

Dialysis in Asia

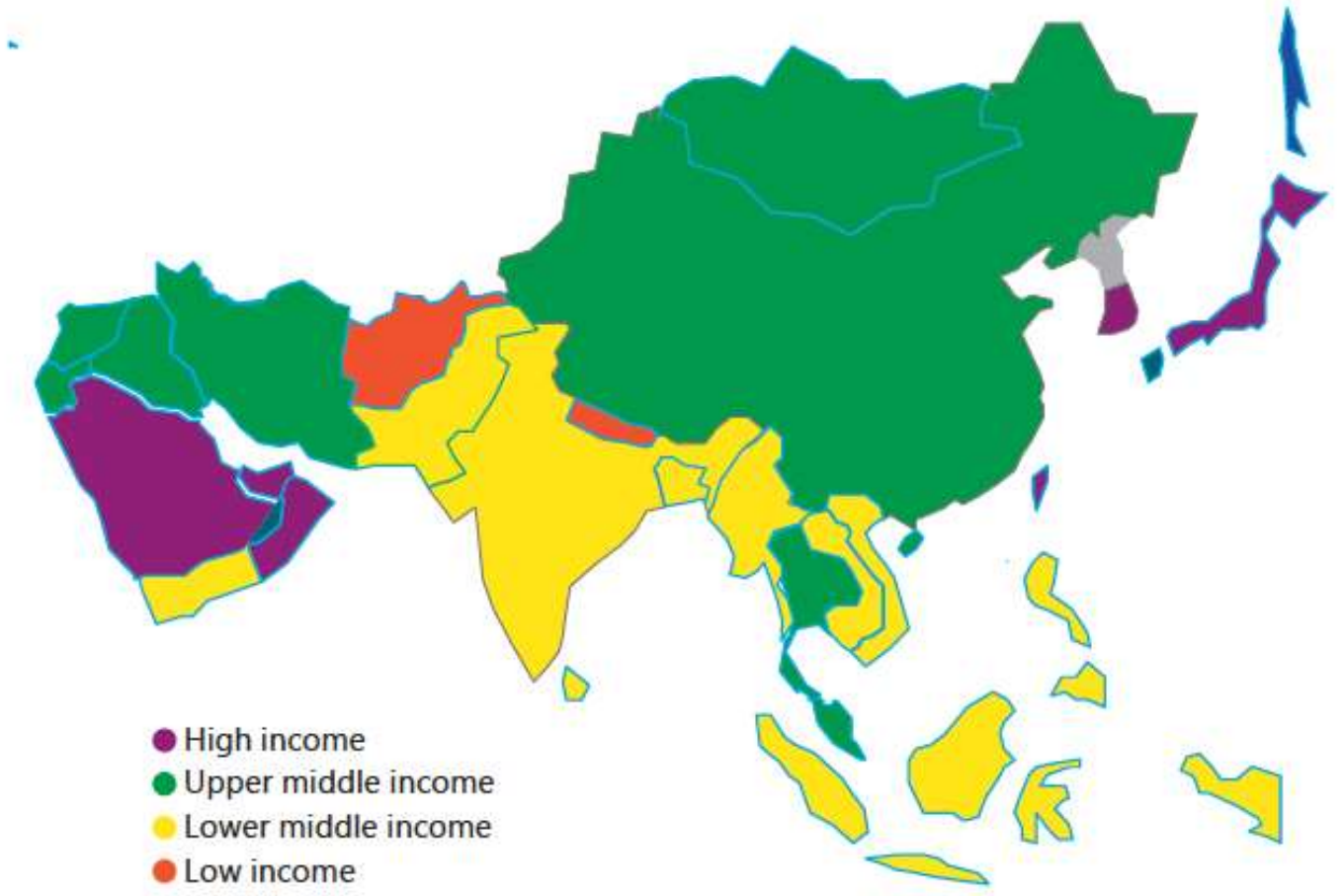
Past, Present and Future



Vivekanand Jha



ASIA

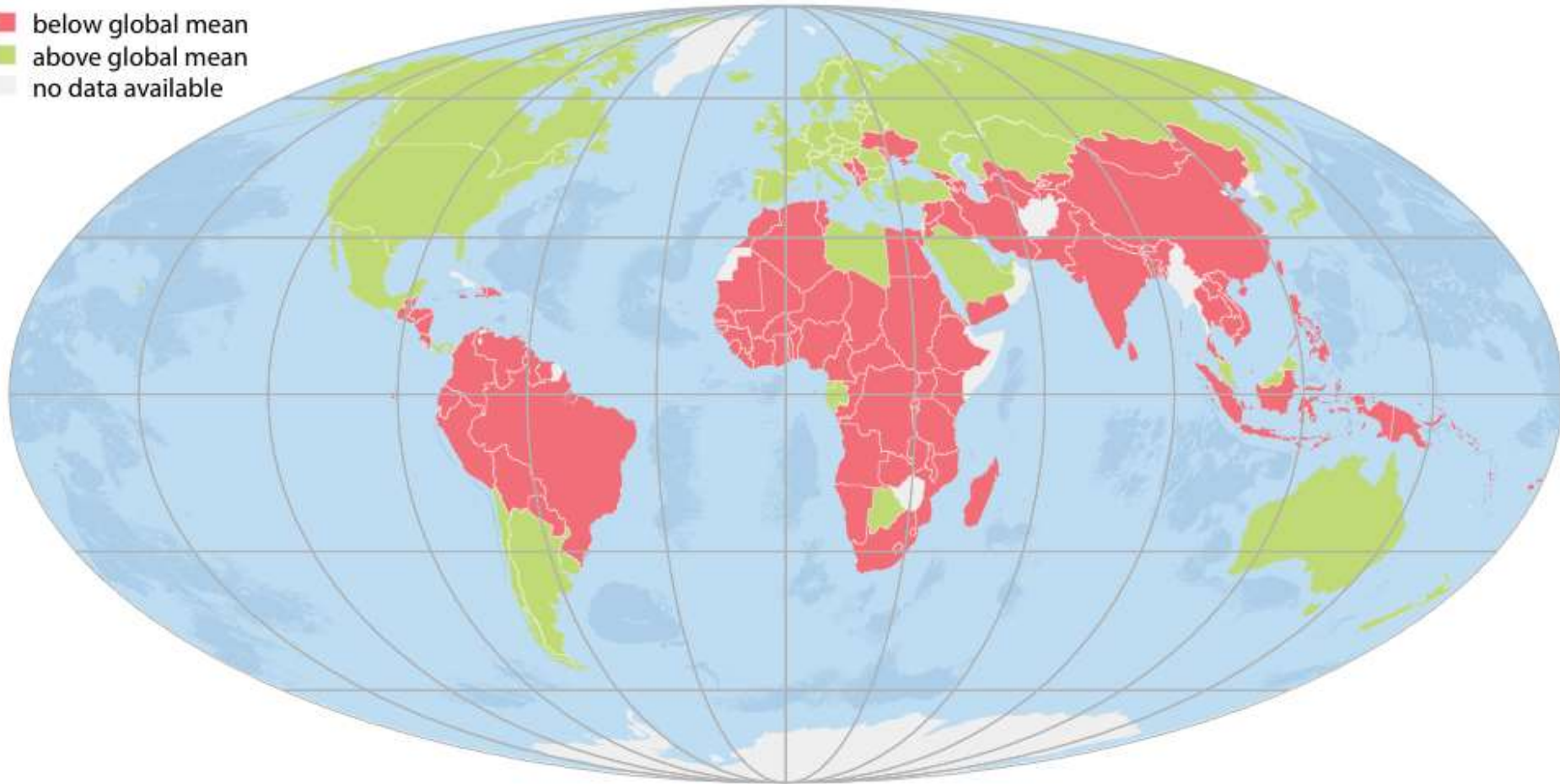


Population
4.46 billion

Where the other half lives

GDP per Capita (2010*)

- below global mean
- above global mean
- no data available



Source: UNEP GEO Data Portal, as compiled from World Bank, UNPD.

Dialysis: this is how it started

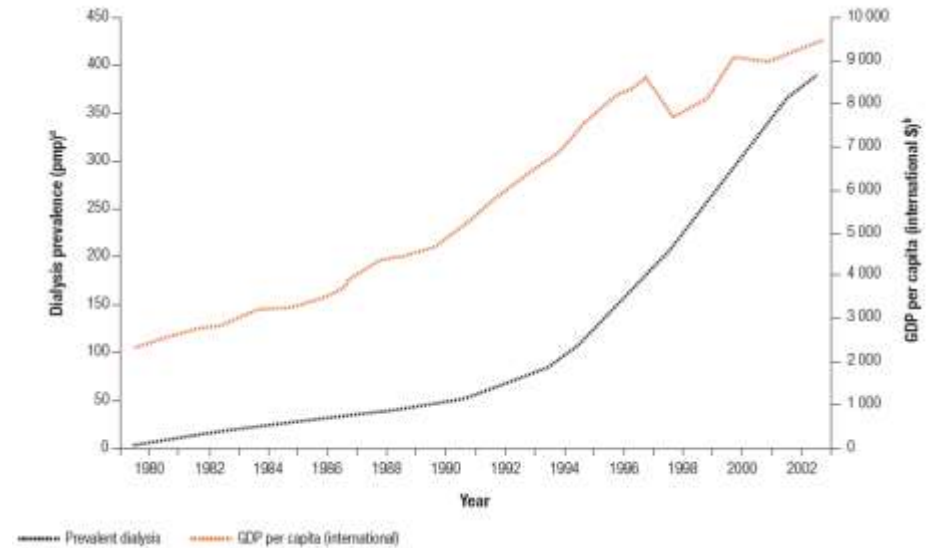
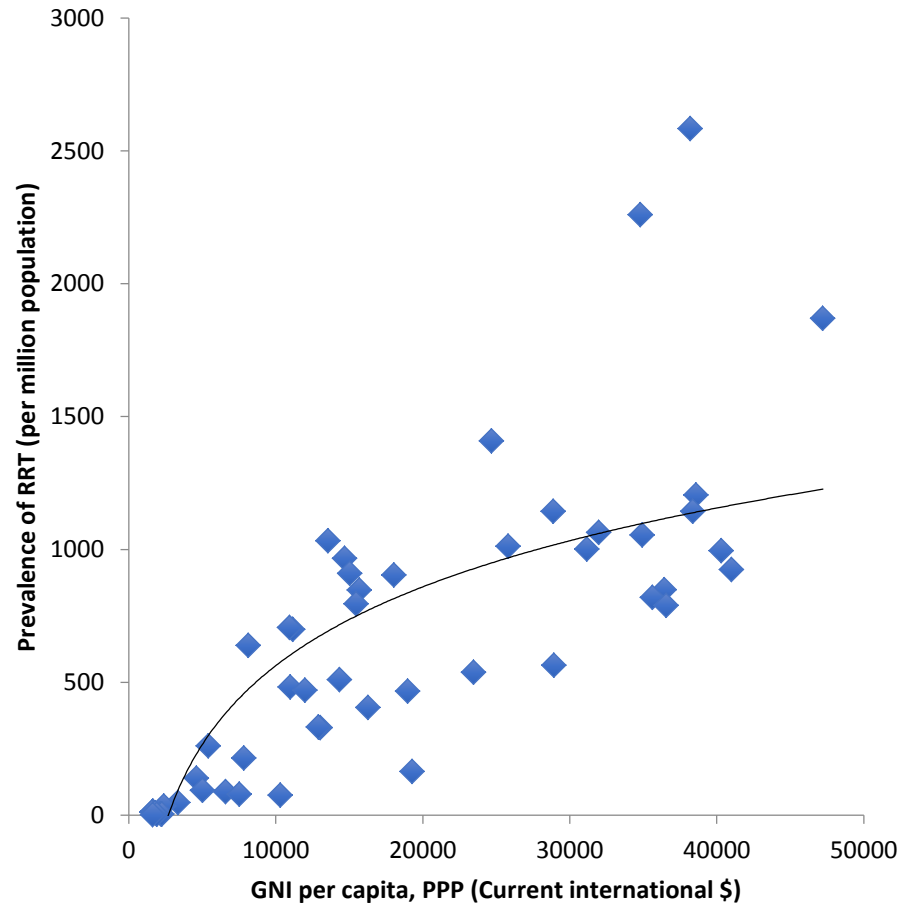


CARI Guidelines

Availability of resources should not be a reason to deny a patient access onto dialysis.

Decisions to recommend or not to recommend dialysis should not be influenced by either availability of resources or potential litigation.

