

# New Zealand: Partnering for Science and Business Innovation

NZ-Japan Bilateral Workshop in Technologies for Elderly Care  
March 2017



**MINISTRY OF BUSINESS,  
INNOVATION & EMPLOYMENT**  
HĪKINA WHAKATUTUKI

**CallaghanInnovation**  
BUSINESS TECHNOLOGY SUCCESS



**MINISTRY OF BUSINESS,  
INNOVATION & EMPLOYMENT**  
HIKINA WHAKATUTUKI

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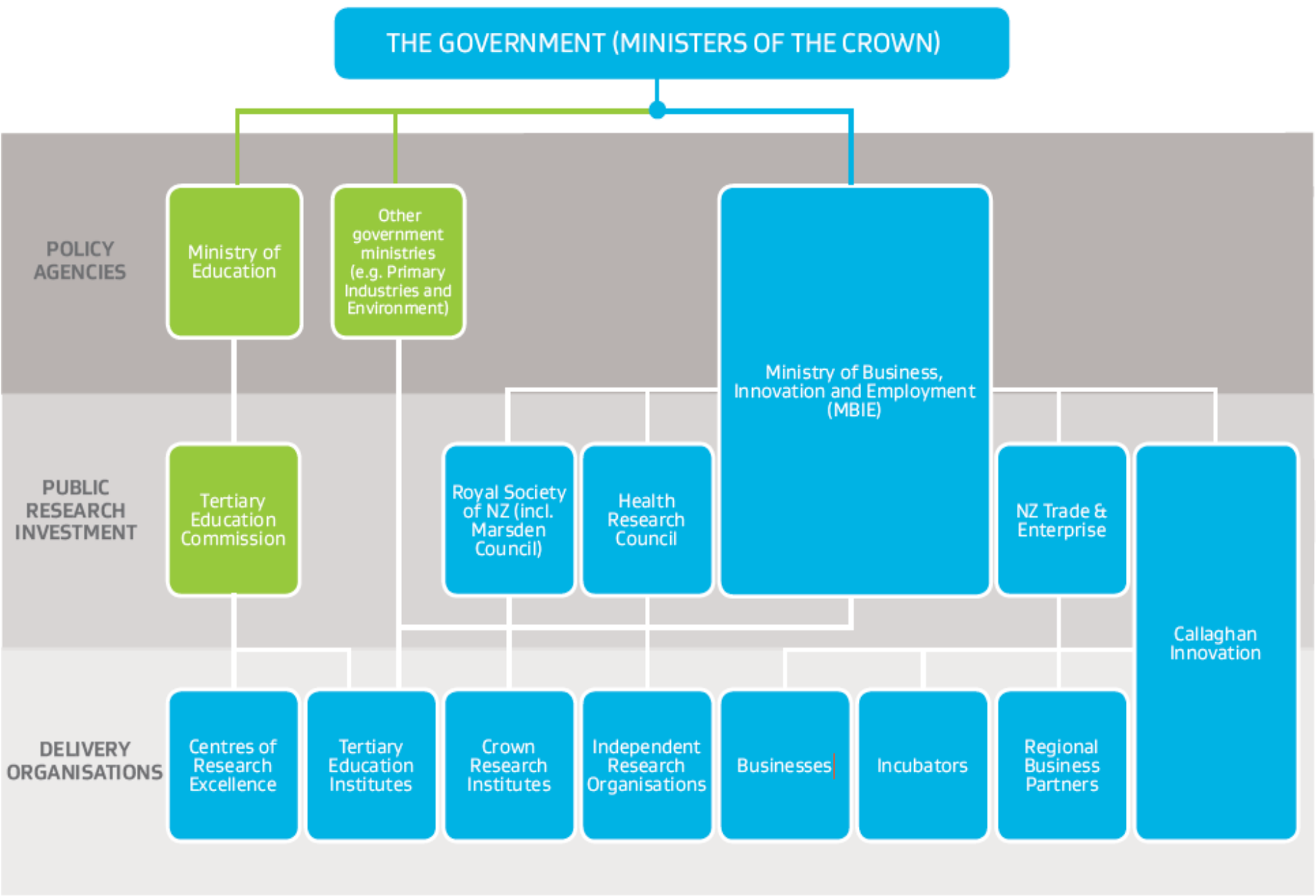
# **New Zealand Science and Innovation System**

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Dr Seishi Gomibuchi, Senior Advisor- International Science Partnerships



# The Government support for the S&I system



# Catalyst Fund

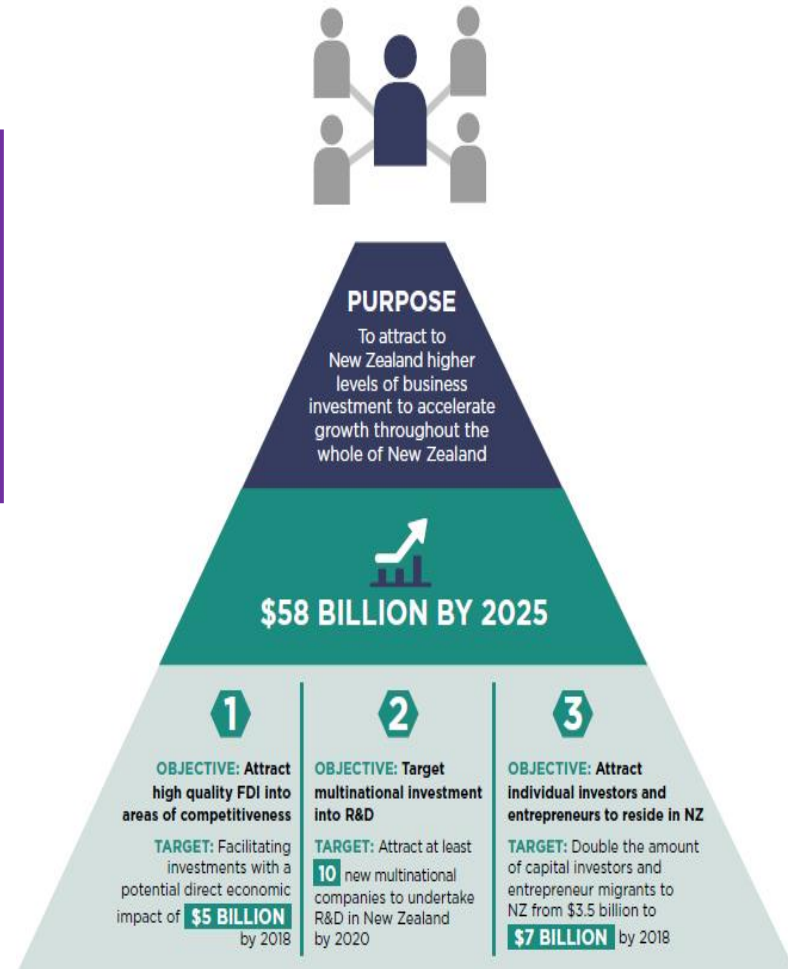
The Catalyst Fund supports activities that initiate, develop and foster collaborations leveraging international science and innovation for New Zealand's benefit.

<b>Catalyst: Strategic</b>	funds strategic research and large-scale international collaborations
<b>Catalyst: Seeding</b>	supports small and medium-sized new international partnerships
<b>Catalyst: Leaders</b>	supports targeted international fellowships for exceptional individuals
<b>Catalyst: Influence</b>	supports New Zealand's involvement in international fora



# Attracting Investment to New Zealand

The Investment Attraction Taskforce is designed to deliver the strategy and support a step-change in New Zealand's investment attraction efforts, to unlock barriers and enable the seamless facilitation of investment opportunities.



