Green Nephrology

Katherine Barraclough
Nephrologist, Royal Melbourne Hospital
Chair, Environmental Special Interest Group, Victorian Clinical Renal Network
Chair, Green Nephrology Action Team, ANZSN
MY PATH TO HERE
OVERARCHING AIM

To impart that change is needed, possible, and has the potential to bring broad benefits...
• The environmental impact of renal care
  • Global climate change & resource depletion
• International experience with Green Nephrology
• Australian Initiatives
  • ESSIG
  • GNAT
  • Waste processing project
• Conclusions
THE PROBLEM

- 23,012 individuals receiving Rx for ESKD (~50% haemodialysis\(^1\))
- 1.7 million Australians ≥18 have indicators of CKD\(^2\)
- Burden of ESKD likely to continue to increase over time\(^2\)

1. ANZDATA Registry. Available at: [http://www.anzdata.org.au](http://www.anzdata.org.au)
THE PROBLEM

Recurrent per capita resource consumption profile = second to none in healthcare

POWER

• Wkly power requirement of a standard Hdx system ~ ½ the weekly power requirement of an average Australian 4 person home

WATER

• 500 L/Rx vs. average Australian daily per capita domestic use of 160 L

1. Agar JW. Semin Dialysis. 2015
2. Agar JW. Nephrology. 2010
THE PROBLEM

*Recurrent per capita waste generation profile = second to none in healthcare*

**HD** plastics $\sim$ 2.5 kg/pt/Rx
3 (min)/wk = 390 kg/pt/annually

**PD** plastics $\sim$ 1.3 kg/pt/day

Daily therapy = 475 kg/pt/annually

↓

12,091 prevalent Australians dialysis pts (80% HD, 20% PD)

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5,100 tonnes plastic/yr

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1. [www.sustainablehealthcare.org.uk/nephrology](http://www.sustainablehealthcare.org.uk/nephrology)
2. ANZDATA Registry. Available at: [http://www.anzdata.org.au](http://www.anzdata.org.au)
THE PROBLEM

Financial price is high

\[ \text{Mx of ESKD in Aus from 2009-2020 estimated at} \]

\[ >12 \text{ billion AUD}\]¹

⇒ Without targeted actions....“the costs at an individual and system level will become unsustainable”.

THE PROBLEM

Environmental price is also high

Carbon footprint of a HD patient is

$>1.5 \times$ that of the average Australian$^1$

1. Lim AE. Aust Health Rev. 2013
Carbon footprint of a HD patient is 50-100x that of individuals from Africa and some parts of the Asia Pacific.
THE PROBLEM

For 650,000 years, atmospheric CO₂ has never been above this line ... until now

* current CO₂ level

1950

GLOBAL CLIMATE CHANGE
climate.nasa.gov

* as of July 2013
Average global temperatures in February 2016 were 1.65°C warmer than the norm for 1880–1900, which is the baseline used by the IPCC.

Data source: NASA - GISS, data.giss.nasa.gov - climatesafety.net 2016
THE PROBLEM

If warming continues unchecked...

‘Severe, pervasive & irreversible impacts for people & ecosystems globally’

UN Intergovernmental Panel on Climate Change 2015

‘The greatest global health threat of the 21st Century’

The Lancet 2009 and 2015
2016 - humanity uses the equivalent of **1.5 planet earths** each year. \(^1\)

Australians = **3.6 planet earths** \(^2\)

= UNSUSTAINABLE

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1. [http://www.footprintnetwork.org](http://www.footprintnetwork.org)

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Ecological Footprint versus Carrying Capacity

This graph shows the number of Earths required to provide the resources used by humanity and to absorb their emissions for each year since 1960. This human demand is compared with the available supply: our one planet Earth. Human demand exceeds nature’s supply from the 1980s onward, over-shooting it by some 20 percent in 1999. (Source: M. Wackernagel et al.)
‘Multiple mitigation pathways are available which if followed, make it likely that warming can be limited to 2°C’

U.N. Intergovernmental Panel on Climate Change 2015

‘The solutions are many and (they) allow for continued economic and human development. All we need is the will to change....’

Rajendra Pachauri, Chair of the Intergovernmental Panel on Climate Change

‘To ride this storm we need all hands on deck.’

Ban Ki Moon, U.N. Secretary General
SOLUTIONS....

- U.K Green Nephrology Initiative
- Practice change
  - Widespread RO water recycling
  - Retrofitting of heat exchangers into dialysis systems
  - Advanced recycling
  - Telemedicine to reduce travel-related emissions
- Also...
  - Environmentally focused research
  - National “green guidelines”
  - Establishment of a ‘Green Network’ of local representatives

1. [http://sustainable healthcare.org.uk/green-nephrology](http://sustainable healthcare.org.uk/green-nephrology)
3. Connor A. J Ren Care. 2010
SOLUTIONS....