CKD care is linked to economic development



Asia is heterogenous...

| | Afghanistan | Laos | China | India | Singapore | Japan |
|--|-------------|-------|-------|-------|-----------|--------|
| GDP per capita (nominal; US\$) ¹ | 470 | 1,320 | 5,430 | 1,489 | 46,241 | 45,903 |
| Total Health Expenditure per capita (US\$) | 15 | 39 | 191 | 44 | 1,531 | 3,754 |

At < US\$60 per capita, difficult to deliver reasonable minimum services (WHO, 2000)

Regional variations in health status in Asia

| Life expectancy | Asian countries | Chinese province | Indian state |
|------------------------|---|--------------------------|-----------------------|
| 75 – 79 | Singapore, Korea | Shanghai, Beijing | Kerala |
| 70 – 74 | Malaysia, Vietnam, Sri Lanka | Zhejiang, 20 others | Punjab |
| 65 – 69 | Philippines, Thailand, Indonesia, Bangla Desh | Inner Mongolia, 6 others | Maharashtra, 5 others |
| 60 – 64 | Laos, Myanmar, Pakistan | Tibet | AP, 7 others |

Developing countries of Asia are seeing dramatic transitions

- Political, socio-economic transition
 - rapid industrialisation
 - rising affluence
- Demographic transition
 - low fertility, rural-urban migration, ageing
- Nutritional transition
- Epidemiological transition

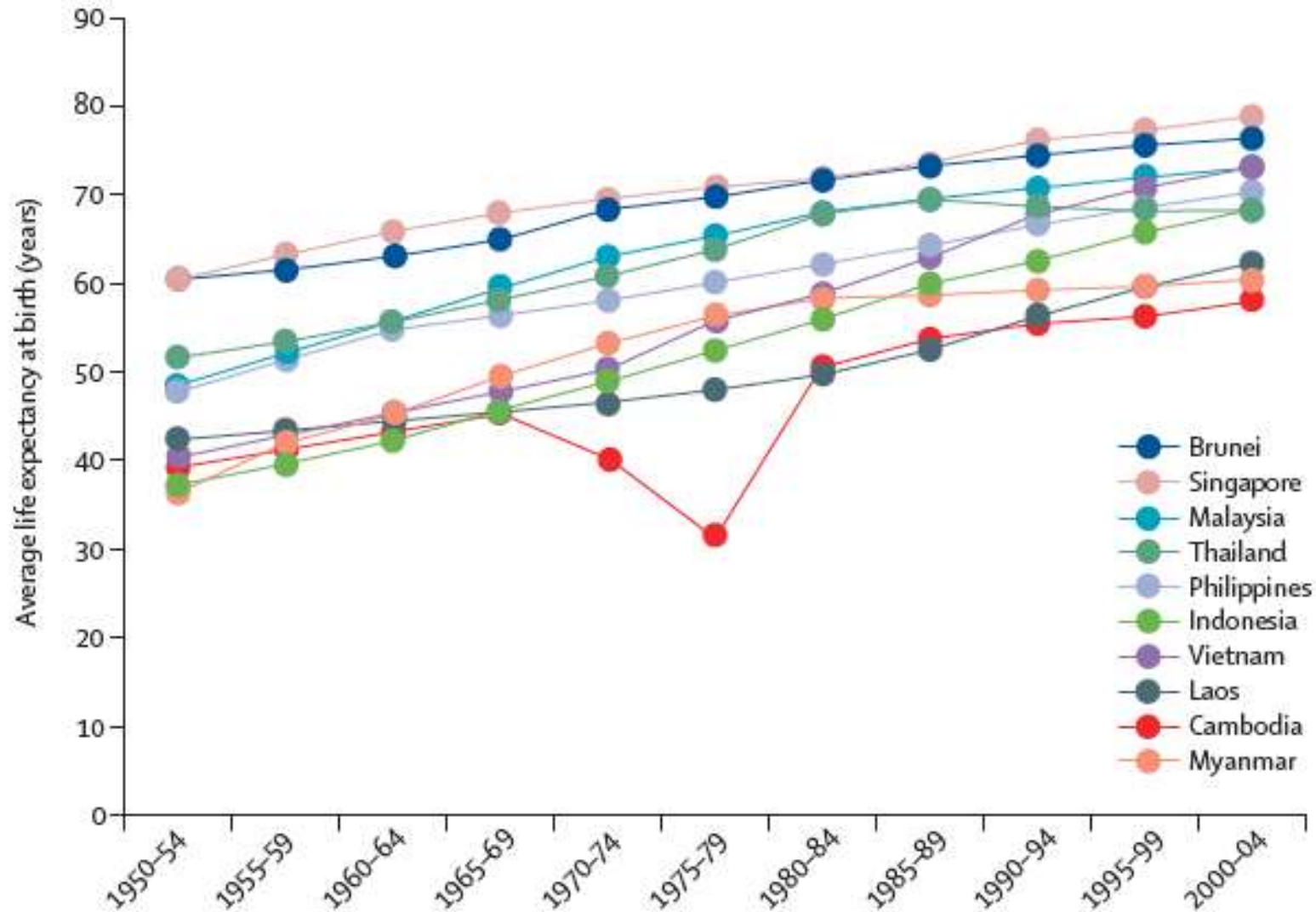
The impact of population transitions

- Better education, consciousness of human rights, democratic environment
- Increasing middle class, booming private sector, market forces
 - Increasing demand for better care
 - Labor force distortions for production/distribution of HCWs
- Financial crisis, depreciation of currencies
 - Increased cost of imported drugs/supplies

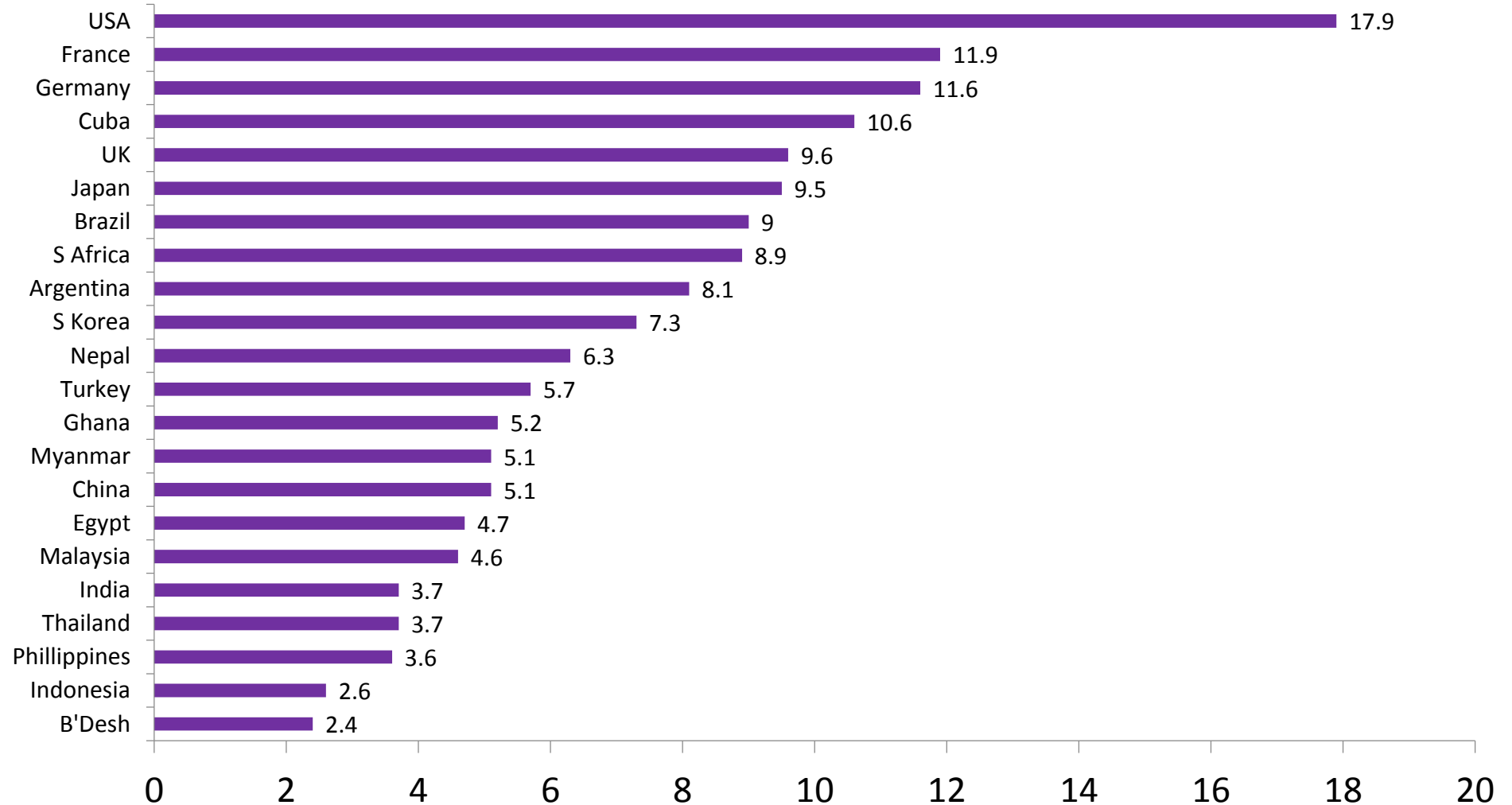
Reduced access to the most vulnerable

Demographic Transition

Populations are ageing throughout Asia



Percent GDP spent on healthcare



Source: <http://data.worldbank.org/>

Healthcare Models Around the World

- **Bismarck Model:**
 - Germany, Japan, France, Belgium, Switzerland, Latin America
- **Beveridge Model:**
 - Great Britain, Italy, Spain, Cuba, US VA, Medicare
- **National Health Insurance Model:**
 - Canada, Taiwan, S Korea
- **Out-of-Pocket model:**
 - India, China, Thailand, Vietnam, Africa

Epidemiological Transition

| Burden of diseases (age-standardized DALYs per 100,000) | Vietnam | China | B'Desh | Japan | Nepal |
|--|---------|--------|--------|-------|--------|
| Communicable diseases, maternal, perinatal and nutritional causes | 4,510 | 2,816 | 10,857 | 562 | 12,301 |
| NCD s | 10,810 | 10,829 | 13,762 | 6,497 | 14,939 |

CKD in Asia: How good are the data?



| Registry name (common abbreviation), year of establishment | Accessibility | Patient-level data availability | Treatments | Out- comes |
|---|---------------|------------------------------------|------------|---------------|
| Hong Kong Renal Registry (HKRR), 1995 | + | + | +++ | +++ |
| Korean Renal Registry, 1985 | ++ | ++ | +++ | +++ |
| Malaysian National Renal Registry (NRR), 1993 | ++ | +++ | +++ | +++ |
| Shanghai Dialysis Registry, 1996 | + | + | ++ | +++ |
| Singapore Renal Registry, 2001 | +++ | ++ | +++ | +++ |
| Taiwan Renal Registry Data System (TWRDS), 1987 | + | + | +++ | + |
| Thailand Renal Replacement Therapy Registry (TRT), 1997 | ++ | + | +++ | + |

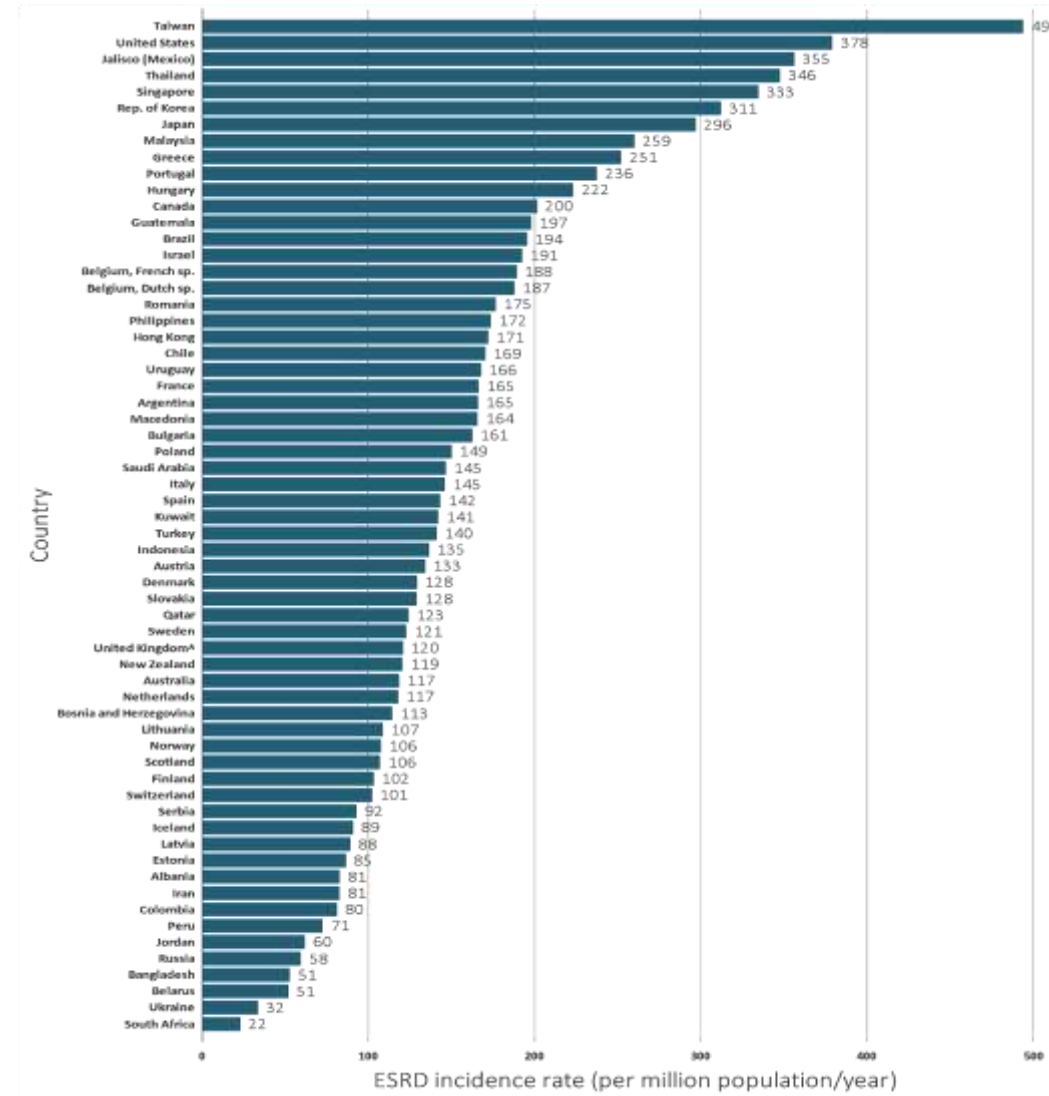
Accessibility: +++ (good): information including annual reports, publications and aggregate data accessible via website, publicly available records, or with assistance from registry staff. ++ (moderate): information in local language only or limited publicly available information including on website; with additional searches, basic information may be available in reports or in published research; more information may be accessible via third-party collaborators (e.g. registry researchers or local academics). + (limited/unclear): very limited information available publicly or unclear.

Patient-level data availability: +++: available to external researchers directly or through application and review; may include usage fee. ++: conditional access, e.g. via third-party collaborators. +: not available to external researchers or access process unclear.

Treatments: +++: submodality available. ++: modality available but not submodality. +: modality not available or availability unclear.

Outcomes: +++: mortality/survival and/or hospitalization/complication data available. ++: mortality/survival or hospitalization/complication data not reported; surrogates such as laboratory result data reported. +: no reported outcome or surrogate data or availability unclear.