# Attracting Multinational R&D Investment to New Zealand

- **Aim to attract 10 multinationals by 2020**
- Objectives:
  - Build a more internationally connected science system
  - Contribute to lifting BERD
  - Enhance R&D investment ecosystem
  - Build NZ's reputation as an R&D location
  - Enhance our reputation as a great place to do business

# Our global rankings – a great starting point

**1st**

for Entrepreneurship

**1st**

for corporate ethics and accountability

**2nd**

best country in the world to do business with

**1st**

for trust-worthiness and confidence

**1st**

in world for investor protection and monetary freedom

**3rd**

in world for economic freedom and opportunity

**1st**

highest investment level in digital network

**2nd**

easiest place in the world to do business

**4th**

most attractive investment destination in the world

# The flip-side...

Small

Remote



Great science

Ideal test-bed

Nimble and responsive  
government

Privacy

Disease-free agricultural  
environment



# NZ MedTech Research and Partnering Ecosystem

Dr Diana Siew  
MedTech Sector Specialist

# Consortium for Medical Device Technologies, CMDT

- National industry-research network
- Accelerate innovation – medtech one stop portal
- Simplifies cross-organisational collaborations
- International connections



[www.cmdt.org.nz](http://www.cmdt.org.nz)



## Centre of Research Excellence (CoRE)

- MedTech CoRE – solving health needs with new technologies and creating commercial opportunities
- Brain Research NZ – understanding the aging brain to develop interventions and treatments for neurodegenerative disease
- Te Punaha Matatini – data analytics

## National Science Challenge (NSC)

- Science for Technological Innovation
- Ageing Well – providing better health and wellbeing for older Nzers
- Healthier Lives – prevention and treatment of chronic conditions



## NZ MedTech Industry- Overview

- Emerging & vibrant \$1.4B sector
- 160 companies – 90% start-ups to \$10M revenue

Diagnostics & Therapeutics	Sleep Apnea, Fisher & Paykel Healthcare; Bladder cancer screening, Pacific Edge Biotechnologies
Interventional Technologies	Anaesthesia monitoring, Custos; Devices for interventional radiology, Adept Medical
Assistive & Rehabilitation Technologies	Robotic mobility devices, REX Bionics; Stroke Rehabilitation, AbleX Healthcare
Telehealth & Health Informatics	Electronic patient records, Orion Health; Remote communication, Poppin; Behaviour modification, SHI Global
Regenerative Med Technologies	Tissue Scaffolds, Aroa; Orthopaedic implants, Enztec



# Standing Trial Populations (STPs)

## NZ as a Test Bed

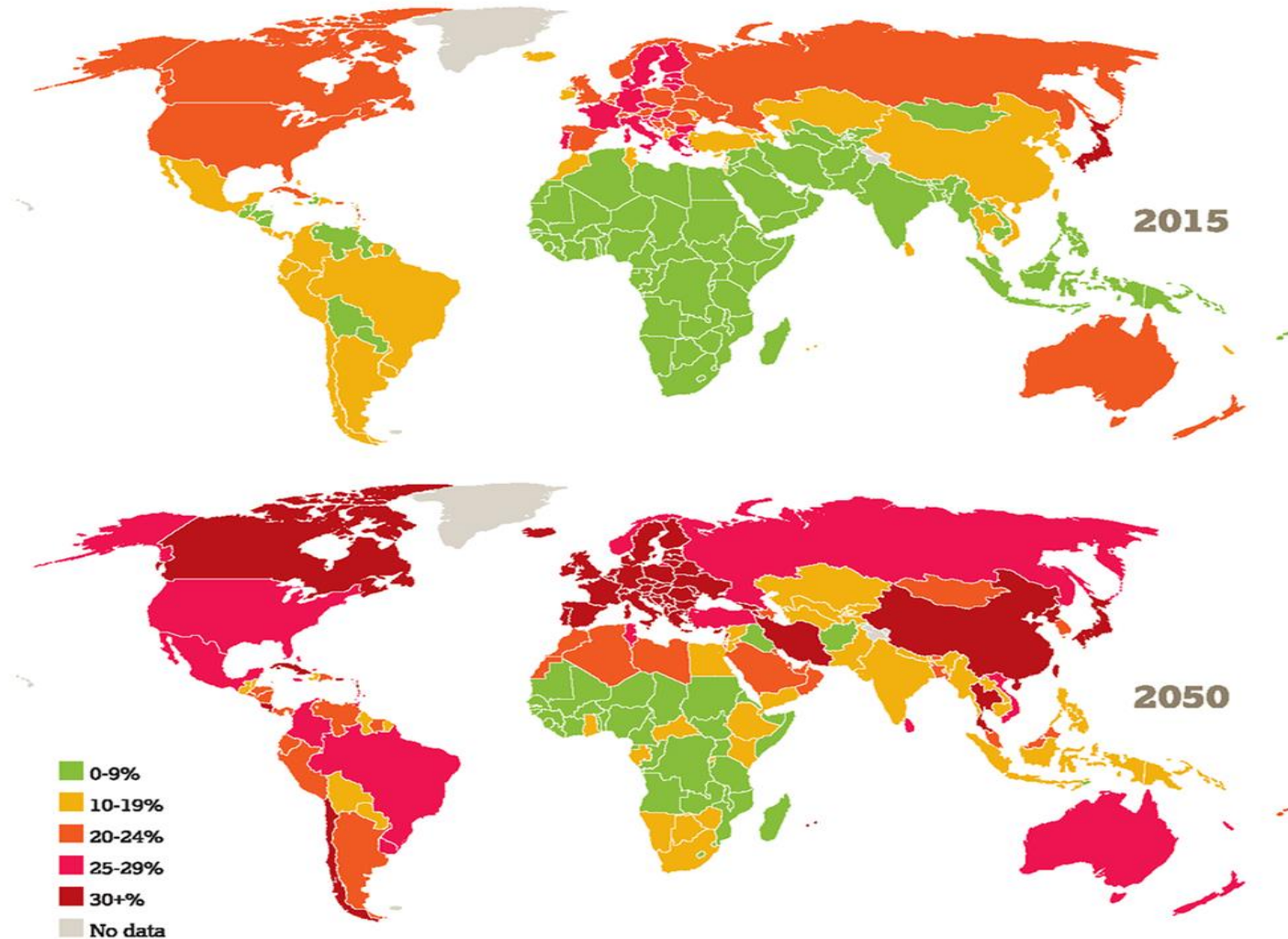
- Institute of Healthy Aging STP - Waikato DHB  
([An.Yu@waikatodhb.health.nz](mailto:An.Yu@waikatodhb.health.nz))
- Rehabilitation Innovation Centre – AUT, BAIL ([nada.signal@aut.ac.nz](mailto:nada.signal@aut.ac.nz))
- Rural Health STP - Callaghan Innovation Maori Health & Social Services Cluster
- DesignLabs – AUT and VUW



Standing Trial  
Populations

[www.standingtrialpopulations.nz](http://www.standingtrialpopulations.nz)

# We are growing older





**THE UNIVERSITY OF AUCKLAND**

**FACULTY OF MEDICAL AND  
HEALTH SCIENCES**



**Waikato** District Health Board

# **The role and potential of medical technologies for care of an ageing population**

**Professor Matthew Parsons**

**Clinical Chair in Gerontology**

**Waikato District Health Board in partnership with The University of Auckland**

**Exploring the market**

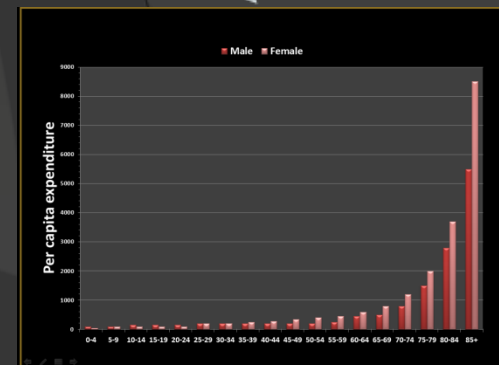
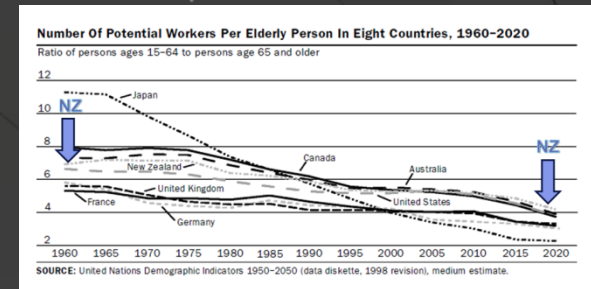
**Identifying the technology  
gap**

