

Corporate Presentation 2011



Section 1:

INTRODUCTION



AWAK

(Automated Wearable Artificial Kidney)

VISION

- Create new paradigm in renal dialysis

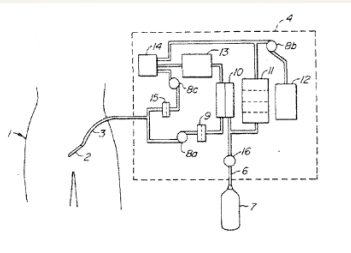
MISSION

- Contribute to patients, technology, economy & society
- Wealth creation



Concept to Prototypes

July 2007



United States Patent [19]
Roberts et al.

[54] WEARABLE PERITONEUM-BASED SYSTEM FOR CONTINUOUS RENAL FUNCTION REPLACEMENT AND OTHER BIOMEDICAL APPLICATIONS

[75] Inventors: Martin Roberts, North Hills; David Be-Nyi Lee, Encino, both of Calif.

[73] Assignee: The Regents of the University of California, Oakland, Calif.

[21] Appl. No.: 08/866,972

[22] Filed: Jun. 2, 1997



Jun 2008



Oct 2008

Jan 2010



Mar 2009

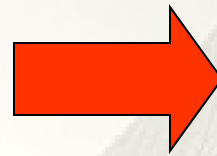


Dec 2008





Paradigm Change



Source: HealthTech Wire
Center-based HemoDialysis
Alternate Day, 4-hr Sessions

Automated Wearable Artificial Kidney
24x7, Anytime & Anywhere



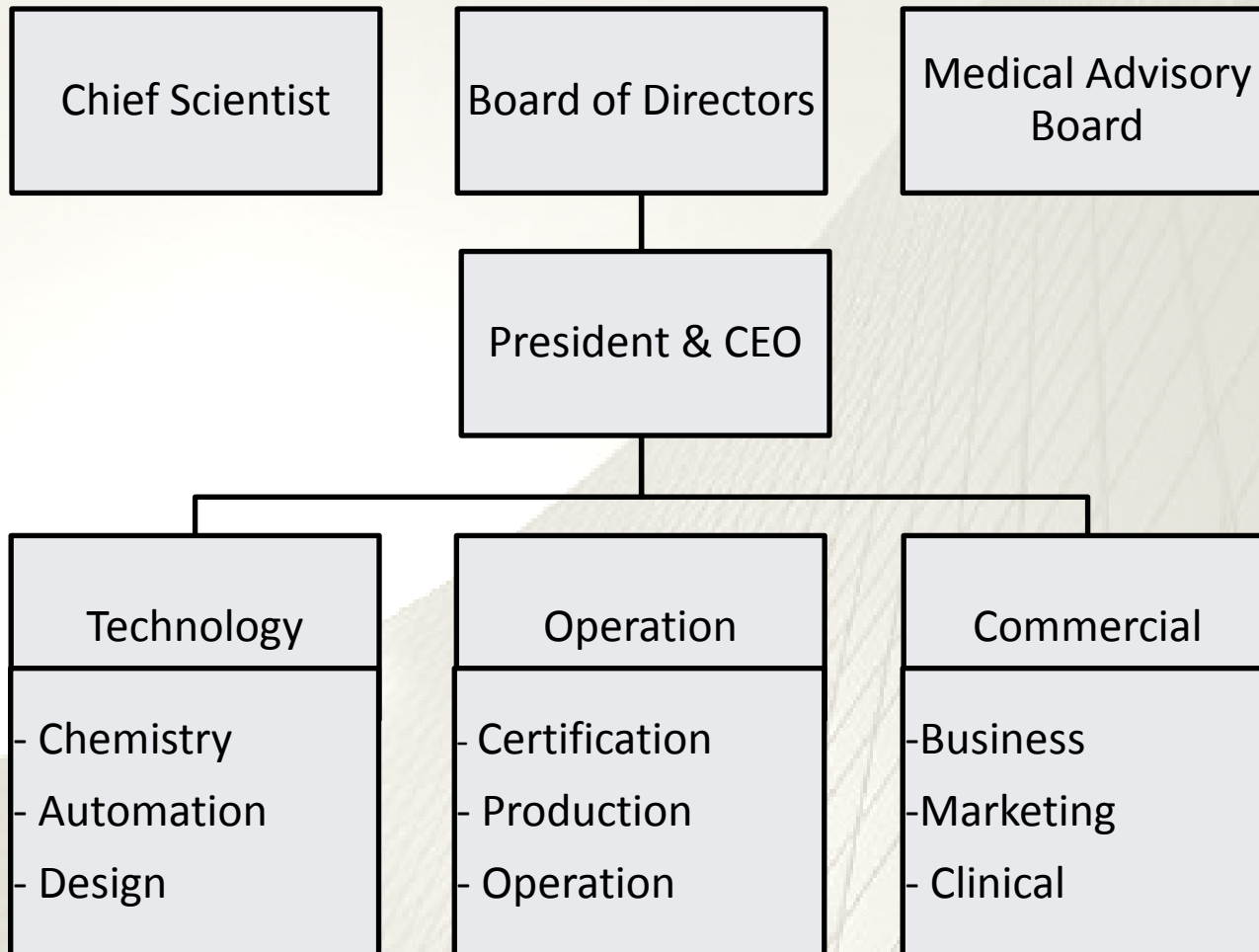
AWAK Technologies

The Wearable Dialysis Company

Founded April 2007	US Office: Science, Regulatory & Marketing Singapore Office: Engineering, Productions & Operations