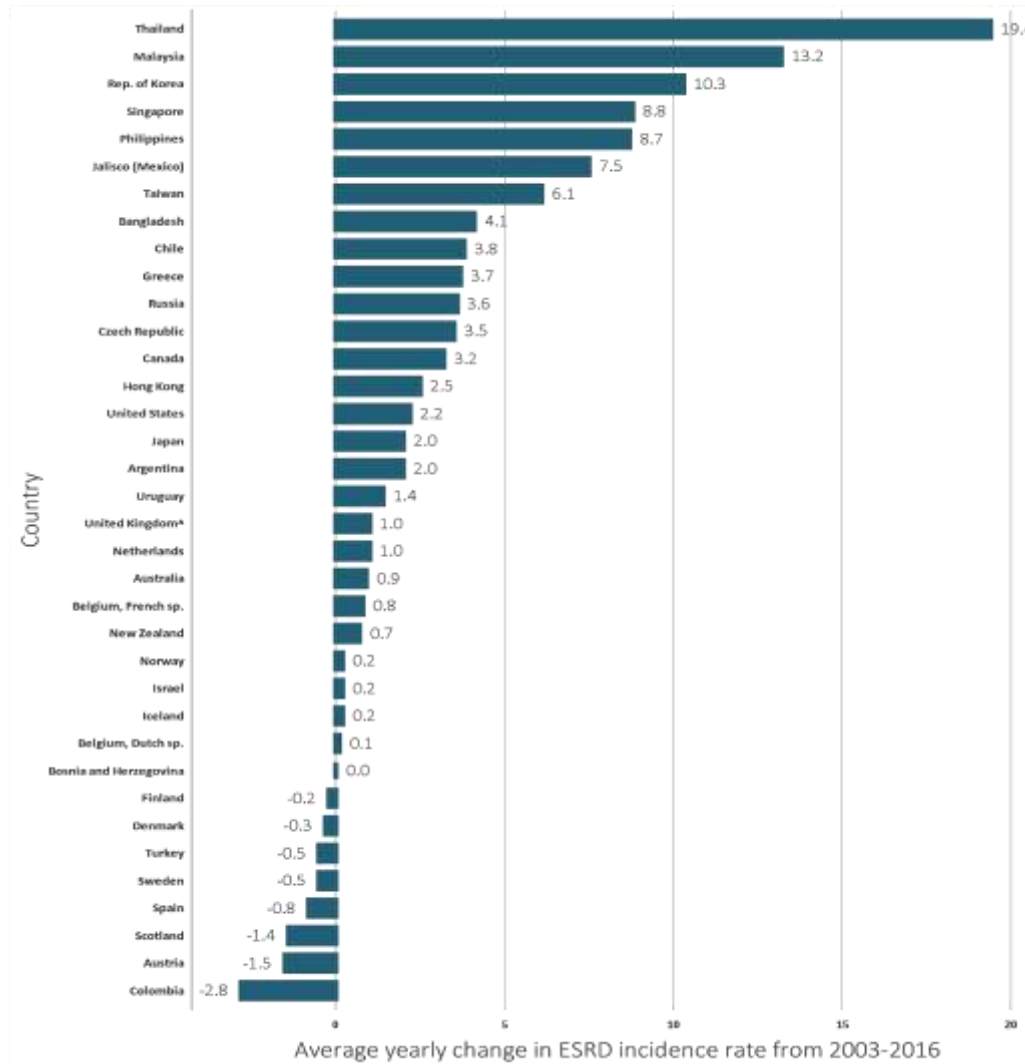
vol 2 Figure11.2 Incidence rate of treated ESRD (per million population), by country, 2016



Data source: Special analyses, USRDS ESRD Database. Data presented only for countries from which relevant information was available. All rates are unadjusted. Data for Belarus from 43 of 51 RRT centers. Data for Canada exclude Quebec. Data for France exclude Martinique. Data for Guatemala exclude pediatric ESRD patients and patients receiving non-institutional RRT. Data for Italy representative of 35% (7 out of 19 regions) of ESRD patient population. Japan includes dialysis patients only. Data from Latvia representative of 80% of ESRD patient population. Data for Serbia approx. 30% less than reported in 2015 due to incomplete reporting. United Kingdom^: England, Wales, Northern Ireland (Scotland data reported separately). Abbreviations: ESRD, end-stage renal disease; sp., speaking. NOTE: Data collection methods vary across countries, suggesting caution in making direct comparisons.

vol 2 Figure 11.3 Trends in the incidence rate of treated ESRD (per million population/year), by country, 2003-2016

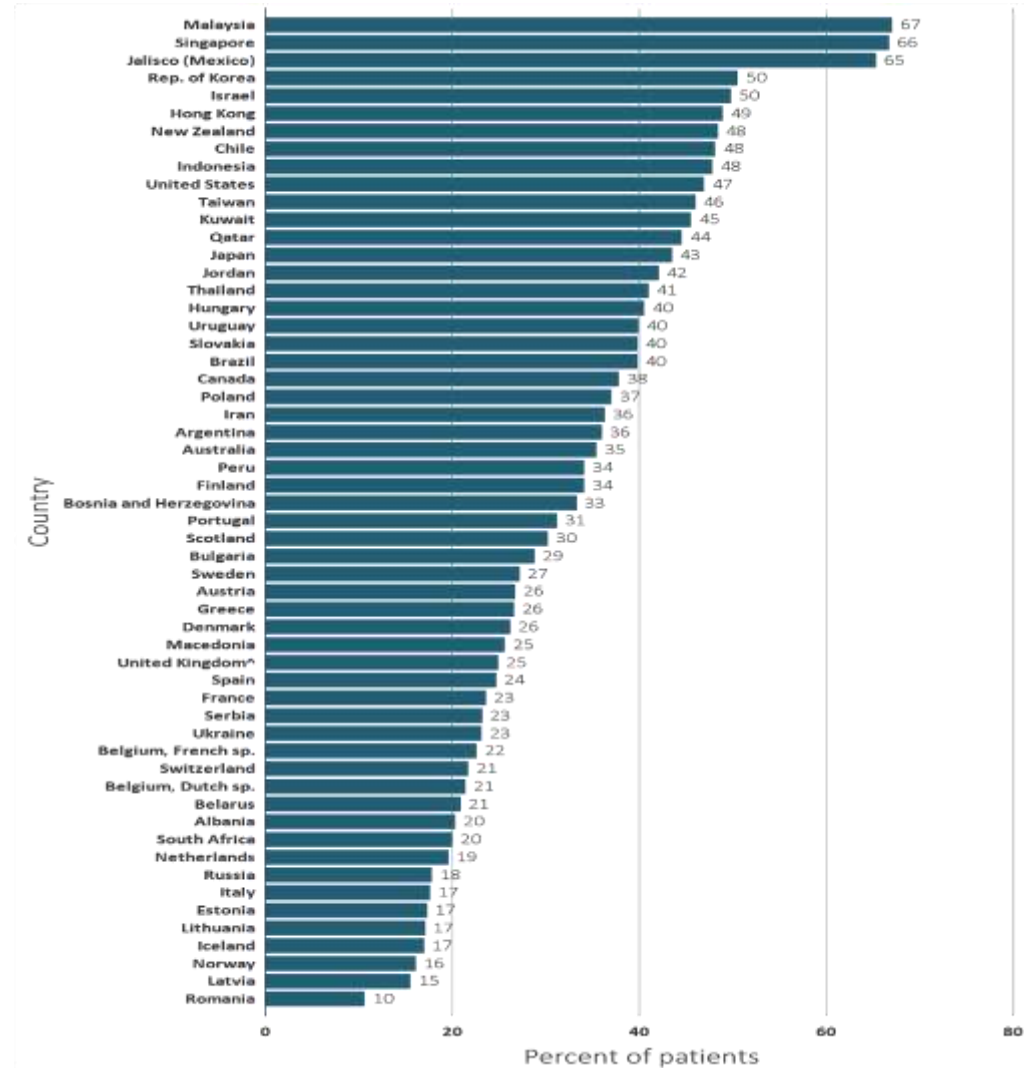
(b) Average yearly change in the treated ESRD incidence rate from 2003-2016



Data source: Special analyses, USRDS ESRD Database. Data presented only for countries from which relevant information were available. All rates are unadjusted. (a) Ten countries having the highest percentage rise in 2015-2016 versus that in 2003-2004, plus the United States. (b) Estimates derived from linear regression. Abbreviation: ESRD, end-stage renal disease. NOTE: Data collection methods vary across countries, suggesting caution in making direct comparisons.

vol 2 Figure 11.4 Incidence of treated ESRD due to diabetes as the assigned primary cause of ESRD cause, by country, 2016

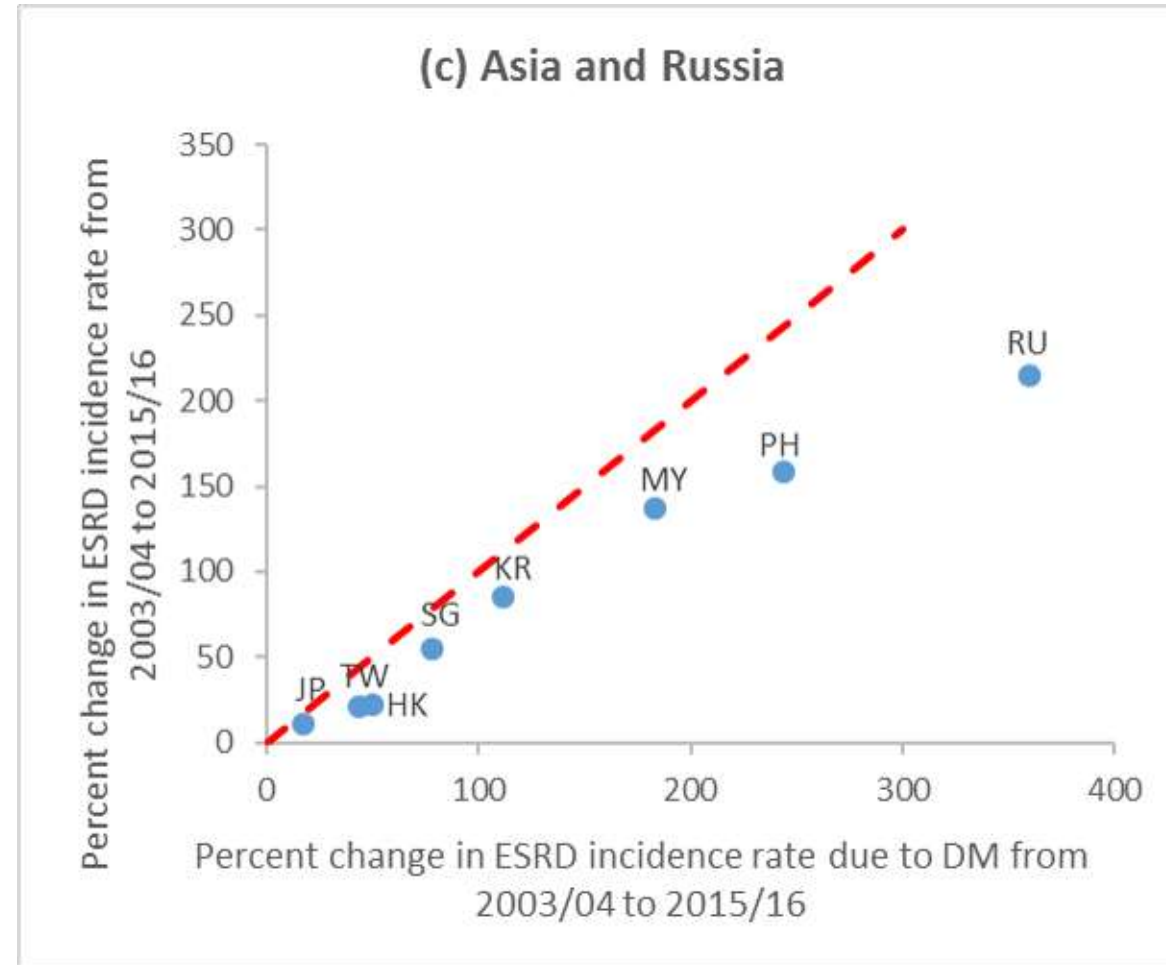
(a) Percentage of incident ESRD patients



Data source: Special analyses, USRDS ESRD Database. Data presented only for countries from which relevant information were available. Data for Belarus from 43 of 51 RRT centers. Data for Canada exclude Quebec. Data for France exclude Martinique. Data for Indonesia represent the West Java region. Data for Italy representative of 35% (7 out of 19 regions) of ESRD patient population. Japan includes dialysis patients only. Data from Latvia representative of 80% of ESRD patient population. Data for Serbia approx. 30% less than reported in 2015 due to incomplete reporting. United Kingdom^: England, Wales, Northern Ireland (Scotland data reported separately). Abbreviations: ESRD, end-stage renal disease; sp., speaking. NOTE: Data collection methods vary across countries, suggesting caution in making direct comparisons.

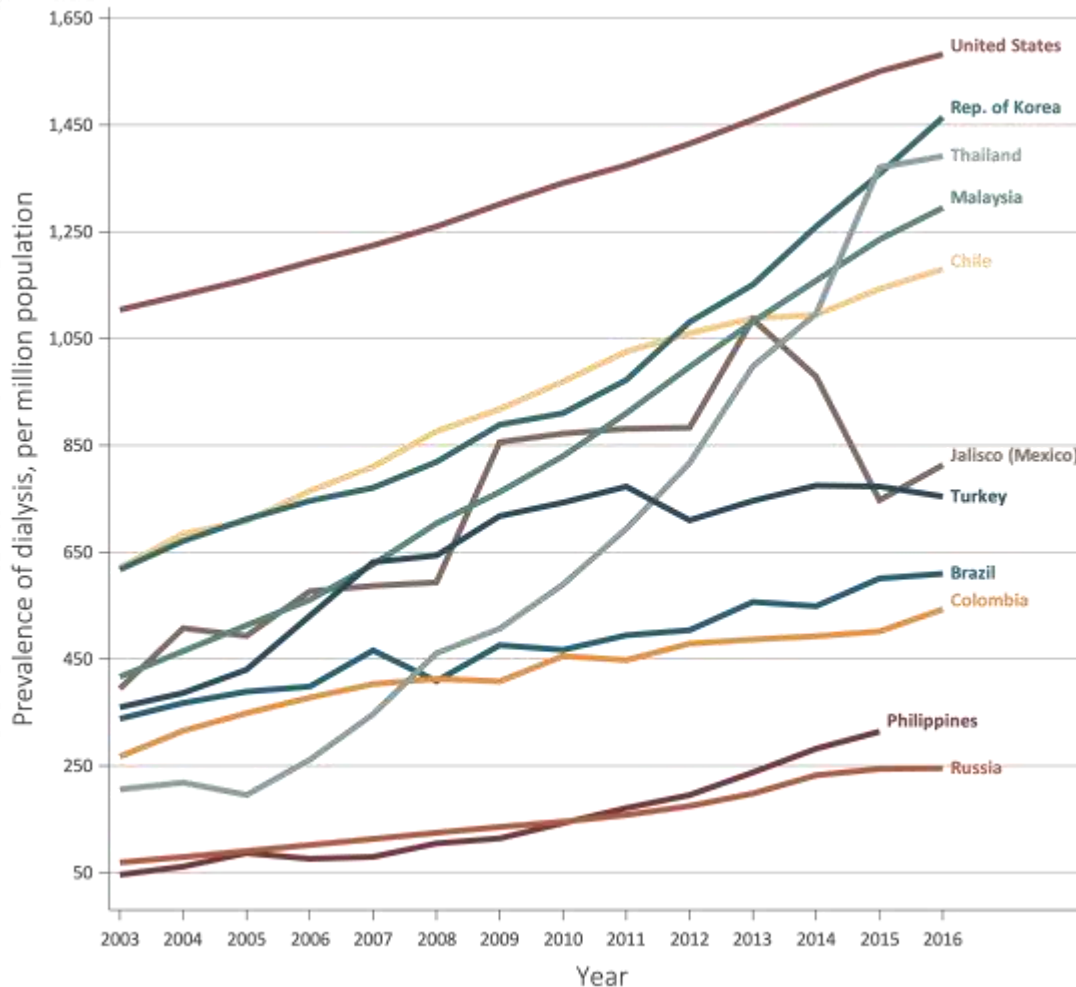
vol 2 Figure 11.6 Country-level correlation of the percentage change in ESRD incidence with the percentage change in ESRD incidence due to diabetes, from 2003-2016, with countries displayed by region

