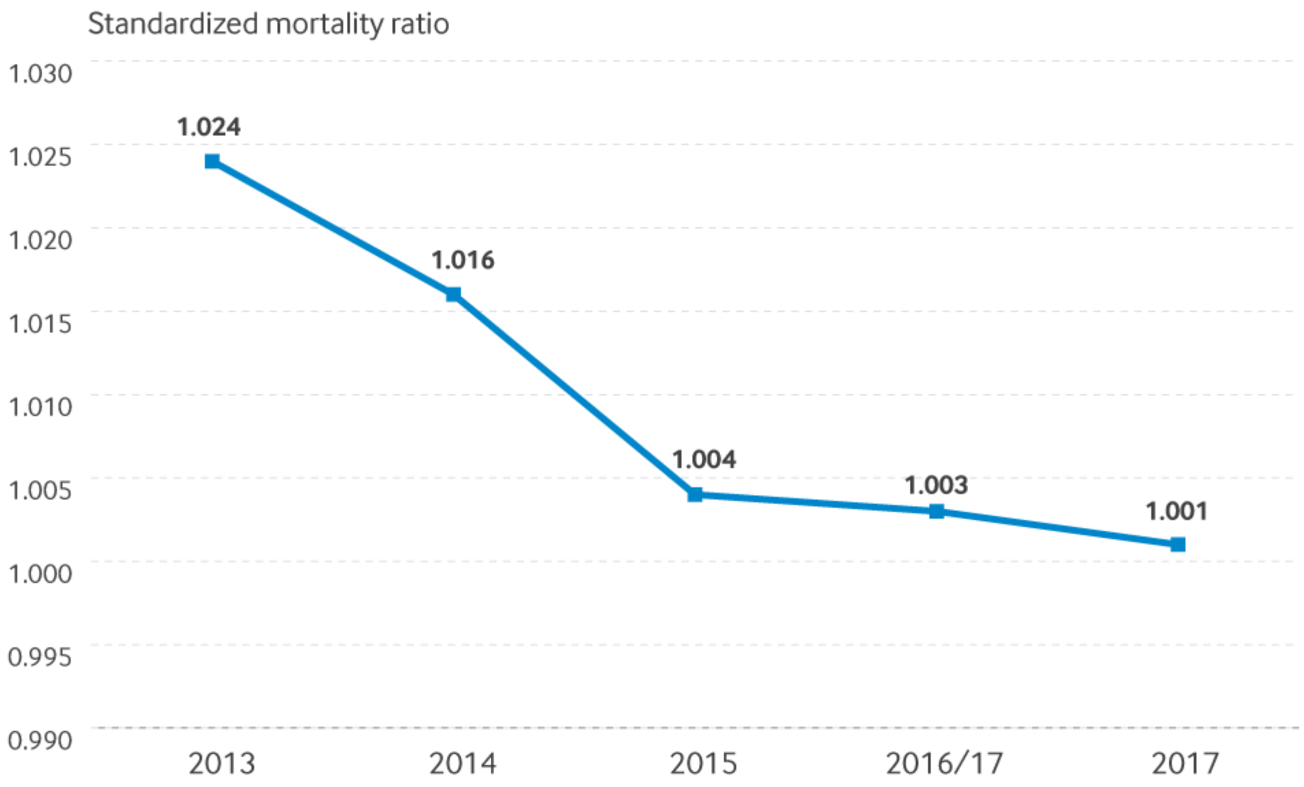
U.S. Five-Star Dialysis Results: Standardized Infection Ratio Improvements, 2013-2017.



Source: The Authors

Improving outcomes on dialysis

U.S. Five-Star Dialysis Results: Standardized Mortality Ratio Improvements, 2013-2017.