**The case for technology**

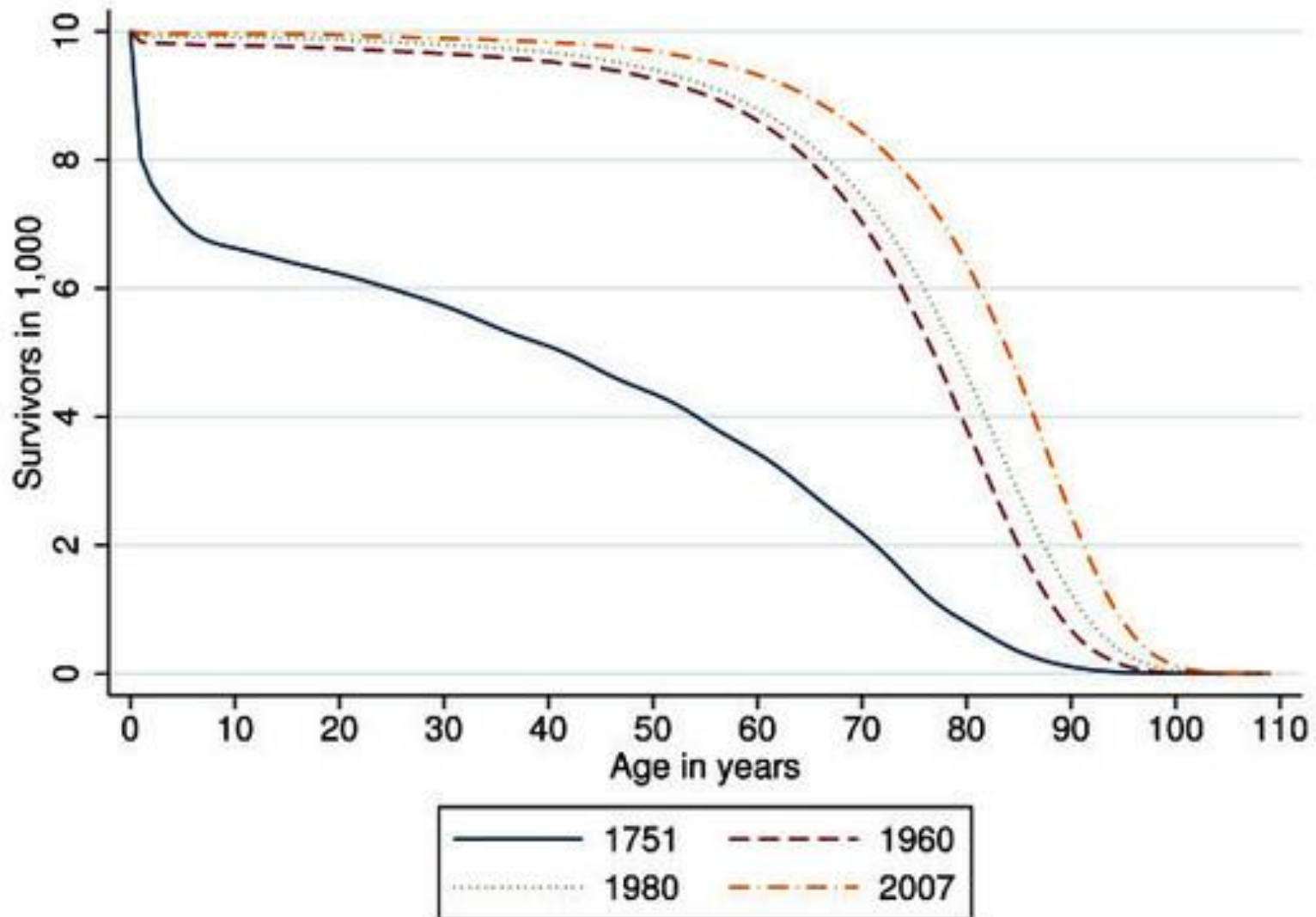


# Change drivers

Age-group	2001		2011		Change 2001-11	
	N (000s)	%	N (000s)	%	N (000s)	%
0-4	281	7	258	6	-23	-8
5-14	597	15	564	13	-33	-6
15-24	534	14	640	15	+106	+20
25-34	549	14	522	12	-27	-5
35-44	604	16	586	14	-18	-4
45-54	507	13	613	14	+106	+21
55-64	350	9	489	12	+139	+40
65-74	252	6	314	7	+56	+22
75+	210	5	263	6	+53	+25
<b>TOTAL</b>	<b>3,884</b>	<b>99</b>	<b>4,249</b>	<b>99</b>	<b>+365</b>	<b>+9</b>