Data source: Special analyses, USRDS ESRD Database. Data presented only for countries from which relevant information was available. Reference line (in red) represents 1:1 ratio of percentage change in ESRD incidence rate due to diabetes and percentage change in ESRD incidence rate from 2003-2004 to 2015-2016. Countries listed in order of lowest to highest percentage change in ESRD incidence due to diabetes in each panel. (a) Europe, Australia, New Zealand, and Israel: (-27-57%) Austria (AT), Belgium, Du. speaking (BE, du.), Finland (FI), Belgium, fr. speaking (BE, fr.), Norway (NO), Sweden (SE), Spain (ES), Denmark (DK), Israel (IS), Greece (GR), New Zealand (NZ), Netherlands (NL), Scotland (SCT), Australia (AU), United Kingdom (GB), and Bosnia and Herzegovina (BA); (b) North and Latin America: (2-45%) Uruguay (UY), United States (US), Argentina (AG) Canada (CA), Jalisco (Mexico, MX-JAL); (c) Asia and Russia: (18-360%) Japan (JP), Taiwan (TW), Hong Kong (HK), Singapore (SG), Rep. of Korea (KR), Malaysia (MY), Philippines (PH), Russia (RU). Abbreviation: ESRD, end-stage renal disease. NOTE: Data collection methods vary across countries, suggesting caution in making direct comparisons.



vol 2 Figure 11.14 Trends in the prevalence of dialysis (per million population), by country, 2003-2016

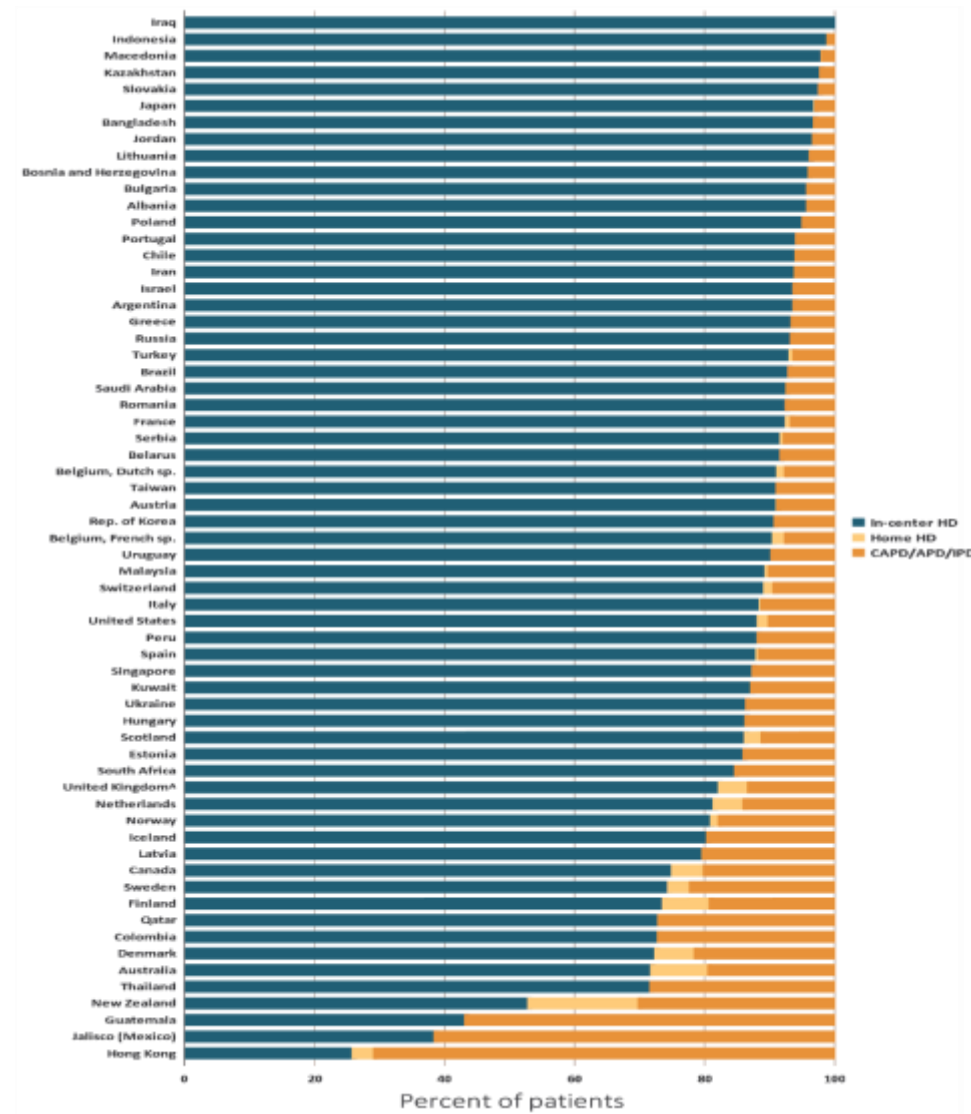
(a) Ten countries having the highest percentage rise in dialysis prevalence rate in 2003-2004 versus that in 2015-2016, plus the United States



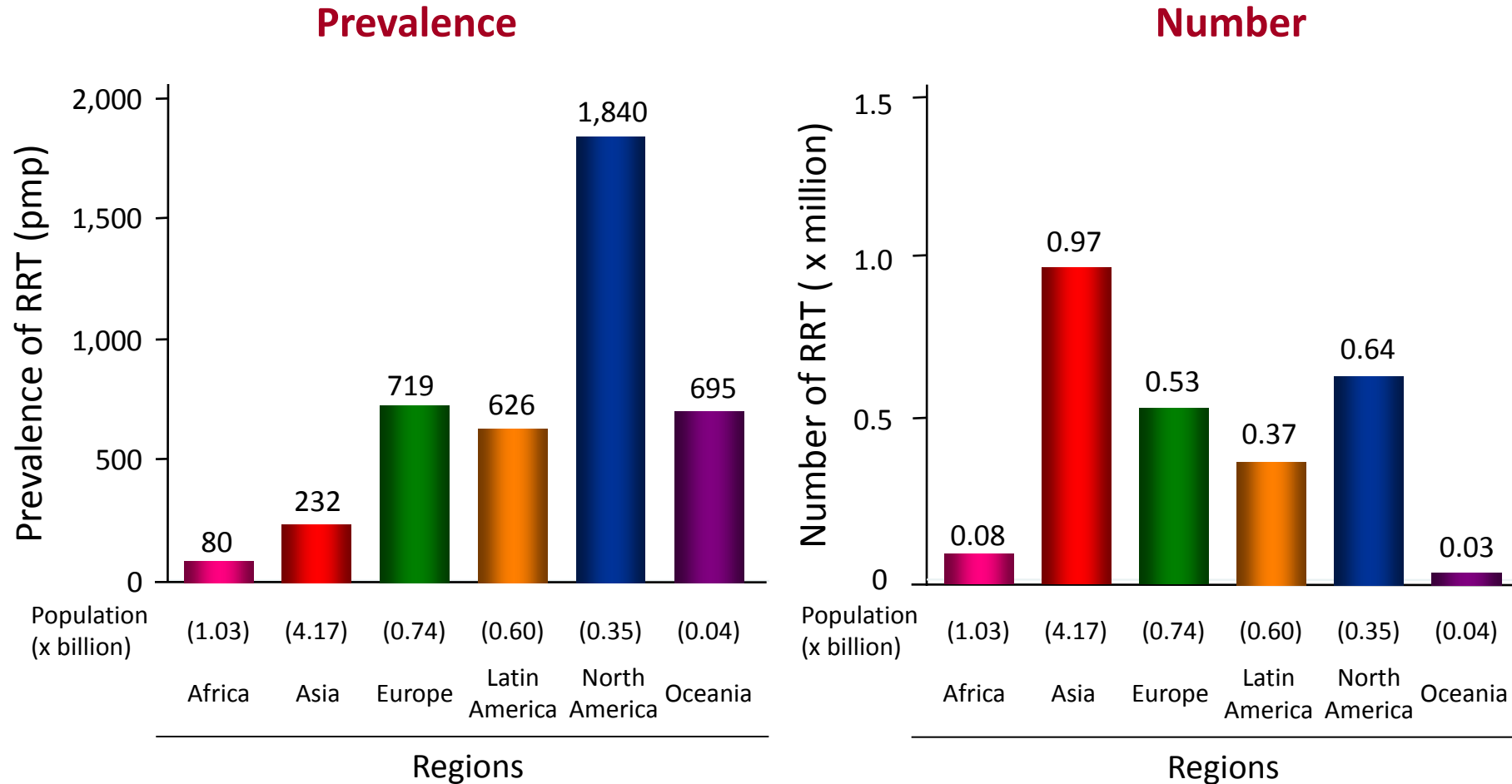
Data source: Special analyses, USRDS ESRD Database. (a) Ten countries having the highest percentage rise in dialysis prevalence: 2015-2016 versus that in 2003-2004, plus the United States. The prevalence is unadjusted and reflects prevalence of dialysis at the end of each year. (b) Estimates derived from linear regression. Abbreviation: ESRD, end-stage renal disease. NOTE: Data collection methods vary across countries, suggesting caution in making direct comparisons.

vol 2 Figure 11.15 Distribution of the percentage of prevalent dialysis patients using in-center HD, home HD, or peritoneal dialysis (CAPD/APD/IPD), 2016

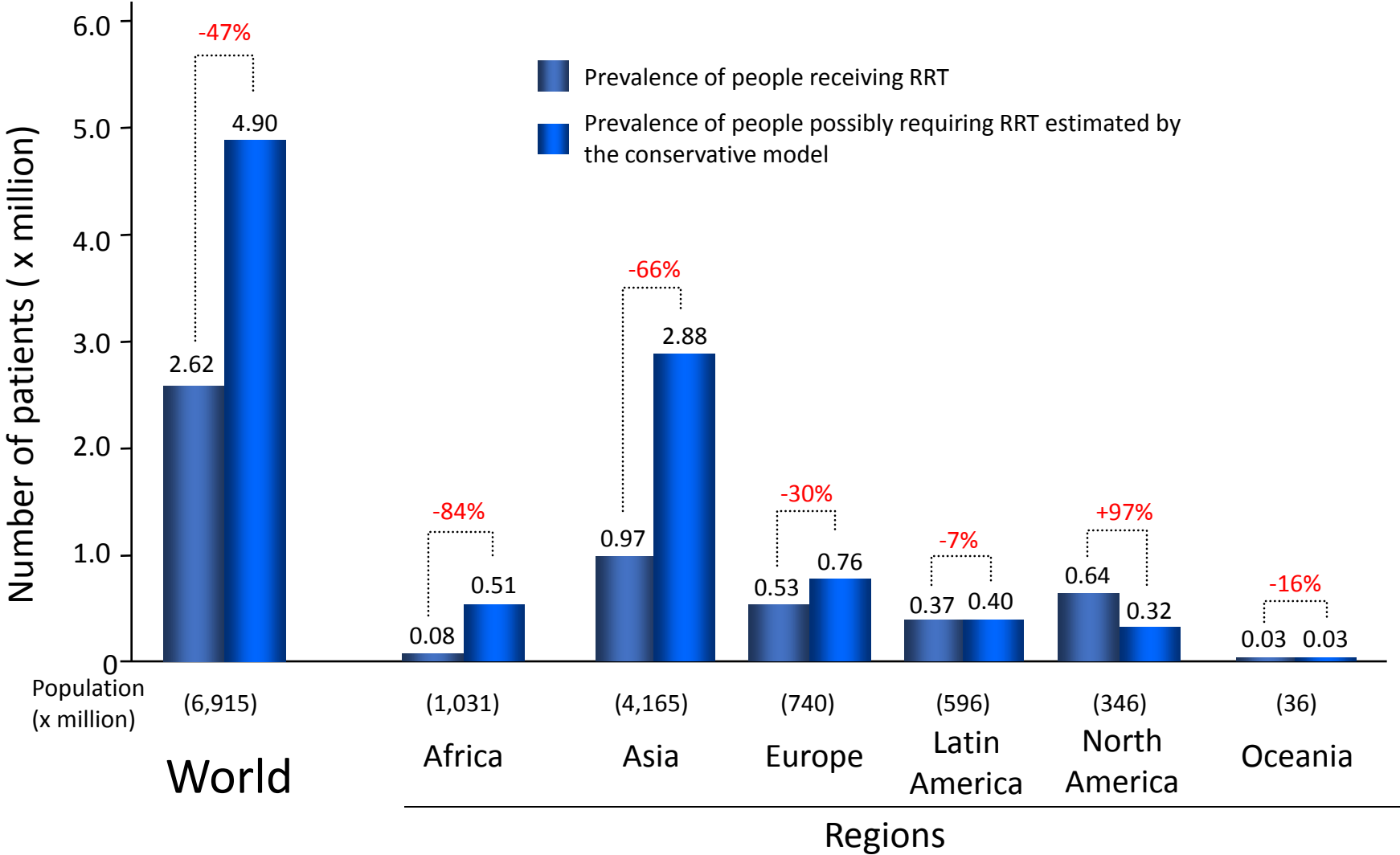
Data source: Special analyses, USRDS ESRD Database. Data presented only for countries from which relevant information was available. Denominator was calculated as the sum of patients receiving HD, PD, Home HD; does not include patients with other/unknown modality. Data for Belarus from 43 of 51 RRT centers. Data for Canada exclude Quebec. Data for France exclude Martinique. Data for Guatemala exclude pediatric ESRD patients and patients receiving non-institutional RRT. Data for Indonesia represent the West Java region. Data for Italy representative of 35% (7 out of 19 regions) of ESRD patient population. Data from Latvia representative of 80% of ESRD patient population. United Kingdom^: England, Wales, Northern Ireland (Scotland data reported separately). Abbreviations: CAPD, continuous ambulatory peritoneal dialysis; APD, automated peritoneal dialysis; IPD, intermittent peritoneal dialysis. NOTE: Data collection methods vary across countries, suggesting caution in making direct comparisons.