Privately Funded	US\$6 Million
ESRD Market	Services: US\$50 Billion Supplies: US\$10 Billion (Source: Kalorama's Worldwide Dialysis Market 2008)
Value Propositions	Freedom – “Automated & Wearable” Functions continuously, like the normal kidney



Organization Overview



Offices:
a) Burbank, CA
b) Singapore



Board of Directors



Dr Gordon Ku (Chairman of the Board)
Consultant Nephrologist
Chairman, Kidney Dialysis Foundation



Neo Kok Beng
President & CEO
AWAK Technologies



Low Check Kian
Partner, NewSmithCapital
Lead Independent Director,
Singapore Stock Exchange



Lim Ho Kee
Chairman, SingPost
Former Chairman,
UBS Asia



Dr Gloria-Loke Keng Fai
Consultant Endocrinologist
Mount Elizabeth Hospital



Dr Yap-Whang Hwee Yong
Consultant Medical Oncologist
Former Associate Professor,
MD Anderson Hospital, TX



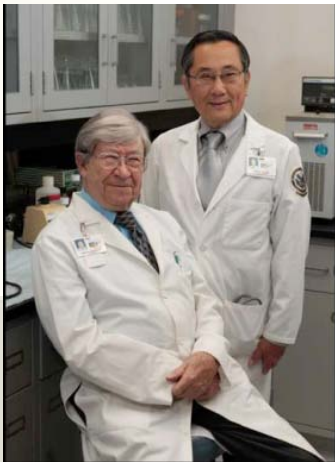
Chua Thiam Joo
Partner,
Accion Capital Management



Advisors & Chief Scientists



Dr (Sir) Roy Calne
(Chairman, Medical Advisory Board)
Emeritus Professor of Surgery,
Cambridge University