# Rectangularisation of ageing structures



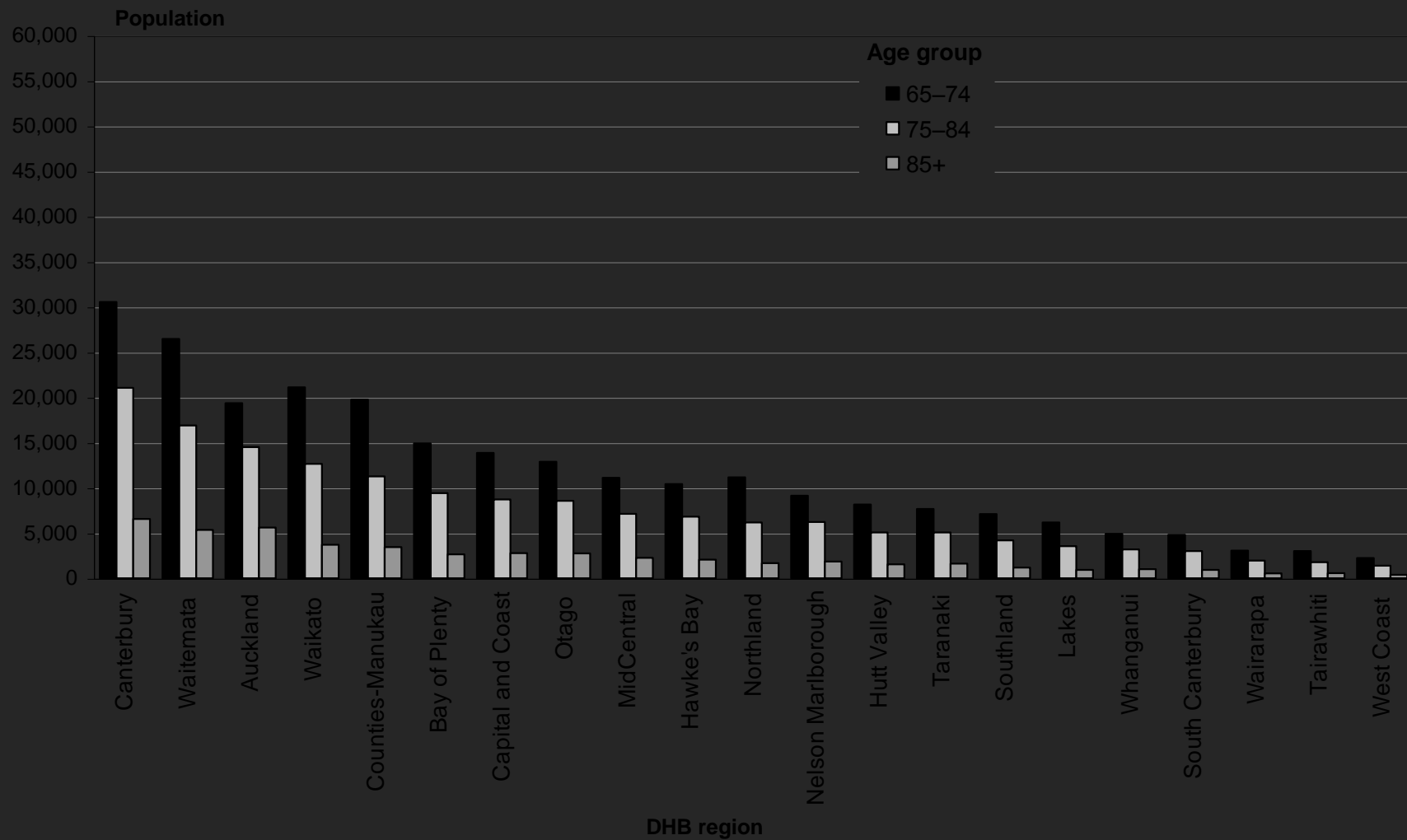
We are  
getting older

*...by 20 minutes a day...*

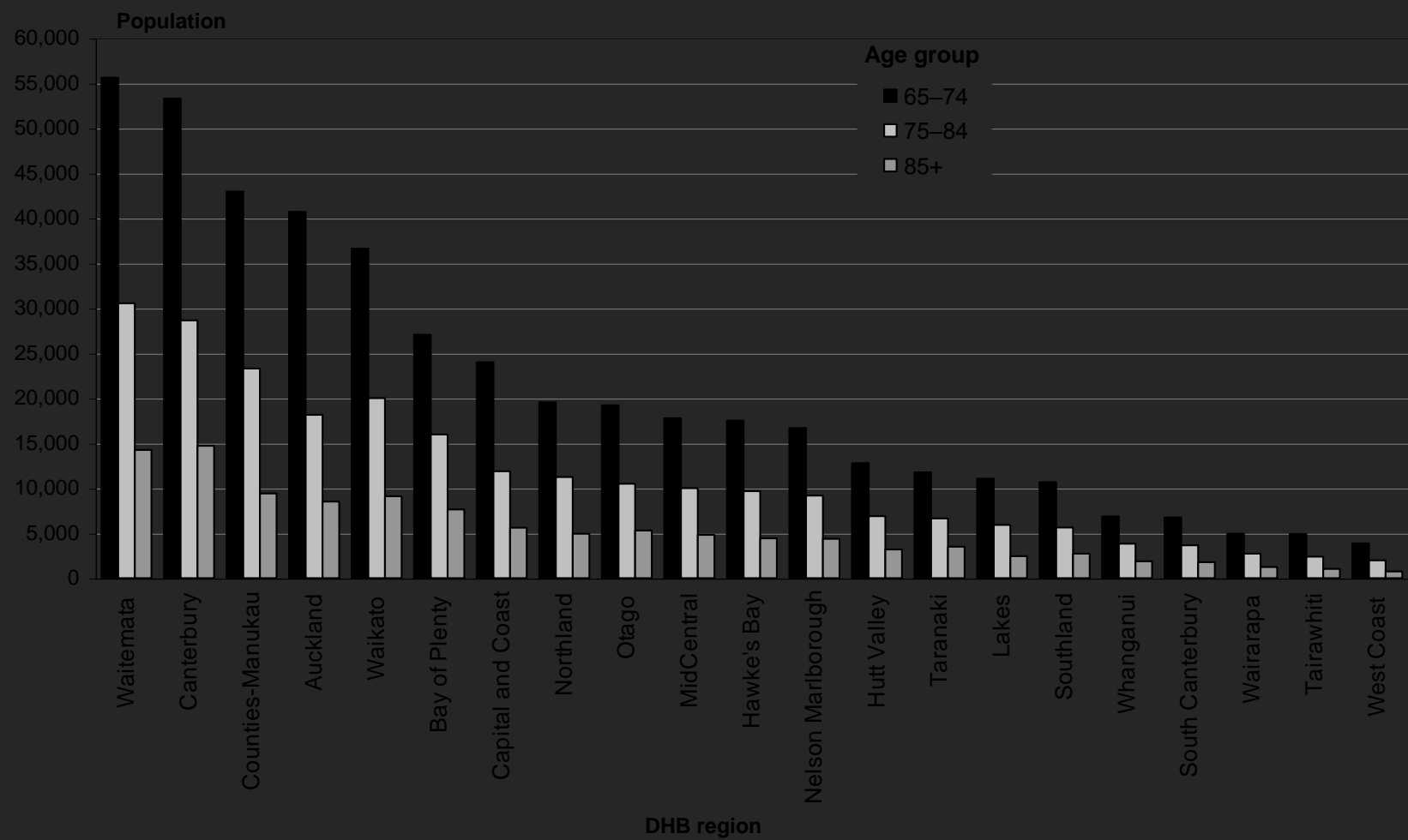
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# Population structural changes (2000)

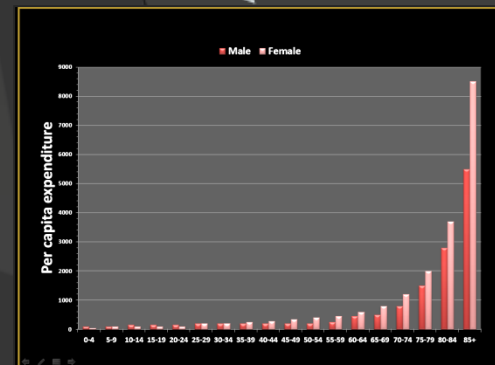
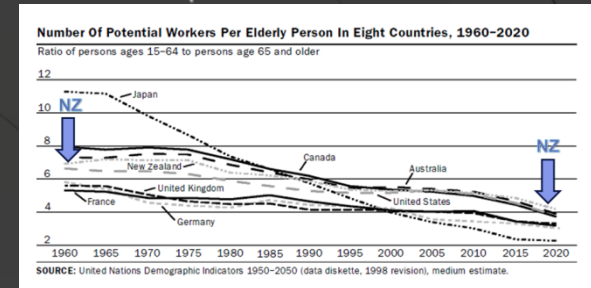


# Population structural changes (2021)



# Change drivers

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...and consumer expectations



Consumer  
expectations

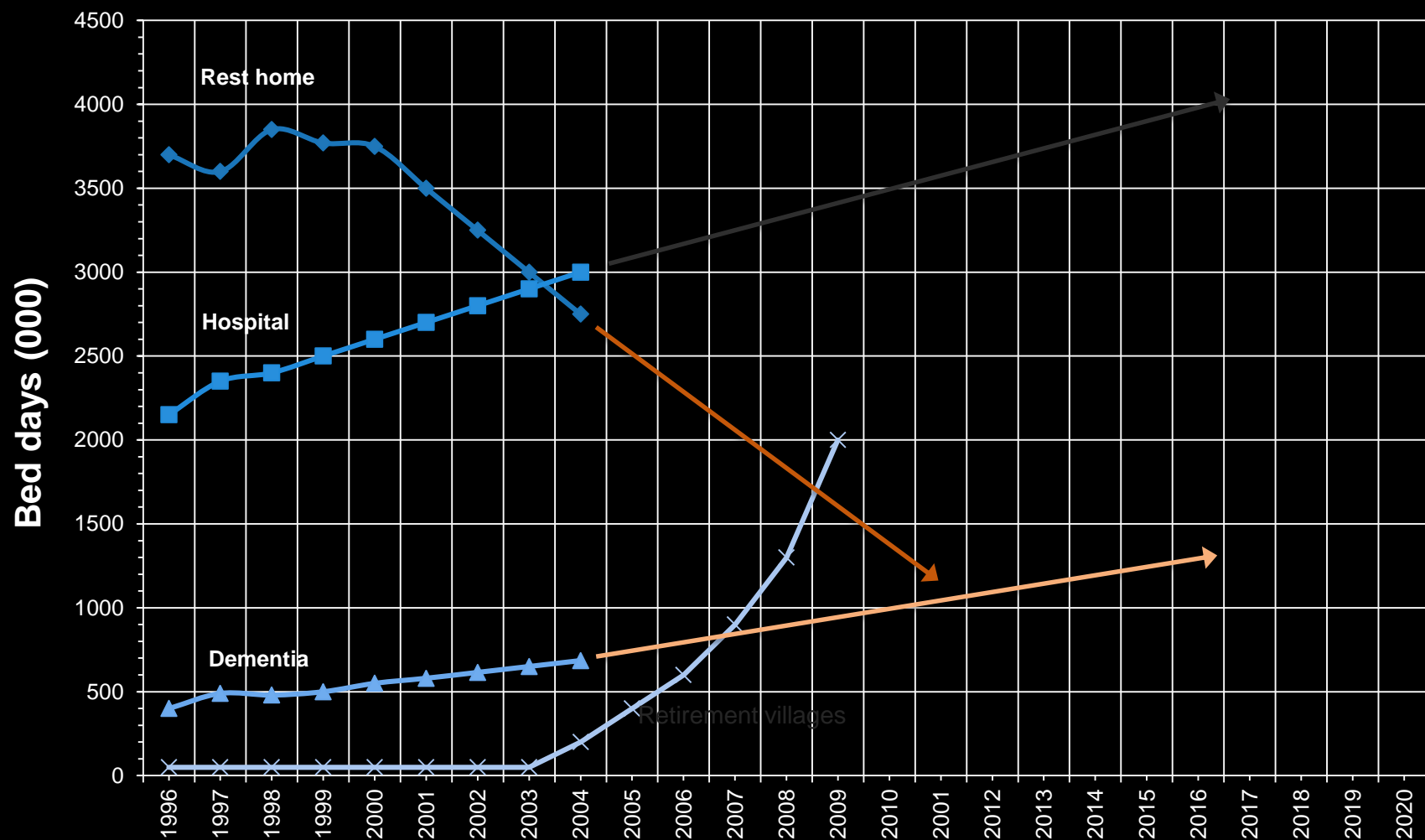
# Older people are staying at home

*"people should be able to continue living in their own place of residence in their later years"*

O.E.C.D. 1994

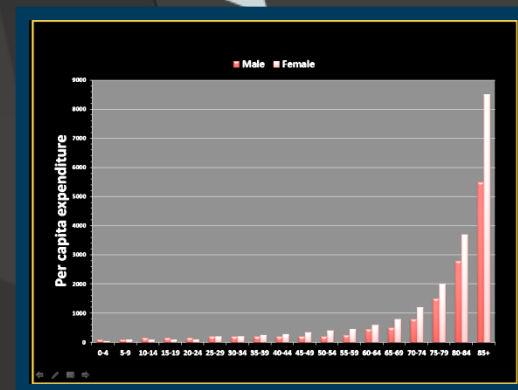
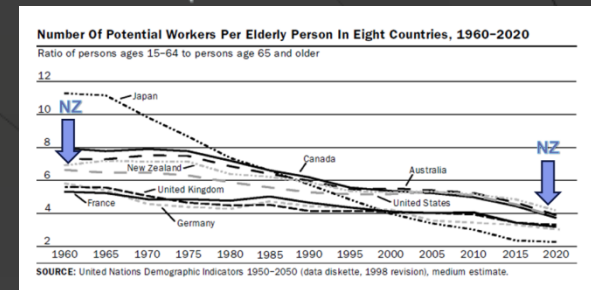