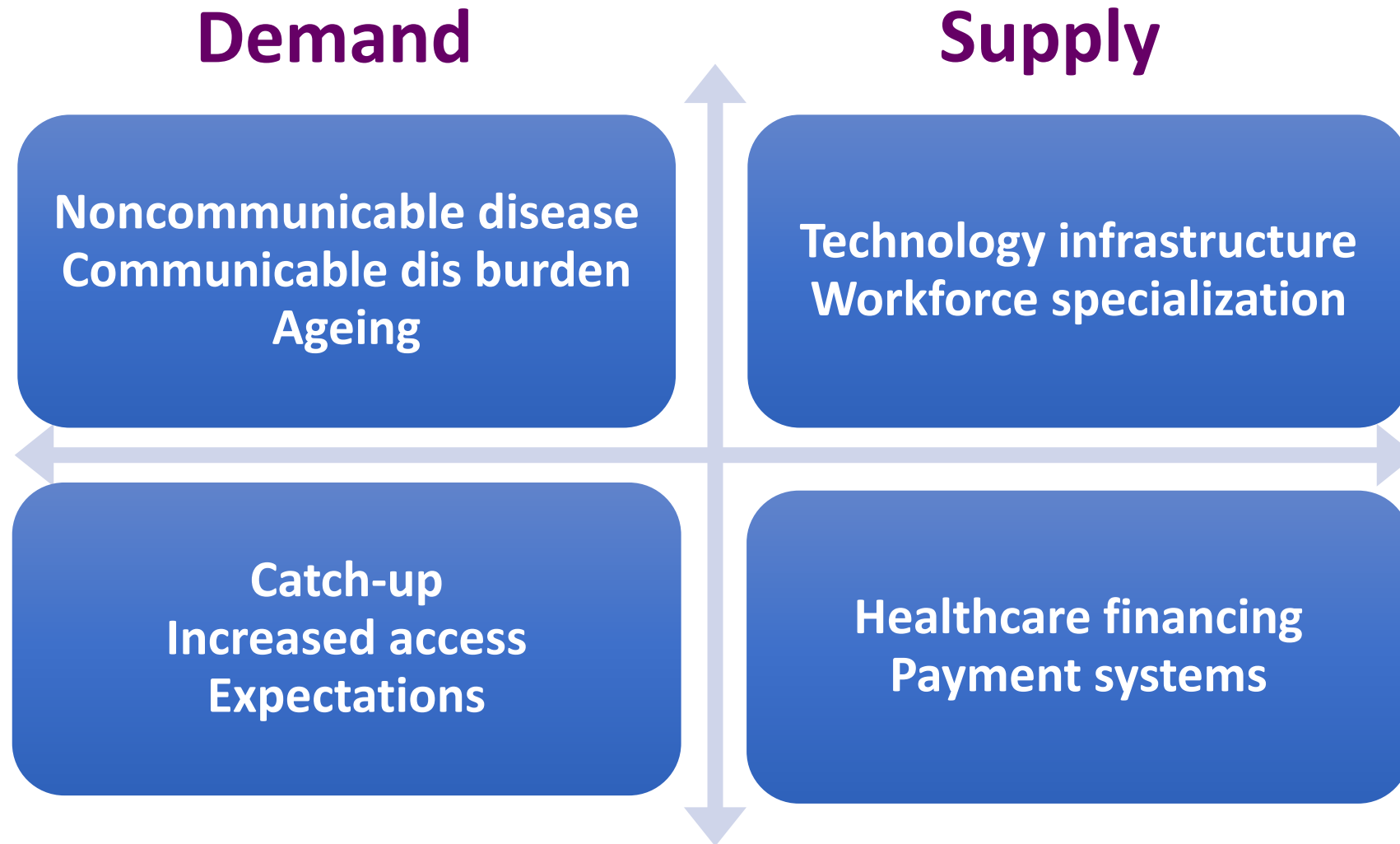
Dialysis according to world regions



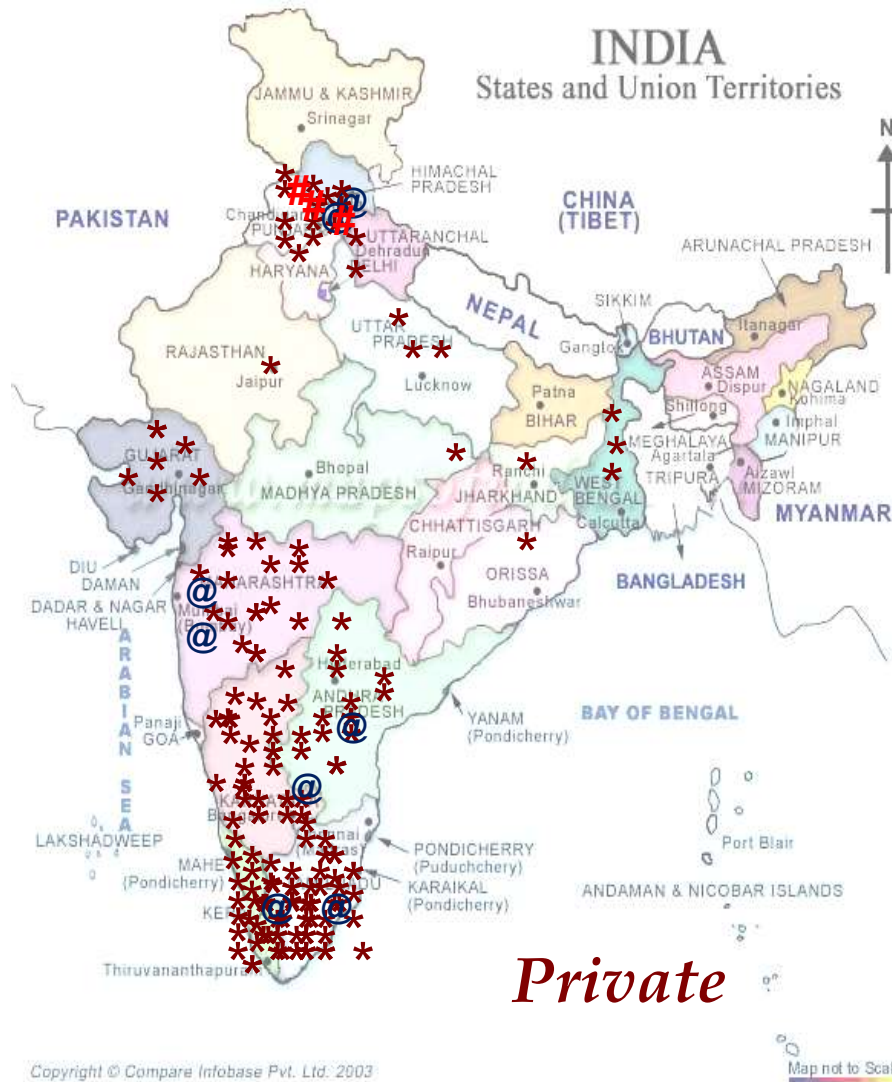
Difference between numbers of people on RRT and people possibly requiring RRT



Driving Forces



**Introduction of any resource-intensive
intervention deepens prevailing inequities
in the society**

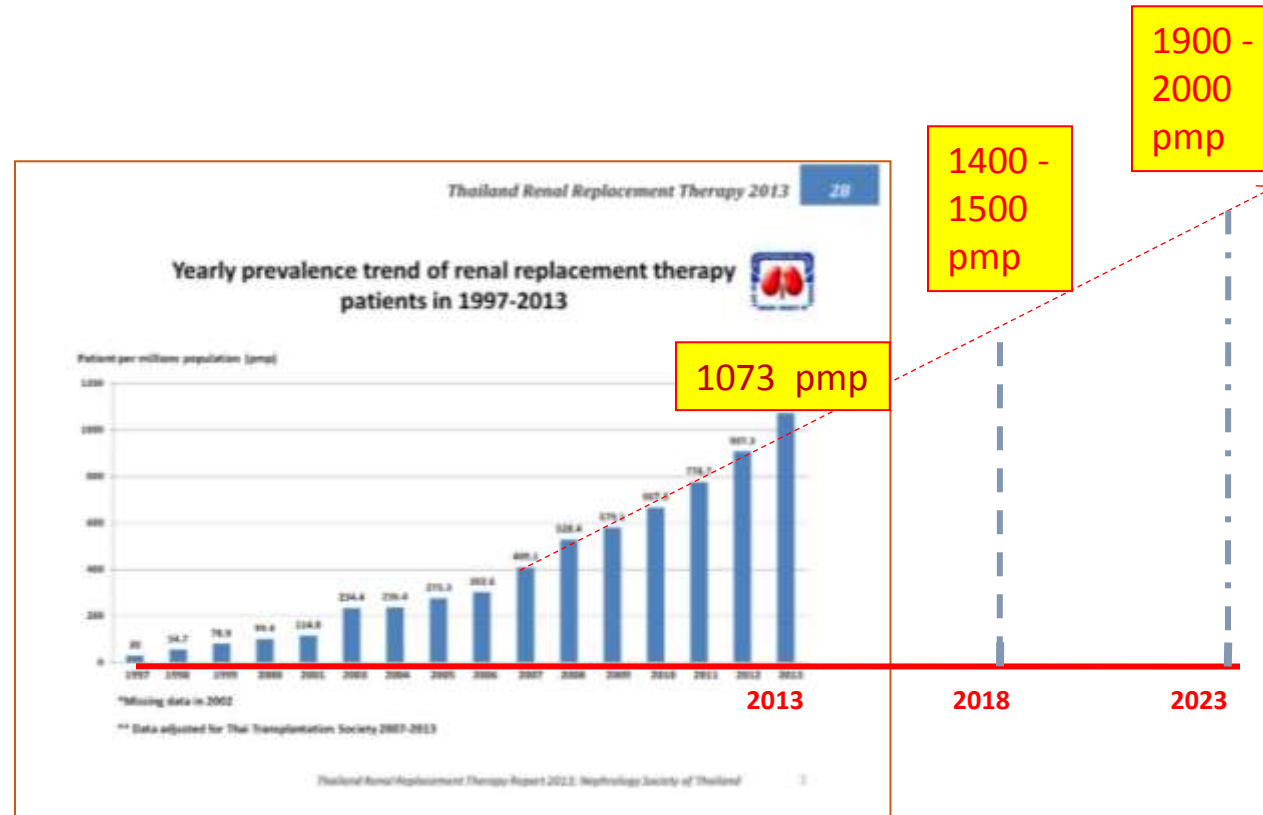


.....and leads to catastrophic healthcare expenditure.

.....about 188 million people experience catastrophic health expenditure annually as a result of kidney diseases across LMICs, *the greatest of any disease group.*

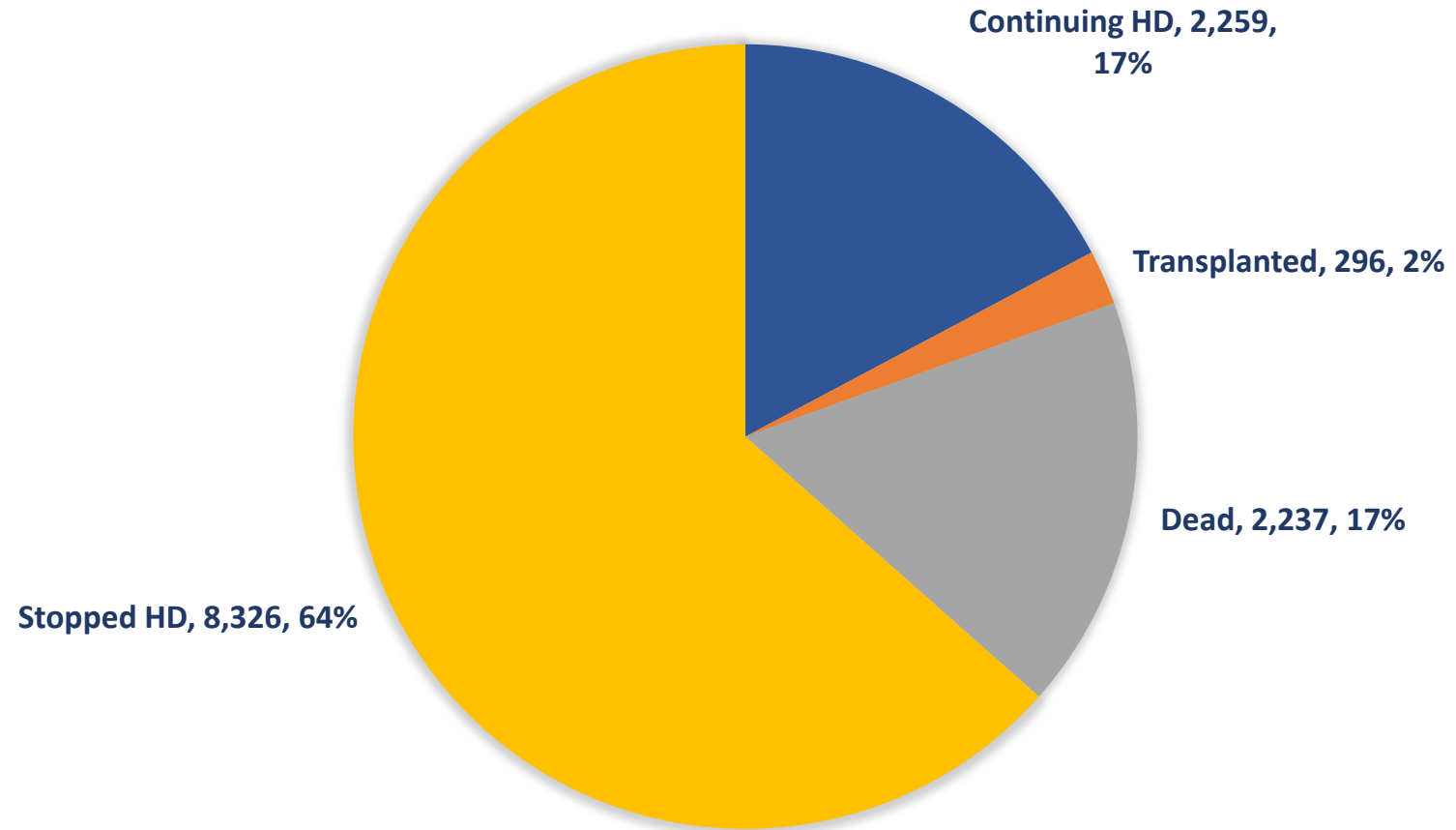
Essue, B.M., et al.,
Economic Burden of Chronic Ill Health and Injuries for Households in Low-and Middle-Income Countries.
2018, World Bank

What happens when financial barrier is removed – treatment costs increase!