Source: The Authors

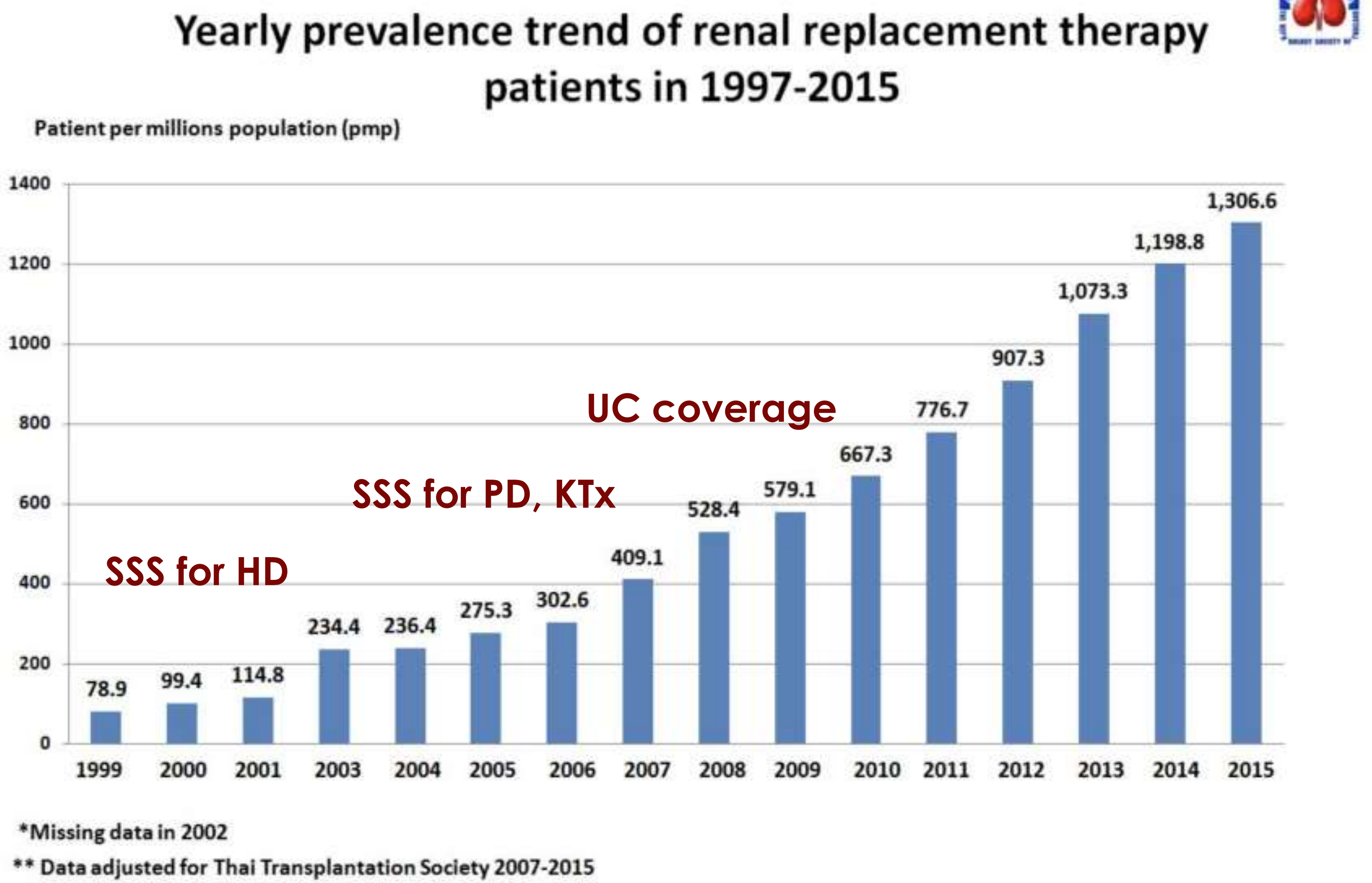
Improving outcomes on dialysis

- Fistula first effort
- Performance Excellence and Accountability in Kidney Care (PEAK initiative): collaboration of physicians, patients, dialysis providers, researchers etc. to improve outcomes
- Specialized integrated pharmacy services to optimize medications and reduce pill burden

Improving outcomes on dialysis

Year	Initiative
2006	ESKD Chronic Condition Special Needs Program
2011	Bundled a more complete set of ESKD services
2012	Launched ESKD Quality Initiative Program
2013	Implemented Five-star Quality Rating System
2015	ESKD Seamless Care Organization

Prevalence of RRT and financial subsidy



Strategies for CKD and ESKD care in SEA

	Need	Strategy
1.	Risk factor recognition: need to establish "Unknown" factors	• Epidemiological and population-based cohort studies
2.	Screening for kidney disease in population at risk	• Increase awareness amongst all types of health-care providers at all levels of health-care delivery • Involve health-care workers starting at the lowest levels of health-care delivery to increase access to community • Regional or national level screening programs, integration with other noncommunicable disease programs
3.	Identification of risk factors for progression of kidney disease	• Long-term, prospective CKD cohort studies
4.	Recognition of complications of CKD and their management	• Early referral to nephrologist • Sensitization of primary care and specialist physicians
5.	Increase access to dialysis	• Establish hemodialysis facilities at secondary and tertiary level healthcare institutions with involvement of both public and private sector health-care setups • Increase awareness about peritoneal dialysis
6.	Increase access to transplantation	• Increase awareness about and promote deceased-donor renal transplantation • Develop regional and national level deceased -donor organ sharing programs involving both public and private sector hospitals

Kumar V, Clin Nephrol 2016; 86 (Suppl 1);S23-S26

Conclusion

- The challenges of provision of HD in Asia are unique
- Establish a robust system of HD delivery in Asia prior to chasing advanced technologies in HD
- Invest in developing innovative ideas for delivery of HD in Asia
- Raise awareness of kidney disease in public and in government

Conclusion

- Lobby for insurance coverage via public and private means
- Set up registries at country and regional level
- Collaborative efforts amongst the stakeholders in the region

Thank you

Advanced Hemodialysis Technologies is needed to improve ESKD care in Asia