# Residential care use in New Zealand

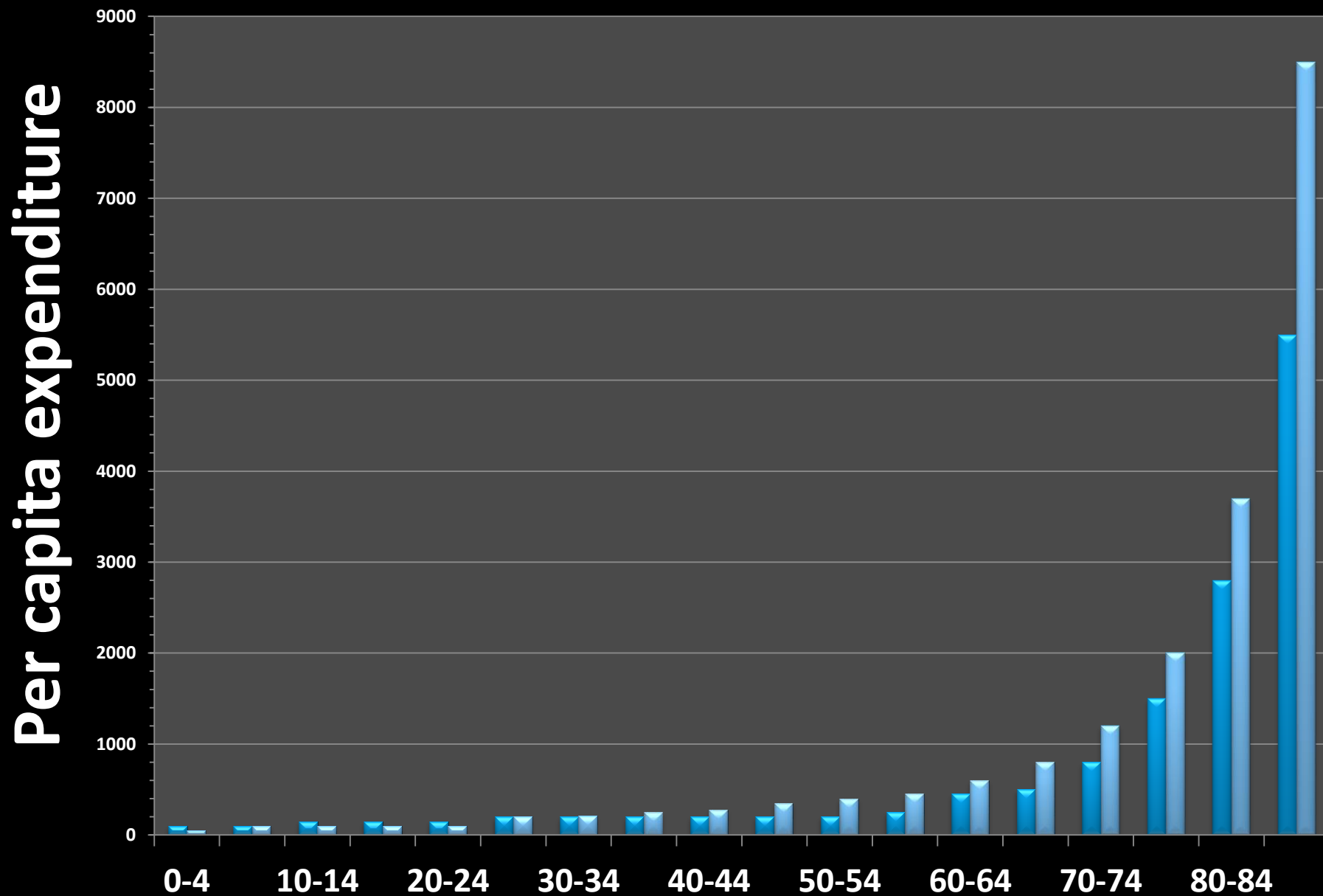


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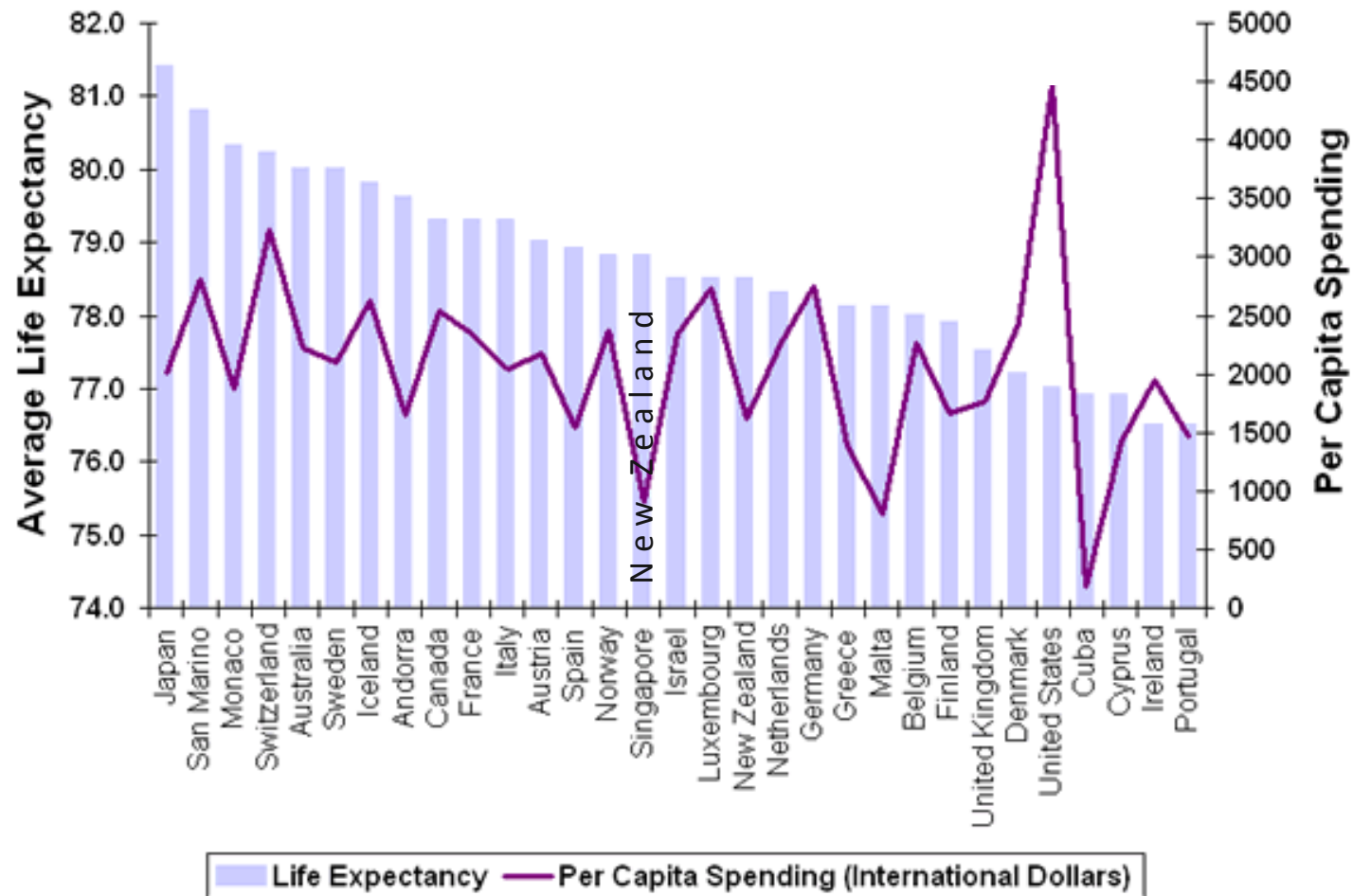
Male Female





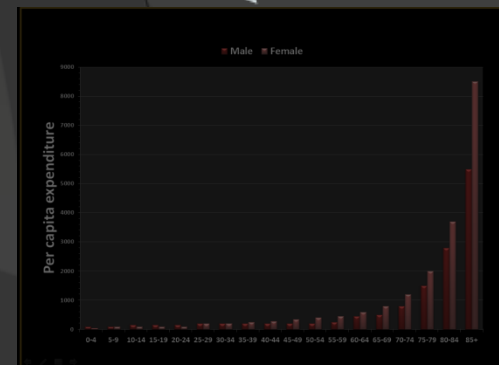
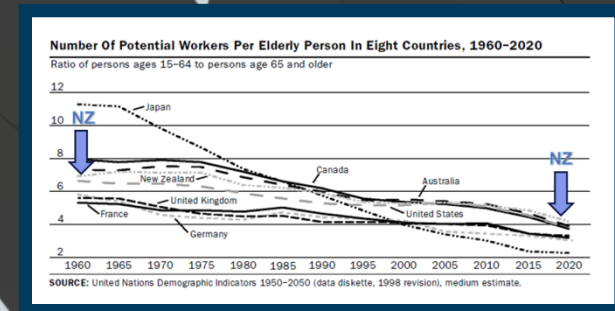
# By the Numbers