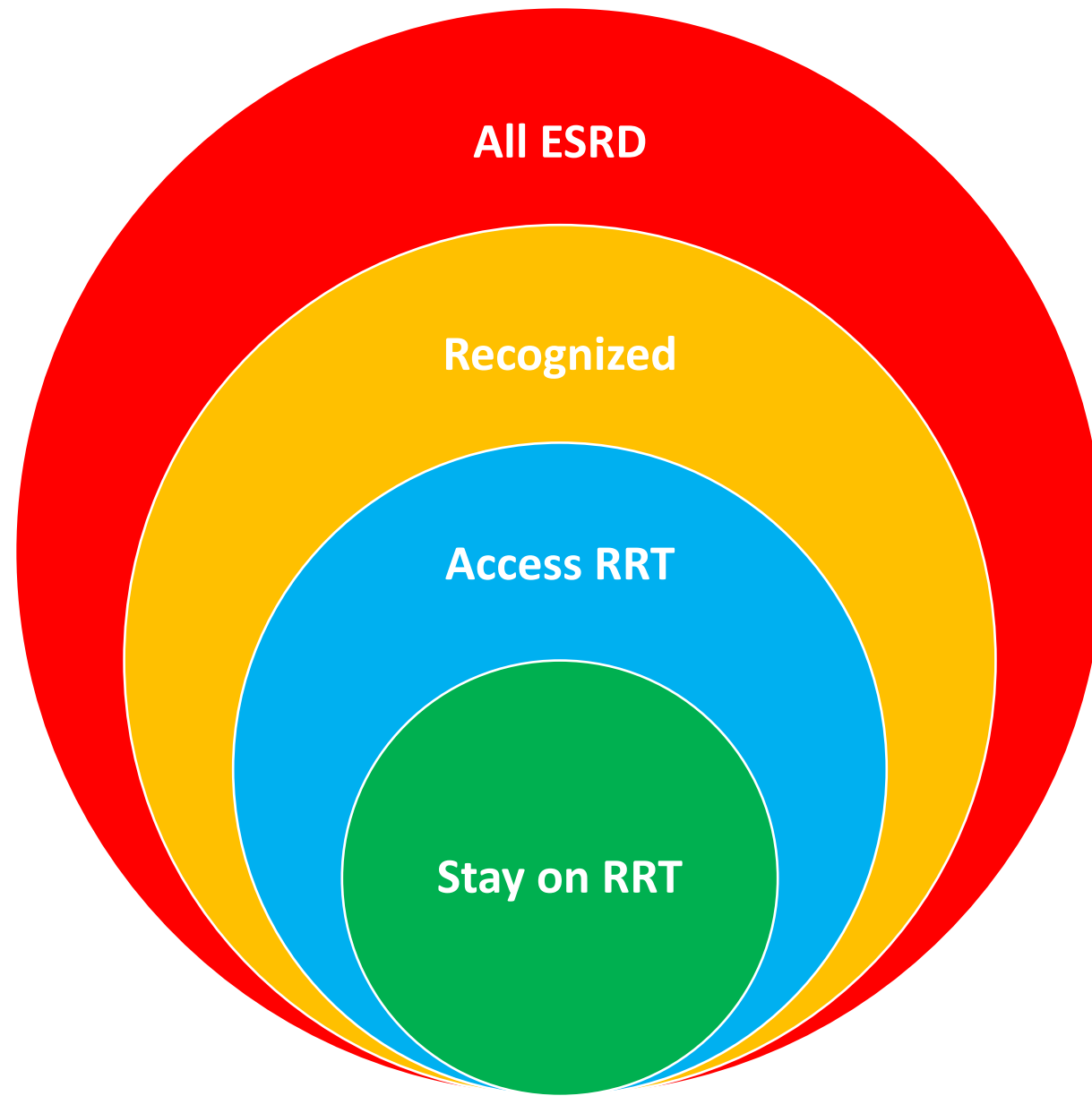


Courtesy: Kriang Tungsanga

Patient outcomes (2008-12, n=13,118)



Dialysis burden in developing countries of Asia



Data/registries

Financing

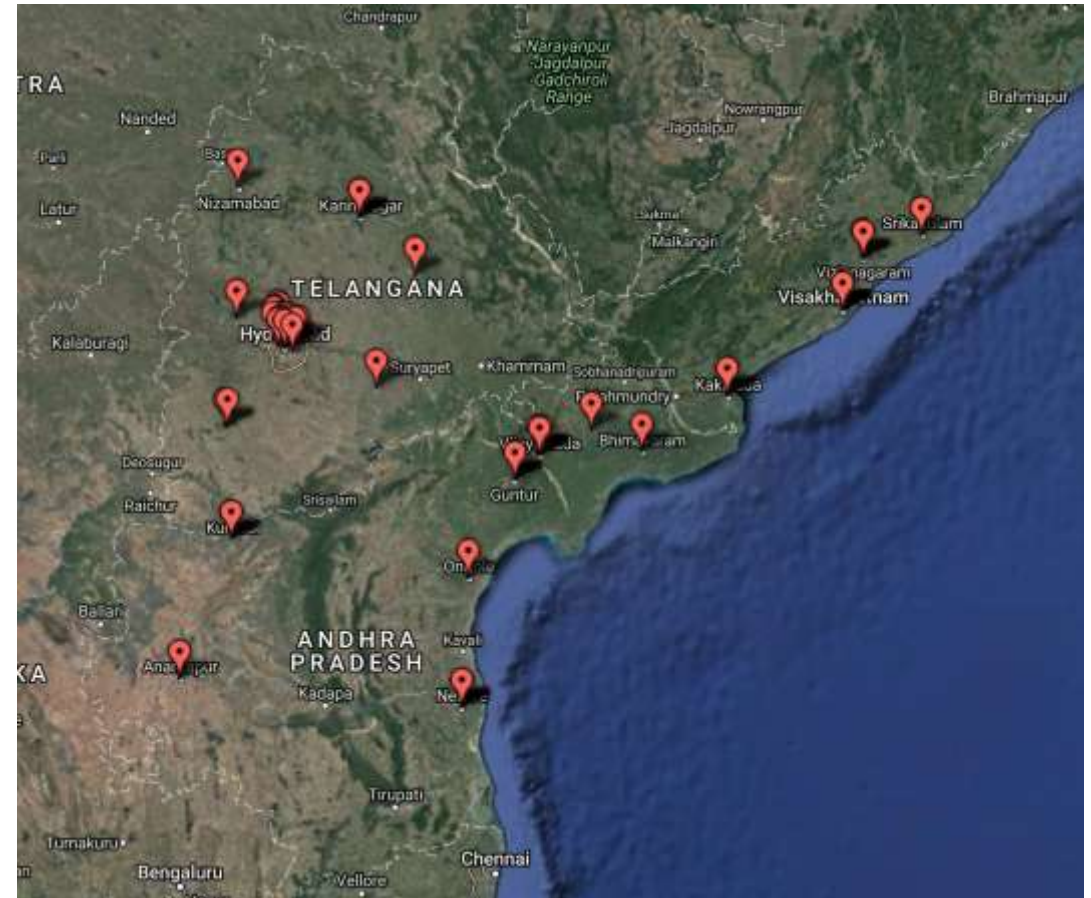
**Gaps in dialysis
initiation**

Workforce

Governance and
policy

Factors that impact dialysis initiation

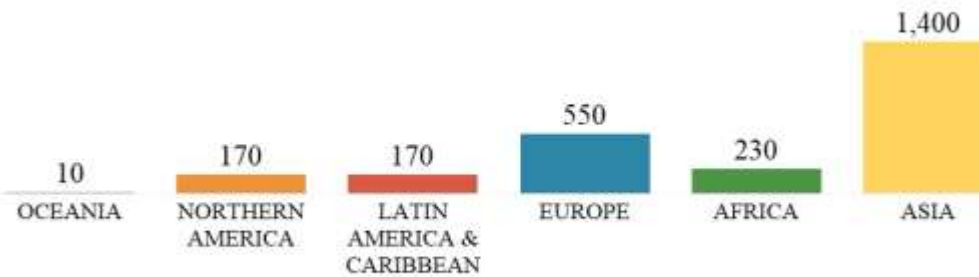
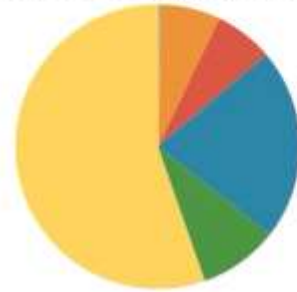
- GDP per capita
- Percentage of GDP spent on health care
- Dialysis reimbursement rate
- Private for-profit share of dialysis provision
- Fragmentation of healthcare services
- Renal unit distribution
- Workforce availability



How will we grow?

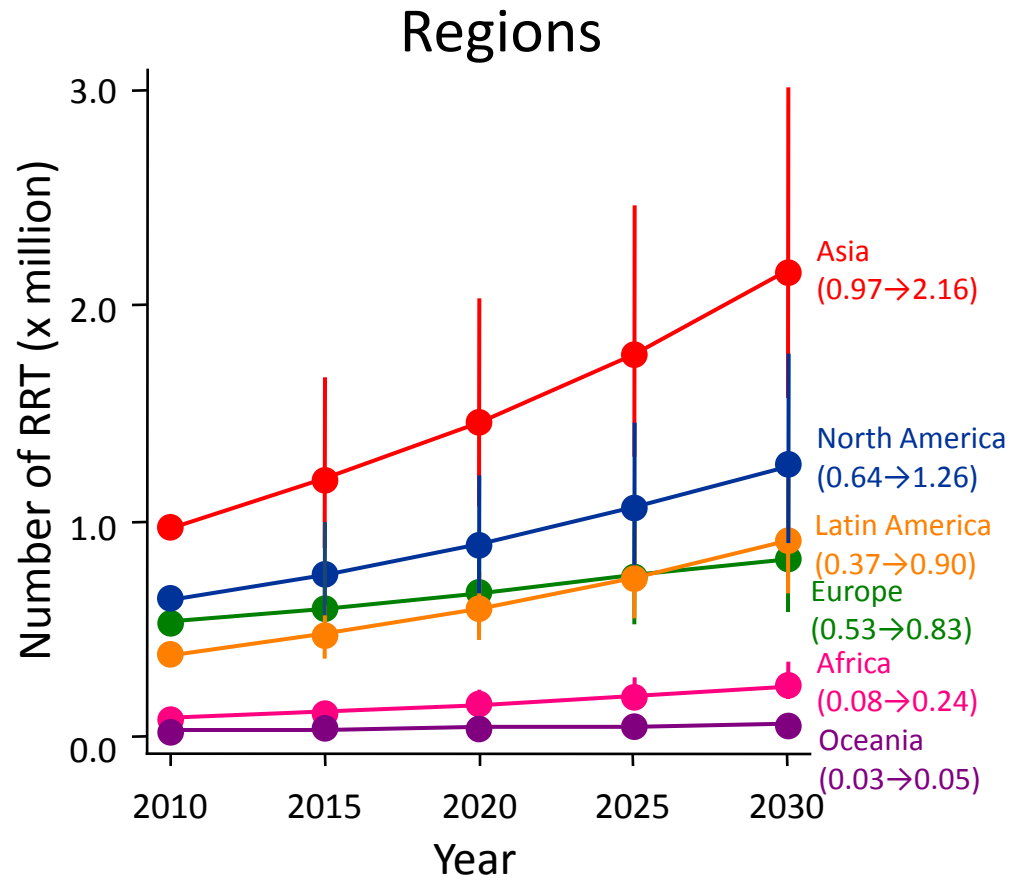
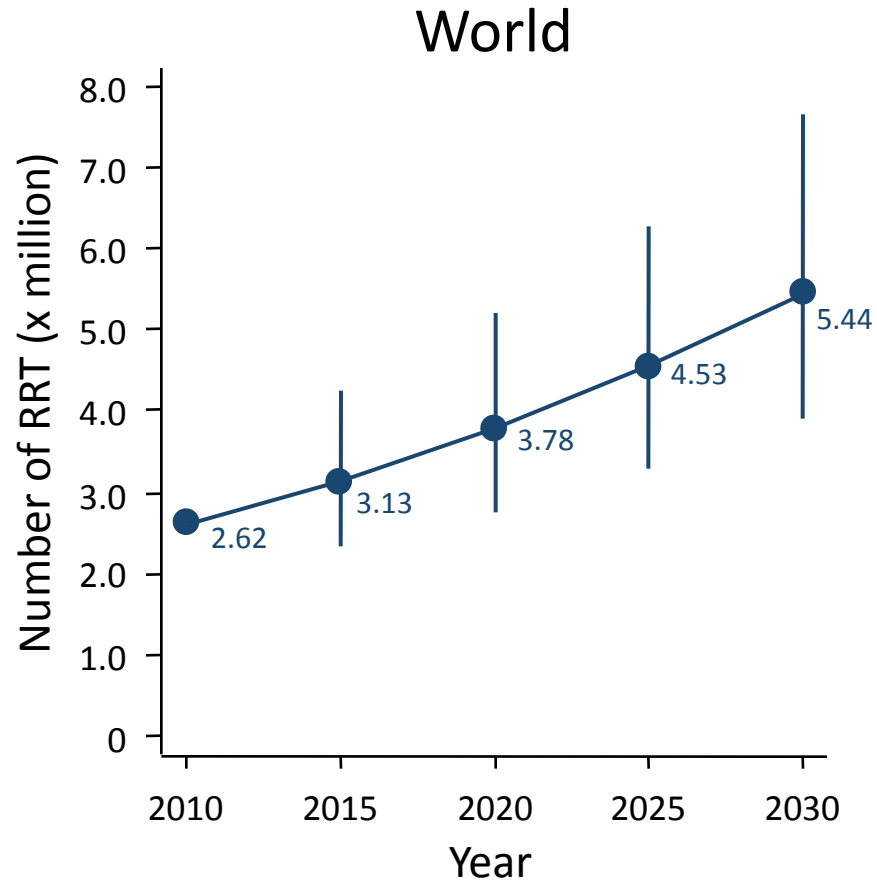
Population in millions by region **1950**