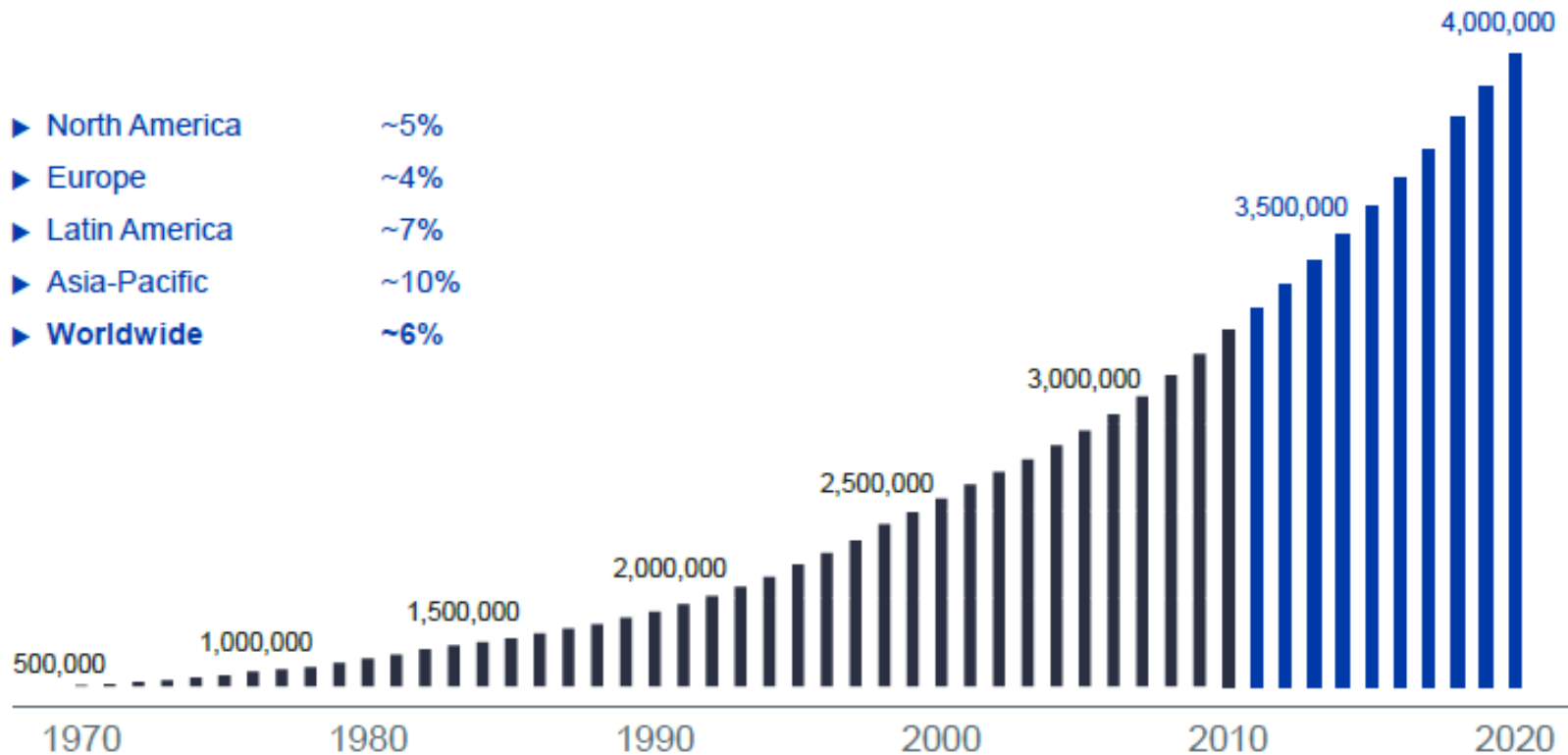
Dr David Lee, MD (Chief Scientist)
Professor, UCLA David Gaffin School of Medicine
Nephrology Consultant, VAGLA Healthcare System

Dr Martin Roberts, PhD (Chief Scientist)
Adj Asst Prof, UCLA David Gaffin School of Medicine
Dialysis Research Consultant, VAGLA Healthcare System