The Cost of a Long Life



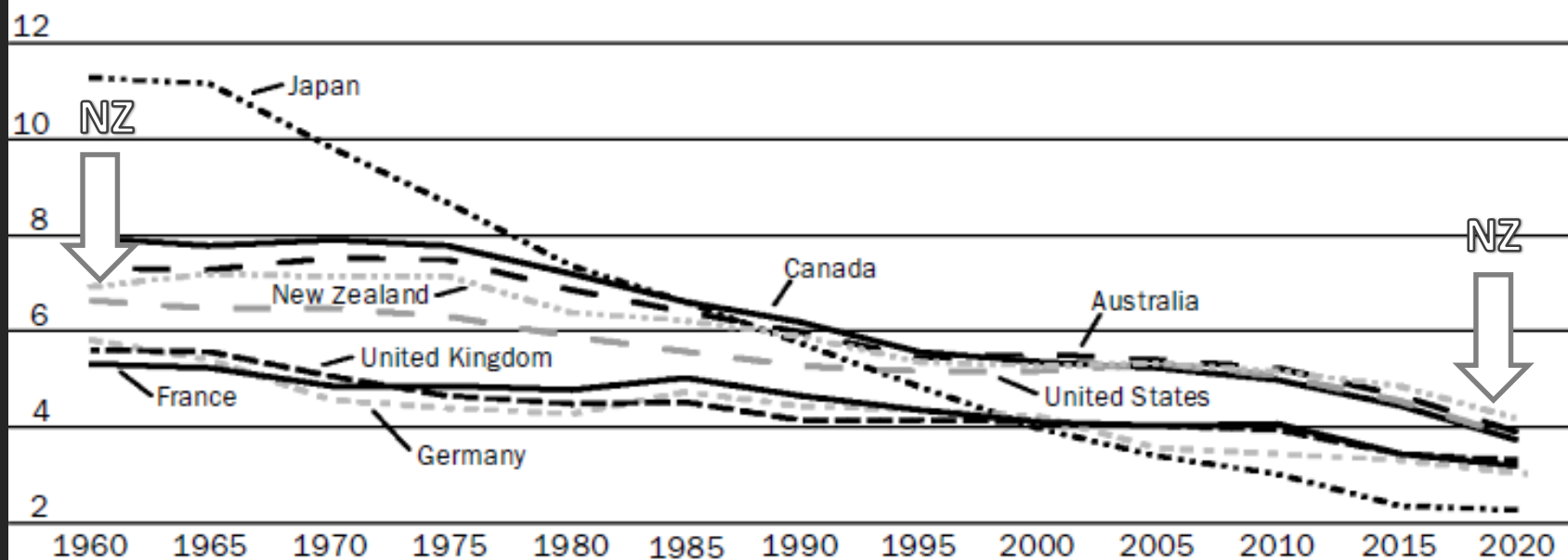
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## Number Of Potential Workers Per Elderly Person In Eight Countries, 1960-2020

Ratio of persons ages 15-64 to persons age 65 and older



SOURCE: United Nations Demographic Indicators 1950-2050 (data diskette, 1998 revision), medium estimate.

- *more costs*
- *more discerning*
- *less workers*



- *more complex conditions*

**Exploring the market**

**Identifying the technology  
gap**

**The case for technology**

**What is  
important to  
older people**

# Social care outcomes for older people (Netton et al, 2002)

## Old domains

Looking After the Home

Food

Personal Self-Care

Physical Safety

Company

Daytime Activities

Money Management

Autonomy & Choice

**Total: 8 Domains**

## New domains

Food & Nutrition

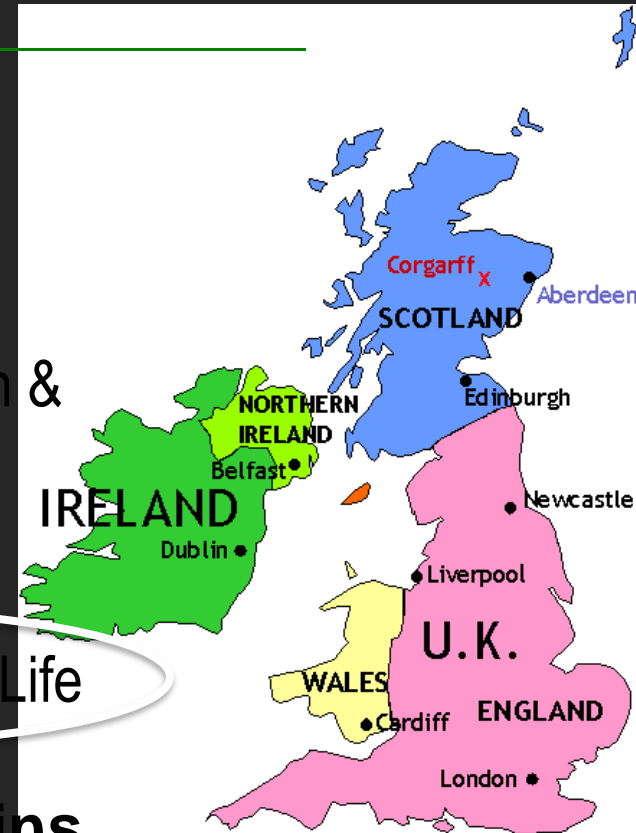
Personal

Safety

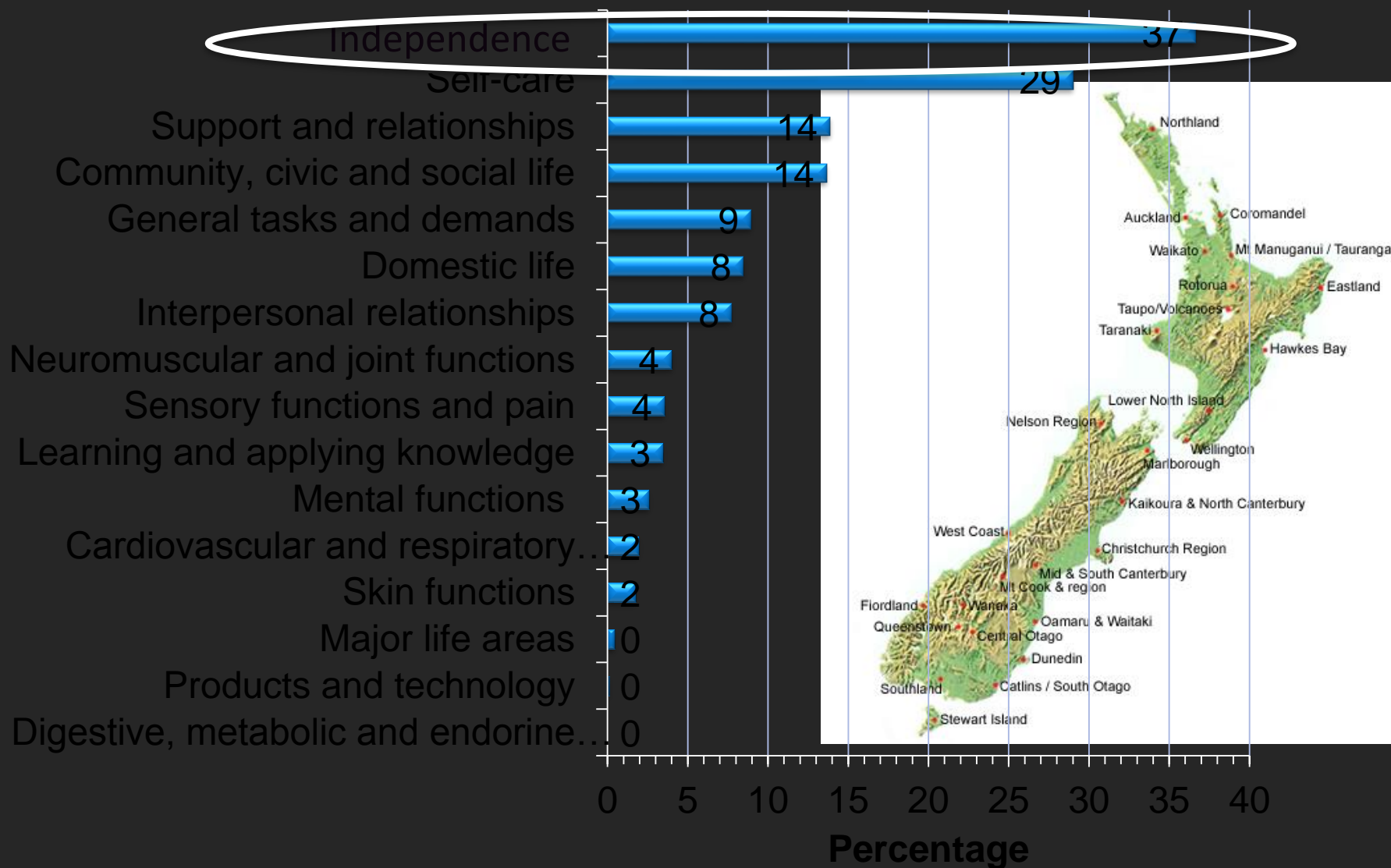
Social Participation &  
Involvement

Control over Daily Life

**Total: 5 Domains**



# Alignment of older person goals with ICF





## A sense of control...

In a US institution (Langer, 1983)