Share of world population **2.5B**

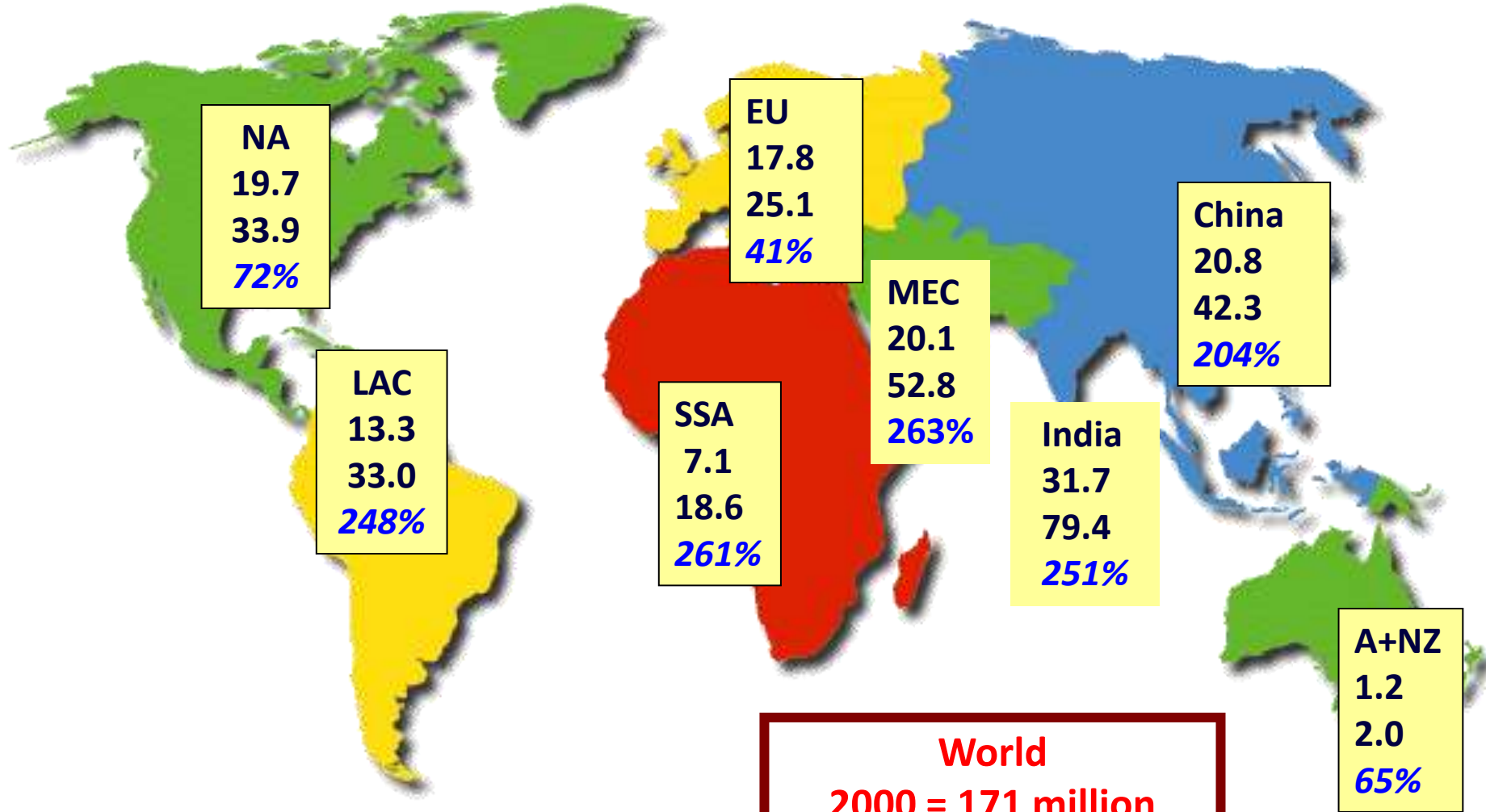


Created by Twitter user [@simongerman600](#) for The Demographics Group
based on data from UN Population Prospects 2017

Projected growth in number of patients on RRT (2010 - 2030)



Global Projections for the Diabetes Epidemic: 2000-2030 (millions)



Wild, S et al.: Global prevalence of diabetes:
Estimates for 2000 and projections for 2030
Diabetes Care 2004

World
2000 = 171 million
2030 = 366 million
Increase 213%

Unique aspects of CKD in Asia

Herbal Therapy Is Associated With the Risk of CKD in Adults

Metabolic Analysis in Taiwan

Transactions of the Royal Society of Tropical Medicine and Hygiene (2007) 101, 1013–1017

Jinn-Yuh C

Bar cases between Stu Set Pre Our Res 13.2% analg indep and C therap interv 0.004 Lin Col analg Am J



ELSEVIER

Chronic Sri Lanka

Kamani P. Rajitha W

available at www.sciencedirect.com



Environ Geochem Health

DOI

O

Chronic di

J. M

D. M

T. A

'Cursed' Uddanam cries for help

Siva G, TNN Aug 10, 2009, 05.16am IST

UDDANAM (Srikakulam): From outside, the Uddanam with coconut plantations and cashew nurseries looks there. For, the people of Uddanam Kaviti, Kanchili, S Icchapuram mandals believe they are "cursed." So m even fear to visit these mandals.

The reason? A staggering 3,200 people have died of k years in these mandals. Notwithstanding the lack of n urine samples, many families of the deceased persons government's apathy.



Ob

Adult prevalence in some Asian Countries (overweight + obesity)

50
45
40
35
30
25
20
15
10
5
0
%



**49% Increase in overweight/obese
(1992-2002)**

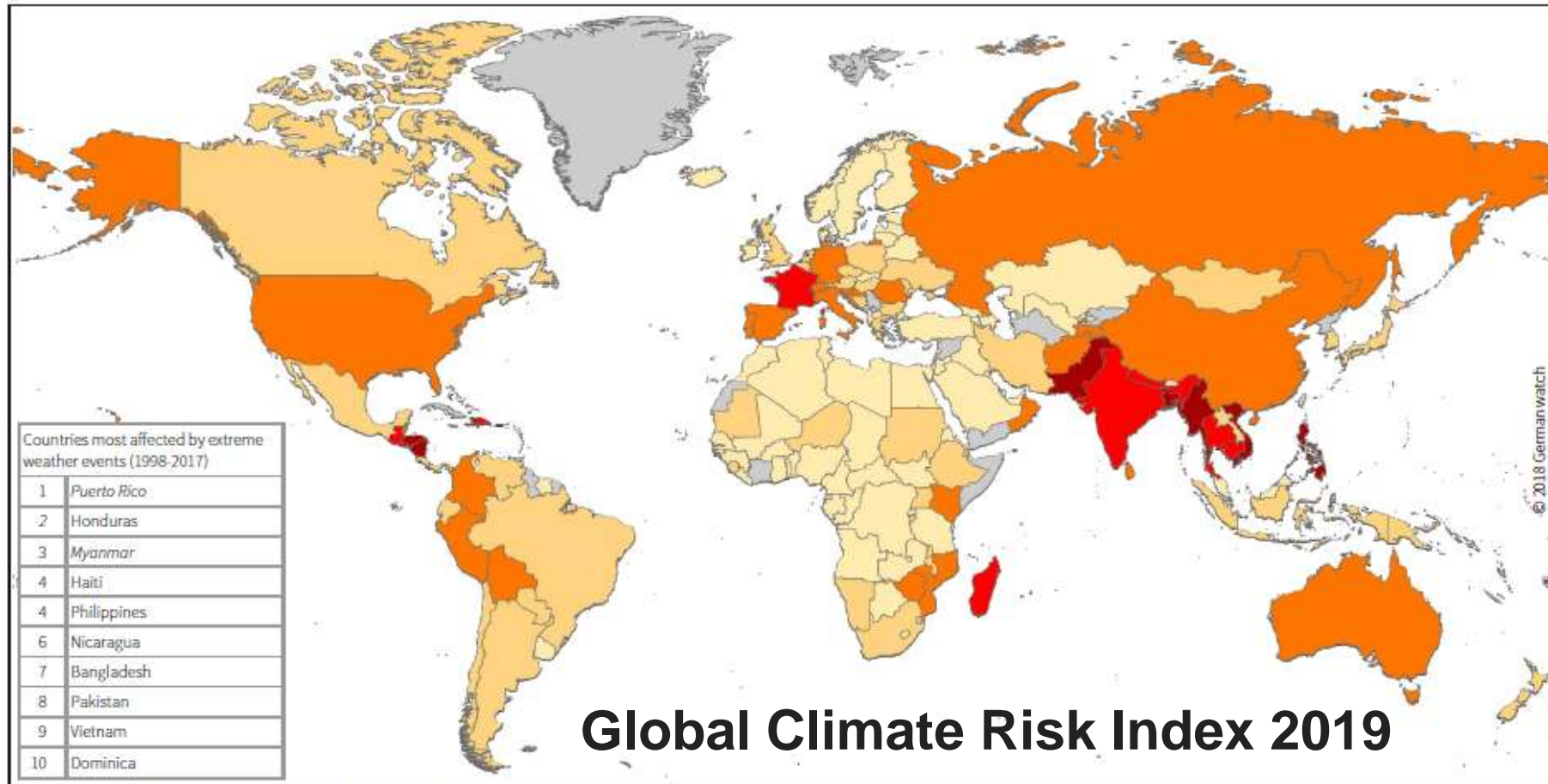
Yang Y, et al. Int J Obesity 2007

Mal

WHI

lia

Climate Change

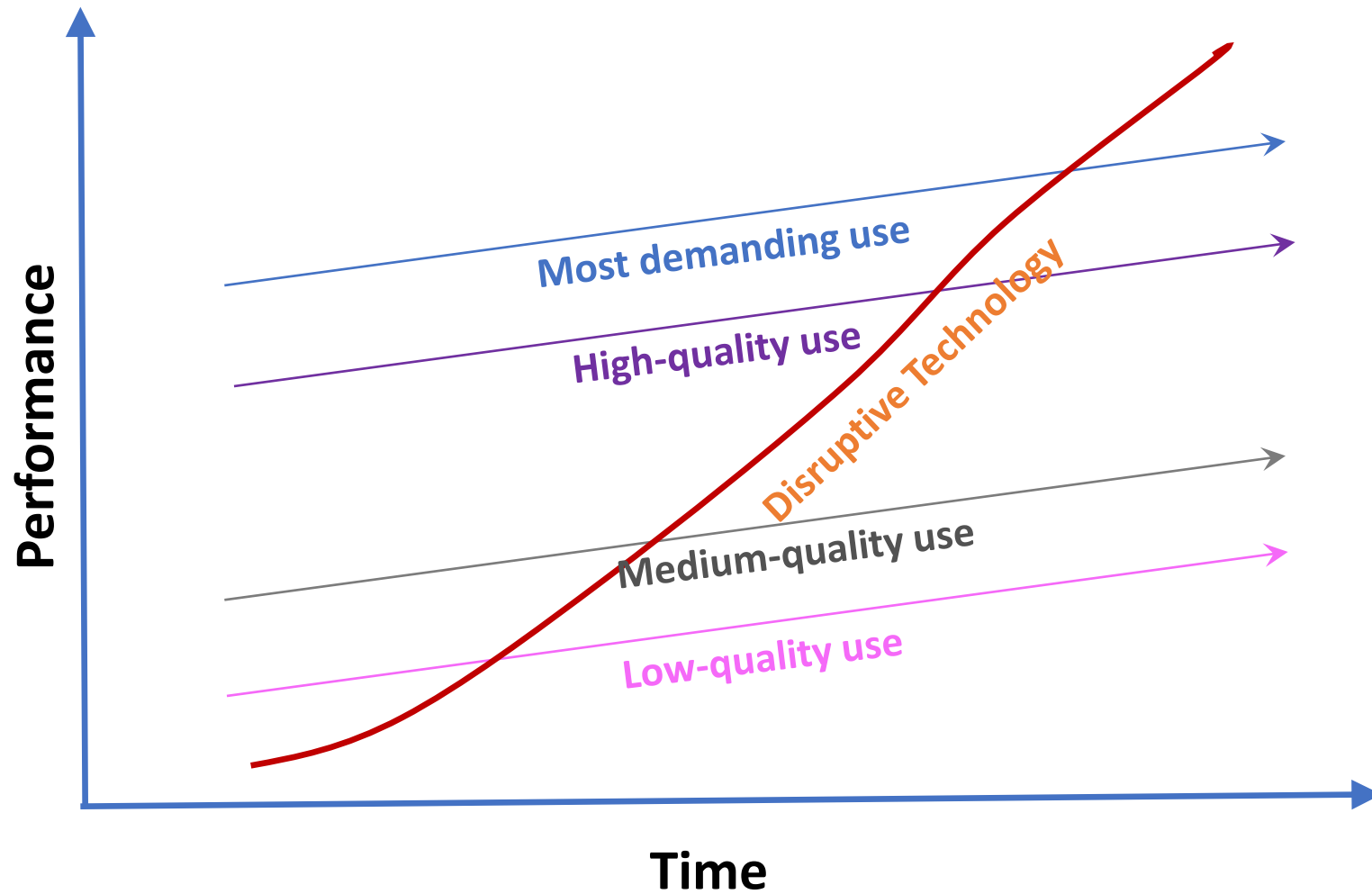


Italics: Countries where more than 90% of the losses or deaths occurred in one year or event.

Climate Risk Index: Ranking 1998 - 2017

| | | | | | |
|------|-------|-------|--------|------|---------|
| 1-10 | 11-20 | 21-50 | 51-100 | >100 | No data |
|------|-------|-------|--------|------|---------|

Low-end disruption





C
y
(h
a



© Imaginechina / Rex Features

• Offered (h
hospital

By CLAIRE BATES

PUBLISHED: 09:36 EST, 22 January 2013 | UPDATED: 03:34 EST, 23 January 2013



© Imaginechina / Rex Features



Keep
Kards

arch

pregnant

The Search for a Solution – the Affordable Dialysis Prize

Design an affordable dialysis machine - First prize \$100,000!

Created by TGI in 2015

a search for a new, disruptive, affordable dialysis system which

- is light, portable and runs on solar power
- can purify water from any source
- is just as safe and effective as conventional dialysis
- costs less than US\$1000 to manufacture and a few dollars a day to run



A global expert judging panel considered entries from around the world

... and unanimously chose a winner

Between 5 and 10 million people in the world need dialysis, but not for terminal kidney failure, but for a chronic condition. The George Institute, the International Society of Nephrology and the Asian Pacific Society of Nephrology, have created the Affordable Dialysis Prize to find a new, disruptive, affordable dialysis machine, and win \$100,000.