Global ESRD Population

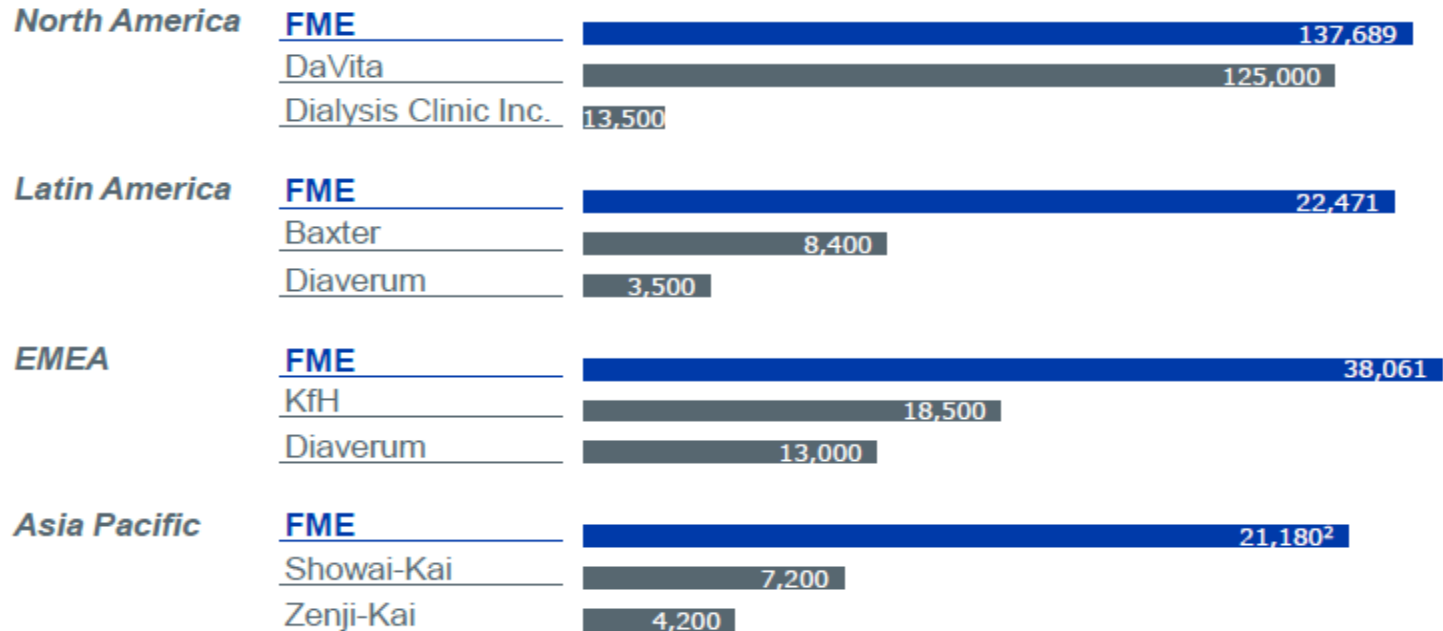
2020:
Estimates suggest an increase to nearly
4 million dialysis patients



(Source: Fresenius Presentation , J.P. Morgan 1 March 2011)



Leaders in Dialysis Services



of patients

(Source: Fresenius Presentation, J.P. Morgan 1 March 2011)

	Rank 1	Rank 2	Rank 3
Dialyzers	FME	Gambro	Nipro
Dialysis machines	FME	Gambro	Nikkiso
Hemodialysis concentrates	FME	Fuso	Gambro
Bloodlines	FME	Gambro	Kawasumi
Peritoneal dialysis products	Baxter	FME	Gambro



Summary of Industry Leaders

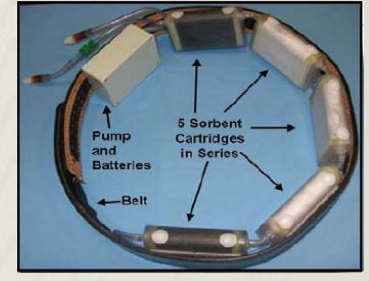
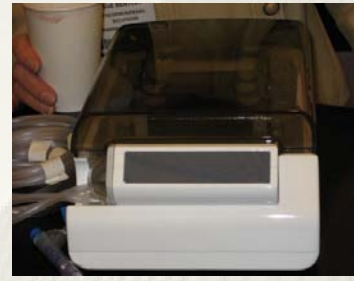
	Fresenius	Baxter	Da Vita
Business	Integrated Service Provider	Product Provider	Service Provider
No. of Patients	214,648	150,000	125,000
Net Sales	12,053M - 2,983 (Products) - 9,070 (Services)	2,389M (Renal) - 1,955 (PD) - 434 (HD)	6,447M
PPPY	58K	16K	49K
Net Income	979M	1,427M	405M
Net Profit Margin	8.12%	15.64%	6.29%
P/E Ratio	18.01	16.03	15.57
Market capitalization	22.67B	32.47B (Includes other businesses)	8.45B