One group received speeches from manager around staff being responsible for their lives

**71% deteriorated functionally within 3 weeks**

another received speeches from manager around individual responsibility. Encouraged to make decisions and given responsibility for something outside

**93% showed improvement in self care, became happier and more active.**



*...therefore...*

*Losing control  
Losing independence  
Losing autonomy*

**What is  
important to  
the health  
sector**

- > Improving well-being
- > Improving independence
- > Increasing hospital capacity,  
curtailing growth (ED + Beds)
- > Maintaining Aged Residential  
Care beds
- > Maintaining Home Care spend

# Risk of entry to residential care

Possible Indicators	Hazard Ratio	Lower CI	Upper CI	p-value
Prevalence of inadequate meals	2.18	1.15	4.13	0.0166
Prevalence of dehydration	1.74	1.04	2.92	0.0347
Prevalence of social isolation	1.86	1.11	3.11	0.0190
Prevalence of delirium	3.65	2.16	6.18	0.0000
Prevalence of negative mood	2.17	1.29	3.65	0.0034
Status of family care using CRA	1.07	1.03	1.11	0.0006
Prevalence of ADL/rehab potential with no therapies	0.38	0.20	0.71	0.0027
Failure to improve/incidence of decline in ADL	11.07	2.57	47.74	0.0013

# Areas of interest...

- Being in control...but also
- Carer stress
- Social isolation and negative mood
- Identifying decline

# Opportunities

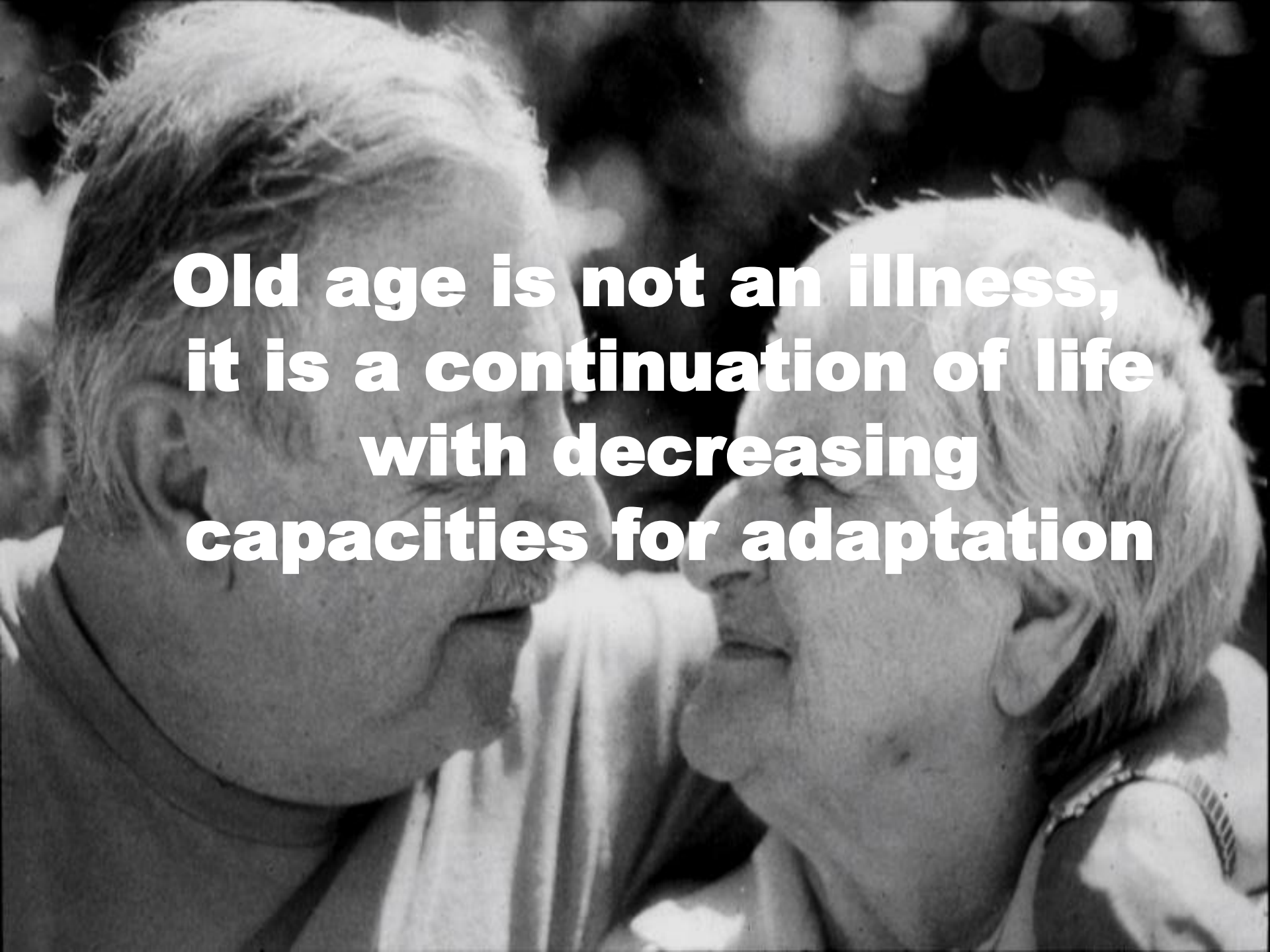
- > Supporting carers...distance vs. live in, alleviating stress
- > Social isolation and negative mood...spiral of decline, methods of communication
- > Identifying decline...monitoring, identifying insidious decline
- > Maintaining control...devices to support independence

**Exploring the market**

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gap**

**The case for technology**



A black and white photograph of an elderly couple in profile, facing each other. The man is on the left, and the woman is on the right. They are both looking towards the center. The background is blurred, showing some foliage. The text is overlaid in the center of the image.

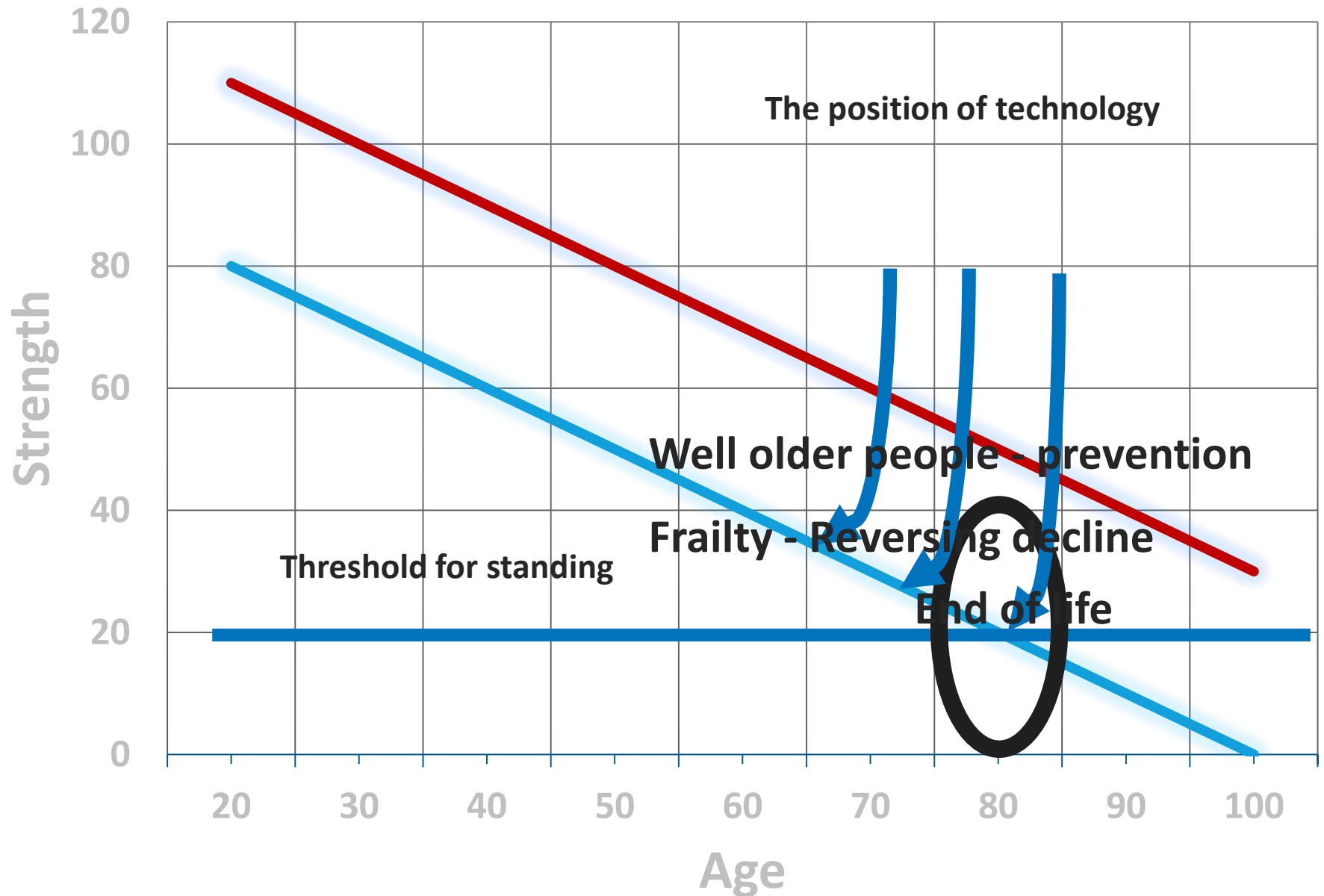
**Old age is not an illness,  
it is a continuation of life  
with decreasing  
capacities for adaptation**