To win the prize your machine will

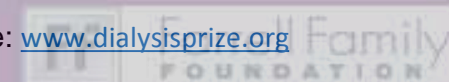
- Do just as good a job as traditional dialysis machines
- Have a target manufacturing cost of \$1000 and low operating costs
- Run off rechargeable batteries and solar power
- Take water from any source and purify it to meet all the standard safety requirements

To find out more on how you can change the face of dialysis forever, please visit:

www.georgeinstitute.org/projects/dialysis-competition

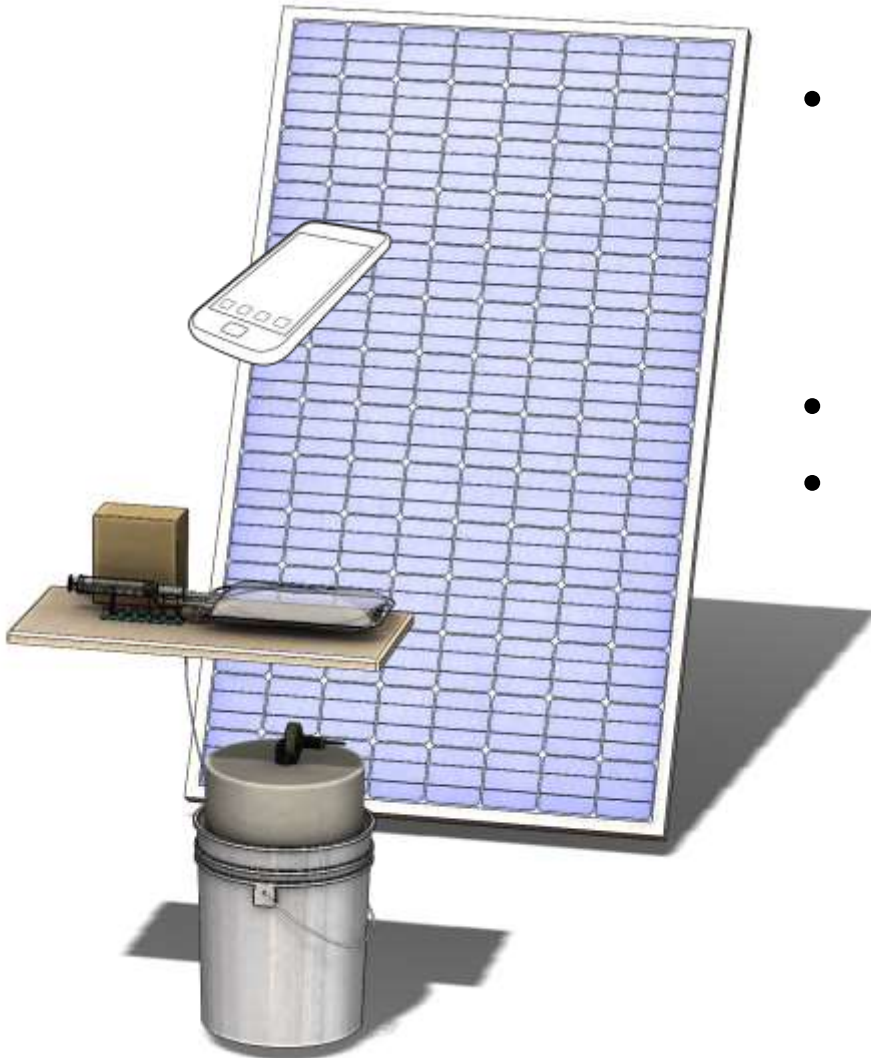


Reference: www.dialysisprize.org



THE AFFORDABLE DIALYSIS PRIZE US\$100K

Awarded to Vincent Garvey, March 2016

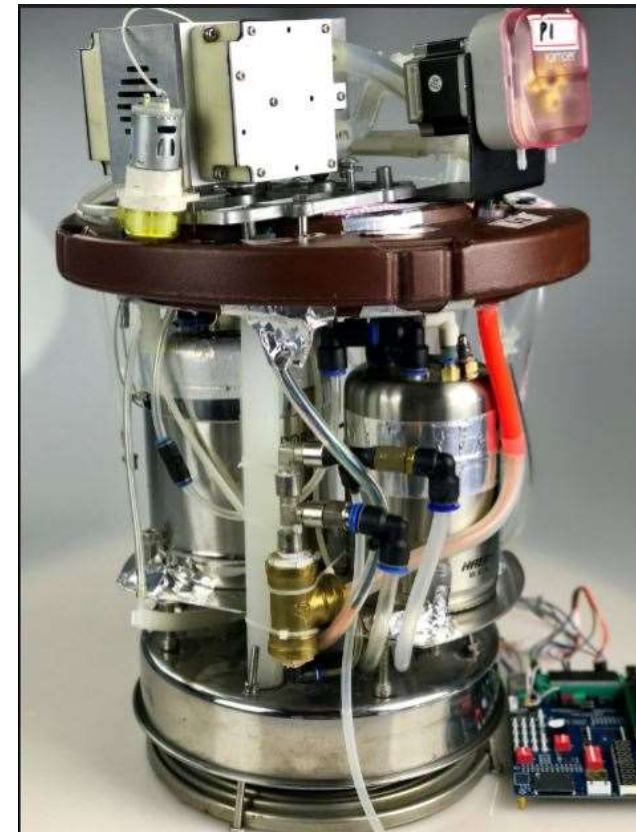


- The winning entry: prepares peritoneal dialysis fluid at the point of care using solar power and water from any source.
- Controlled by a smartphone.
- Cost: around \$500 for kit plus \$5 a day.





- Founded Dec 2016 to bring the winning invention to patients
- Owned by the George and Vincent Garvey
- Based at the George Institute in Sydney
- \$5.3m funding from NSW Health, a major charitable foundation, community donors, and George Health Enterprises



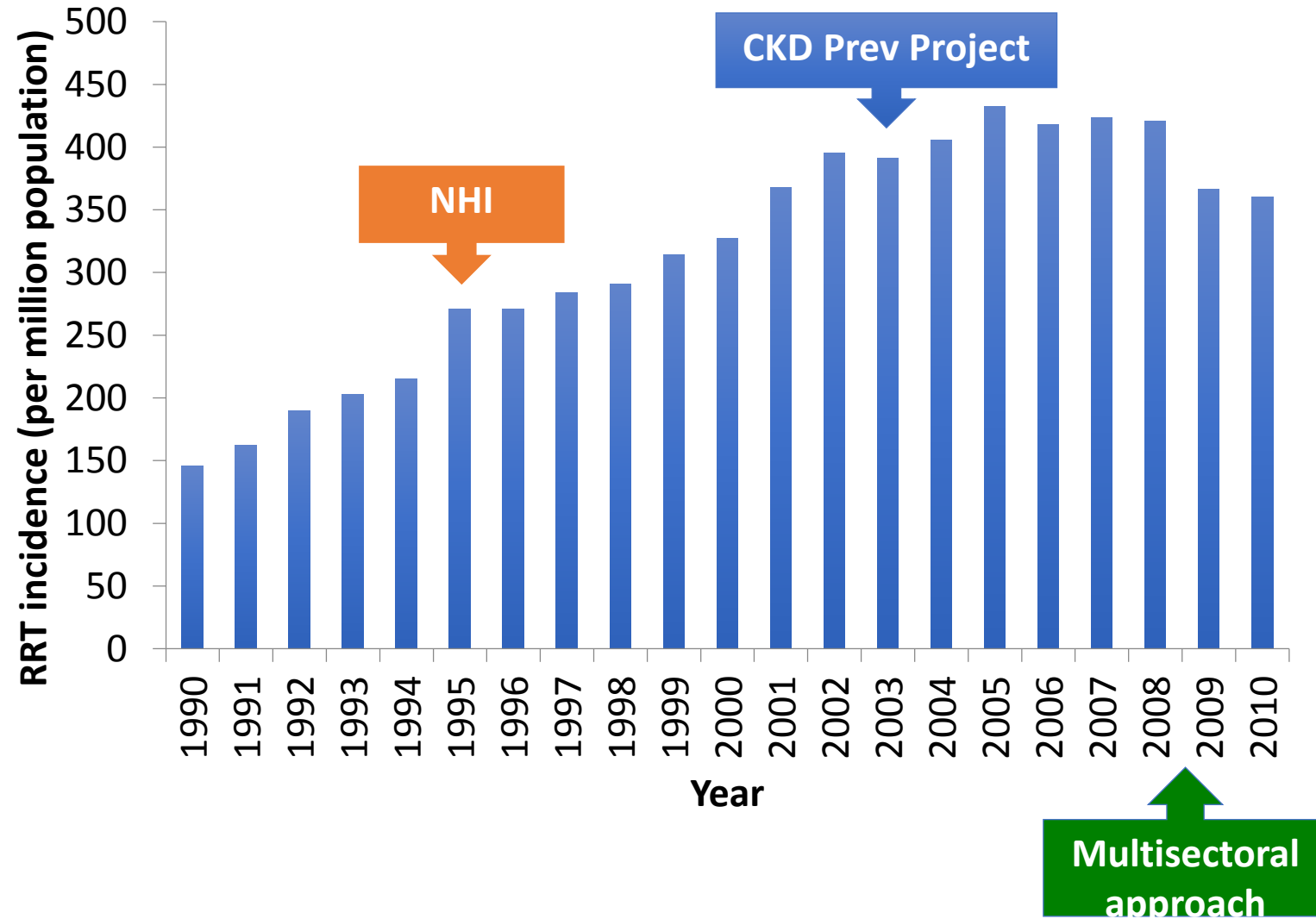
Courtesy : John Knight

Marketplace challenges

- **Risks and cost of regulatory approval**
- **Fascination with “new” technology**
- **“Fee-for-service” reimbursement**
 - **Lack of price transparency**

ESRD incidence in Taiwan

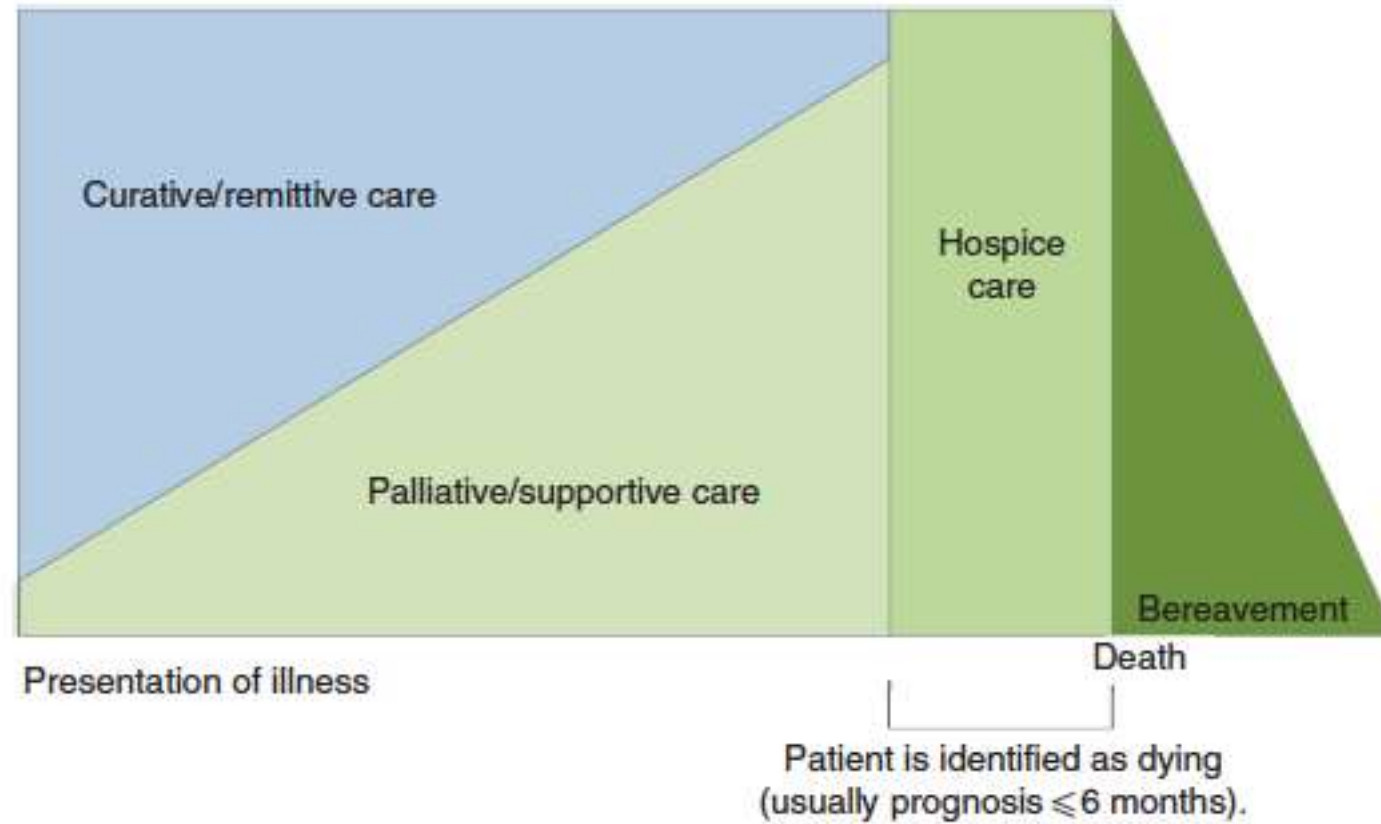
A Case Study



Innovative funding models

- Pro-poor financing schemes
 - Need for clear eligibility policies
- Swadana (self-financing) hospitals: Indonesia
- Public-private partnerships
 - Hybrid forms of corporatized entities
- Innovative funding models: NGOs, religious groups, Rotary Int, SIUT
- Ensuring implementation of universal coverage

Supportive care



Conclusions

- There is a large (and increasing) unmet need of dialysis in Asia
- Determinants of dialysis access are largely non-medical
- Removal of financial barrier increases uptake/initiation on dialysis
- Insurance coverage does not remove all barriers to long-term care
- Residual inequities around dialysis initiation need addressing
- New models of care and care delivery might worsen inequity unless addressed specifically
- Measures to reduce cost of care run into (expected) headwinds!
- Re-conceptualize understanding of health: refocus on prevention, early detection



ISN
WCN '20
MARCH 26-30 - ABU DHABI, UAE

ISN WORLD CONGRESS OF NEPHROLOGY

March 26-30, 2020
Abu Dhabi, UAE

Hosted by