Source: Annual Reports 2010 of Companies



Wearable Developments

Fresenius Medical Care



Source: Pictures from ASN 2008

Nephcor



Source: Lancet



Portable Developments

NxStage Medical Inc

Fresenius Medical Care



System One

Source: NxStage Website



Fresenius-K at Home

Source: Renal Solution Presentation



REDY 2000



Section 2:

TECHNOLOGY



Technology Concept

Concept

Bloodless: Peritoneal-based Dialysis

Waterless: Recycled Spent Dialysate

Value Propositions

Patient's freedom (work, travel & leisure)

Round-the-clock function (like normal kidneys)

Maintain normal physiologic, metabolic and psychological conditions of patient



Intellectual Property



- University of California – Los Angeles
- Exclusive World-Wide License
- Sub-license rights
- 2 patent (PCT 5,944,684) & (PCT/US07/02664)

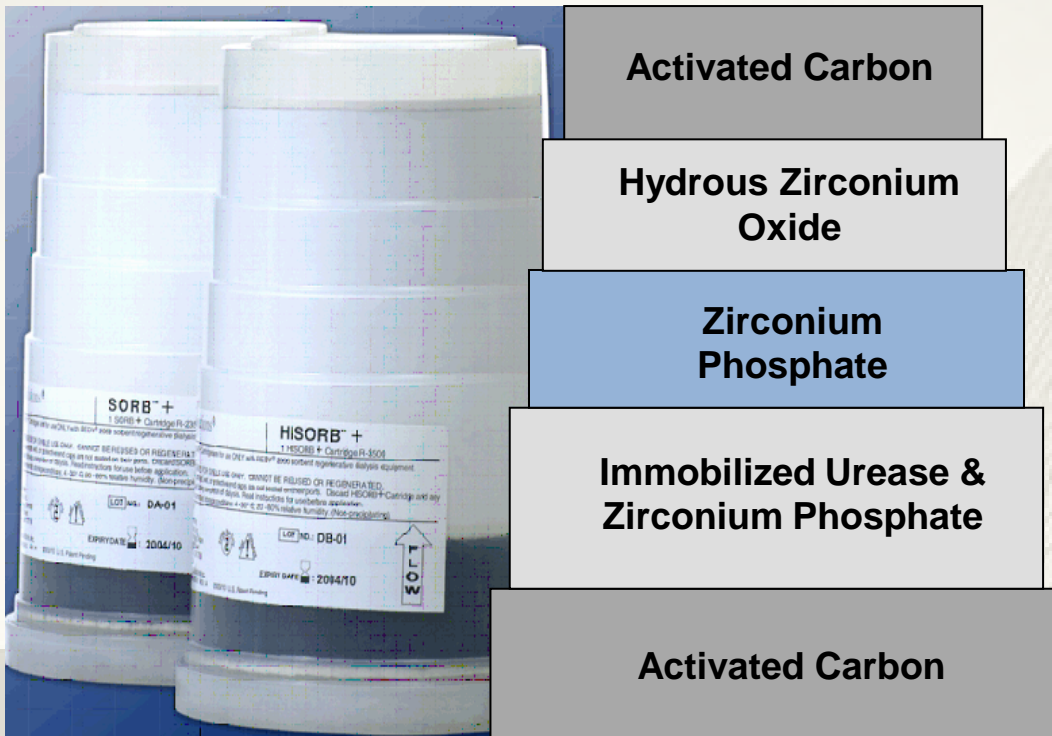


- Temasek Polytechnic
- Strategic Development Partner
- Exclusive World-Wide License
- Sub-license rights
- 3 patents filed, 4 being prepared.