• Annual savings
  – 470 million liters of water
  – 11,000 tCO2 -eq of greenhouse gases
  – £7 million\(^1\)

• Improvements in
  • efficiency
  • quality of care
  • patient and staff morale and empowerment\(^1, 2\)

• A number of European jurisdictions – substantial progress\(^3\)

3. Connor A. J Ren Care. 2010
Italian Study\(^1\)

- 4 different waste policies simulated
  - Careful-optimal (best practice), careful-lazy, careless-lazy, careless optimal (status quo waste \(mx\))
- Average time needed for careful-optimal waste \(mx\)
  - Approx 1 min for a HD session
  - 2 mins for HDF
- Cost savings from careful-optimal vs. careless-optimal
  - \(45–52.5\) million Euro \((60–70.30\) million USD\)
  - \(3\) billion Euro \((4\) billion USD\) world-wide

1. Piccoli et al. NDT. 2015
2012 Green Nephrology Survey from John Agar and colleagues

- Established a baseline, identified areas for attention
- No action followed
- No coordinated initiatives since
Established Nov 2015

Reports to the VRCN in the DHHS

Members:
- Manager, VRCN
- Rep from DHHS Sustainability Unit
- Nephrologist
- 6 nurses
- Consumer (KTxR)

Aim
- To improve environmental outcomes in nephrology practice in Victoria

Role
- To facilitate a coordinated, strategic approach to environmental initiatives across the state, driving change and innovation in this area
**GREEN SURVEY**

**Why do a survey?**

- To improve environmental profile of nephrology, we need to know:
  - Baseline environmental practice
  - The current degree of environmental awareness in the renal community
  - What ‘green’ projects or initiatives are currently active in Vic renal services

**Asked questions on....**

- Energy & water use, waste mx, procurement, transport, building design
- Environmental policies & improvement initiatives
- Attitudes & culture
- Climate change
SURVEY RESULTS

- Responses from 71 out of 83 Vic renal facilities
- = 628 of 660 HD chairs (95%)
SURVEY RESULTS

Overall...

• Limited environmentally sustainable infrastructure within renal buildings in Vic

• Limited consideration of environmental issues in day to day practice

• ‘Green culture’ generally lacking

• Limited climate change preparedness
SURVEY RESULTS

Does your facility reclaim RO reject water for use in other areas?

- Yes: 27%
- No: 62%
- Don’t know: 11%

Has your facility undertaken a sustainability audit (e.g. of waste, water use, energy, other?)

- Yes: 31%
- No: 62%
- Don’t know: 7%
Are you currently running any ‘Green Projects’ in your unit?  

- Yes: 84%  
- No: 16%

Is your facility preparing for heat waves and climate change?  

- Yes: 47%  
- No: 44%  
- Don’t know: 9%
ESSIG sought a local **GREEN** representative from each Vic renal unit

➢ 54 volunteers (54 units of 81 represented)

• **Provided with...**
  • Fact sheets, case studies, tool kits (e.g. ‘how to’ guide for waste auditing)

• **Asked to...**
  • Undertake a local green project
  • Ongoing support provided
GREEN NEPHROLOGY ACTION TEAM (GNAT)

A vector for change ....

Aim:
• To foster, promote and environmentally sustainable nephrology practice within ANZ

Members:
• 4 ANZSN representatives
• 2 RSA representatives
• KHA representative
Position Statement

Focus on education and research

- Inclusion of a ‘green segment’ into ANZSN & RSA annual meetings
- Development of an environmental research prize (one each for ANZSN & RSA)
BACKGROUND:

• Plastic waste ++ generated from dialysis (close to 1 million worldwide)¹
• Almost all discarded as clinical waste
  • Expensive
  • Environmentally damaging
  • Wasted resource

1. Agar. Seminars in Dialysis. 2014
ALYMED 700

- Shreds and chemically disinfects waste
- Reduces waste volume by up to 90%
- Renders it sterile
- Opportunities
  - Reduction in waste disposal cost
  - *Potential for on-use of sterile end-product*
WASTE PROCESSING PROJECT

AIMS:
1. Audit waste generation & disposal at 3 Vic HD units (RMH, Coburg, BH)
2. Pilot trial of on-site waste processing at RMH
3. Investigate opportunities for on-use of sterile end product

Reduce Your Carbon Footprint To Practically Zero.
**PROGRESS:**

- Funding from FMC
- Awaiting EPA approval for disposal of processed waste as general waste
- Promising results from preliminary trials of incorporating processed plastic into concrete
CONCLUSIONS

- Nephrology practice is extraordinarily resource intensive
  - Unsustainable
  - Unacceptable in the face of global climate change
- Solutions exist
  - Improved environmental outcomes
  - Improved cost, efficiency and quality of care
WE CAN PUT OUR HEADS IN THE SAND
OR ....

• Be engaged and informed about local and global issues
  – Films:
  – Issues:

• Participate in public debate
• Join key lobby groups
OR ....

At work...

• **Be open, supportive, receptive**

• Be active
  • Meet your hospital Sustainability Officer
  • Join hospital Green Group
  • Form your own Green Group
  • Become a Green Champion & work with ESSIG
  • **Start a green project...**
“Saving our planet, lifting people out of poverty, improving health...these are one and the same fight. We must connect the dots between climate change, water and energy use, food security, empowering women and global health. Solutions to one problem must be solutions for all.”

- Ban Ki-Moon, Secretary General, United Nations
THANK YOU ☺

CLIMATE SUMMIT

WHAT IF IT'S A BIG HOAX AND WE CREATE A BETTER WORLD FOR NOTHING?

- ENERGY INDEPENDENCE
- PRESERVE RAINFORESTS
- SUSTAINABILITY
- GREEN JOBS
- LIVABLE CITIES
- RENEWABLES
- CLEAN WATER, AIR
- HEALTHY CHILDREN
- ETC. ETC.