Layered Sorbent Cartridge

Filtered Dialysate



Activated Carbon

Hydrus Zirconium Oxide

Zirconium Phosphate

Immobilized Urease & Zirconium Phosphate

Activated Carbon

Removes from dialysate

Releases into dialysate

Creatinine, Uric Acid & Organic Molecules

None

Phosphate

Acetate
•Bicarbonate

$(\text{NH}_4)^+$, Ca^{2+} , Mg^{2+} & K^+

Na^+ & H^+

Urea
 $(\text{NH}_4)^+$, Ca^{2+} , Mg^{2+} & K^+

Ammonium Carbonate,
 Na^+ & H^+

Copper, heavy metals, & Substances adversely affecting urease

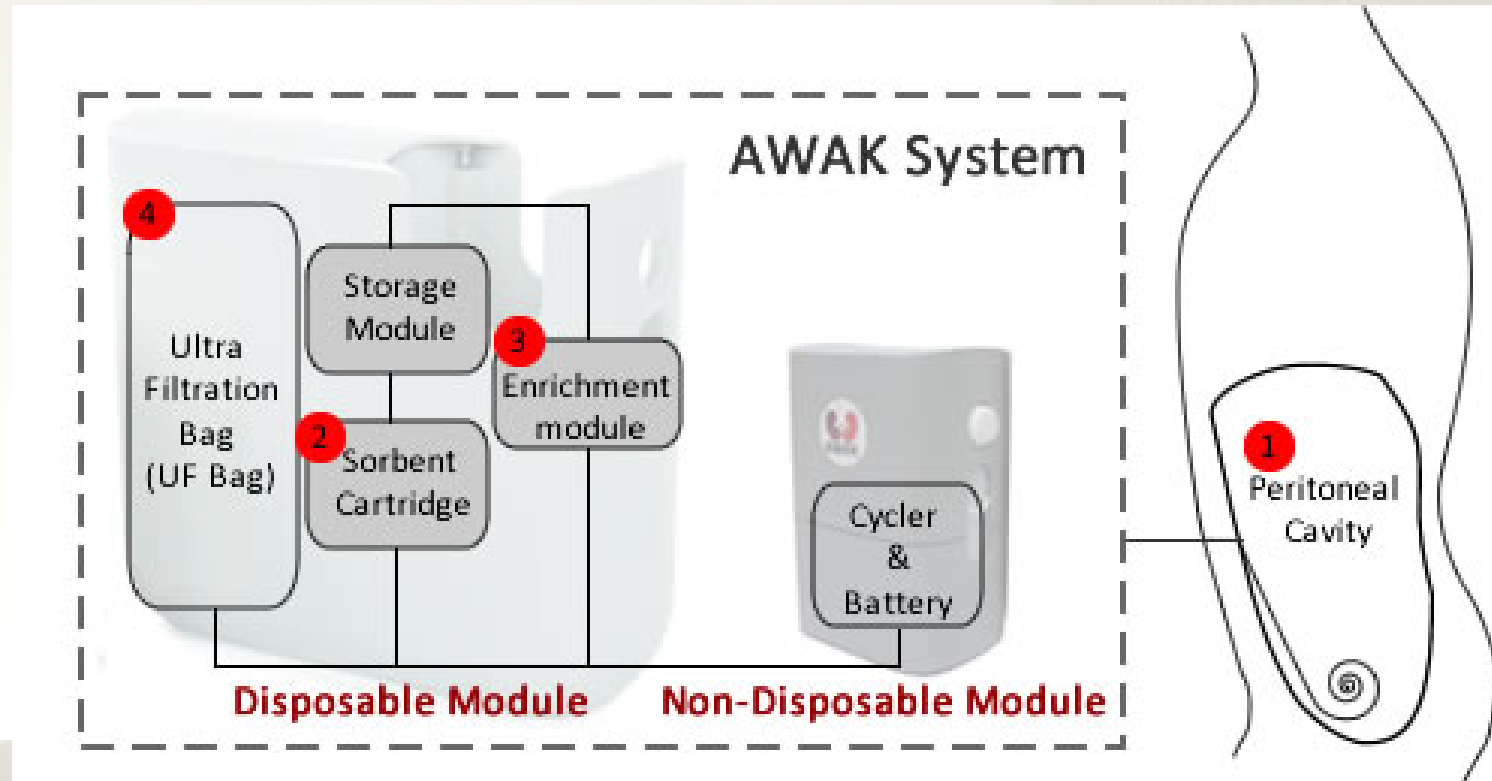
None

Spent Dialysate





AWAK System





AWAK vs Current PD Method

Method	Dialysate Exchange per day	Urea Clearance (Kt/V)
CAPD	6 – 8 L	≈ 2
APD	12 – 15 L	≈ 2
AWAK Hi-Capacity Cartridge	66 – 80 L	≈ 4
AWAK Regular Cartridge	30 – 50 L	≈ 2



AWAK Operating Modes



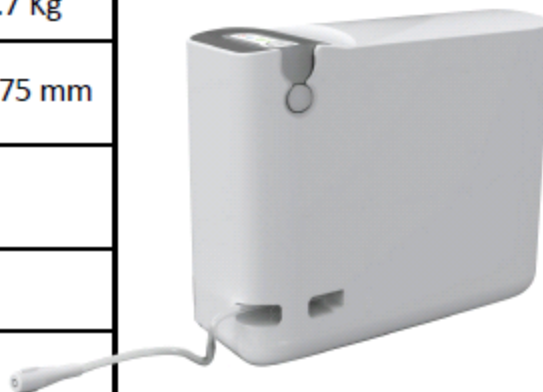
OPERATING MODES	All-time Wearable	Optimal Wearable	Night	Acute
Cartridges	3R	1R & 1H	1H	2H
Est. Kt/V (weekly)	2.0	3.0	2.4	4.8
Operating Hours	21	19	12	24



AWAK Cartridges

AWAK Hi-Cap Cartridge (H)	
Weight	3.75 lbs / 1.7 Kg
Dimension	200 x 160 x 75 mm
Amount of Urea Nitrogen Adsorbed	10 grams
Usage Hours	12 hours
Flow Rate	4L/hour

AWAK Regular Cartridge (R)	
Weight	1.65 lbs / 0.8 kg
Dimension	170 x 146 x 55 mm
Amount of Urea Nitrogen Adsorbed	3.5 grams
Usage Hours	7 hours
Flow Rate	2L/hour





AWAK Operation



Dialysis on the GO !

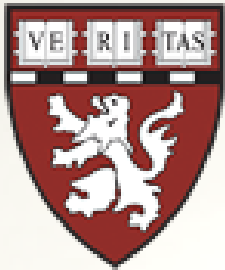


Section 3:

CLINICAL



Regulatory Consultants



Dr David Charytan

Consultant for Clinical Protocol Design
Harvard Clinical Research Institute



ISO 13485 (from 2008)
Quality Management System
For Medical Devices



Dr Veit Otto

CE Consultant for Medical Devices
3R Lifesciences

CardioMed

Dr Elisa Harvey

FDA Consultant for Medical Devices
CardioMed Device



Full Clinical Trial

Aim

- To determine the safety and efficacy of automated wearable artificial kidney (AWAK).

Methodology

- 2 – 3 sorbent cartridges exchanges per day
- 20 hours tidal peritoneal dialysis per day
- Blood and dialysate samples will be collected to determine dialysis efficiency



Full Clinical Trial

Proposed Trial sites	Singapore, US and Germany
Trial sample size	10 to 20 peritoneal dialysis patients per sites
Trial duration	3 to 6 months



Thank you