# The humble toilet seat...



...simple  
inexpensive aid or  
something more  
sinister...

— Male — Female



another  
consideratio  
n

# Number of chronic conditions

Indicator self-reported	Females									
	50-64 years	65-74 years	75-84 years	85+ years	50-64 years	65-74 years	75-84 years	85+ years	50-64 years	85+ years
0	29.4	17.2	12.4	18.7	32	17.6	11			14.9
1 to 3	63.6	63.7	61.6	63.2	63.8	61.9	70.0	70.0	73.5	70.3
4 +	7.0	19.1	26.0	18.1	20.6	6.0	12.4	19.0		14.8

Multiple specialties,  
multiple records

# Co-development in design, testing and implementation

- > Involvement of consumers and users in the conception of the device
- > Identification of the problem
  - > i.e. Home Care workers visit clients x2 a day if someone is unable to administer their own eye drops and there is no one around
  - > TED stockings need visits if a client is not able to put them on themselves



# Making the case

# The Triple AIM

- > The Triple Aim is a framework developed by the Institute for Healthcare Improvement that describes an approach to optimising health system performance.
- > New designs must be developed to simultaneously pursue three dimensions...**'The Triple Aim'**



# The Triple Aim

1. Improving the patient experience of care (including quality and satisfaction);
2. Improving the health of populations; and
3. Reducing the per capita cost of health care.

**Does the  
technology align?**

# Conclusion

- > Rapid changes imminent – a reflection of changing demographics
- > Technology has a clear role
- > Successful technology needs to align with the real issues



...THANK YOU...

[m.parsons@auckland.ac.nz](mailto:m.parsons@auckland.ac.nz)

# Healthcare Robotics

## ヘルスケア・ロボティクス

Centre for Automation and Robotic Engineering Science  
オークランド大学 オートメーション・ロボティック工学センター

February 2017



CENTRE FOR  
AUTOMATION AND  
ROBOTIC  
ENGINEERING  
SCIENCE

# The University of Auckland

## オークランド大学について

- > **Top 100** research universities in the world & NZ's leading research university  
世界トップ100入り&ニュージーランド屈指の研究大学
- > Largest university in NZ 国内最大規模の大学
  - > 40,000 students, 10,000 post graduates & 4,900 staff  
学部生4万人、修士・博士課程1万人、教職員4900人
  - > 6,000 international students from 80 countries  
世界80カ国から6000人の留学生
  - > Eight faculties and five campuses - about **60** Research Units, Centres and Institutes  
8学部、5キャンパス、約60の研究部門、センター、機関

# UniServices – Who are we?

## ユニサービスについて

- > Dedicated to **connecting** the University's capabilities to business & investors, Government, the community  
大学の研究能力を企業や投資家、政府、地域社会に紹介し、産学連携を図る
- > UniServices is a **wholly-owned** company of the University of Auckland  
オークランド大学の100%子会社
- We provide you with **exclusive** access to the University of Auckland capabilities and IP  
オークランド大学の研究能力やIPの独占利用を仲介
- We work alongside academic staff to **identify, protect and develop** big ideas with you, our business partner  
大学研究者と協力しながら、ビジネスパートナーの壮大なアイデアを見出し、守り、発展させる

**uniservices**

# CARES – Aims

## CAREの目的

Centre for Automation and Robotic Engineering Science

オートメーション・ロボティック工学センター

Creating innovative and inspiring robotic technologies that improve societal well-being

より良い社会を目指して、革新的で豊かな発想のロボティック・テクノロジーを創造する

- |                                      |                   |
|--------------------------------------|-------------------|
| 1. Healthcare assistive technologies | 医療支援テクノロジー        |
| 2. Robots in Agriculture             | 農業用ロボット           |
| 3. Human-Robot Interaction           | 人間とロボットのコミュニケーション |
| 4. Technology transfer               | 技術移転              |
| 5. Robotic Device technologies       | ロボットデバイス技術        |
| 6. Software Systems for Robots       | ロボット用ソフトウェアシステム   |





# CARES – Multidisciplinary Team

## 学際的なチーム構成

- Engineering 工学
  - Bruce MacDonald (robotics ロボティクス)
  - Ho Seok Ahn (robotics ロボティクス)
  - Catherine Watson (robot voice ロボット音声)
- Medicine & Psychology 医学・心理学
  - Ngaire Kerse (gerontology 老年学)
  - Kathy Peri (nursing 介護)
  - Elizabeth Broadbent (health psychology 健康心理学)
- Science Health IT 科学、保健、IT
- Postgraduates 修士・博士課程の学生
- Business ビジネス
- Partners in Robotics, Healthcare  
ロボティクス、ヘルスケア分野のパートナー



# Healthbot™

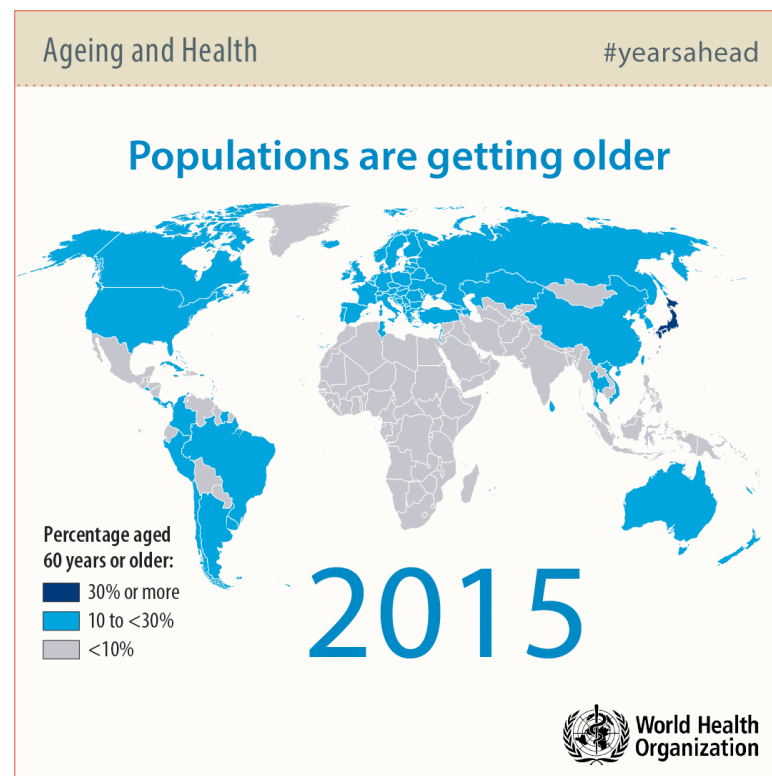
## Rationale and Origin

### ヘルスボット™開発の背景

- Addressing the **growing need for older care** and costs, as recognised by:  
高齢者の介護ニーズの高まりとコスト負担増に対応する。この課題を認識しているのは、
  - Developed-world Governments  
先進国の各国政府
  - Asian Development Bank and other aid agencies  
アジア開発銀行などの国際援助機関
  - WHO 世界保健機関

We created Healthbot™: a healthcare robotic platform

このような課題認識のもと、ヘルスケアロボットのプラットフォームとして「ヘルスボット™」が誕生した。



# Healthbot™

## Features ヘルスボット™の特徴

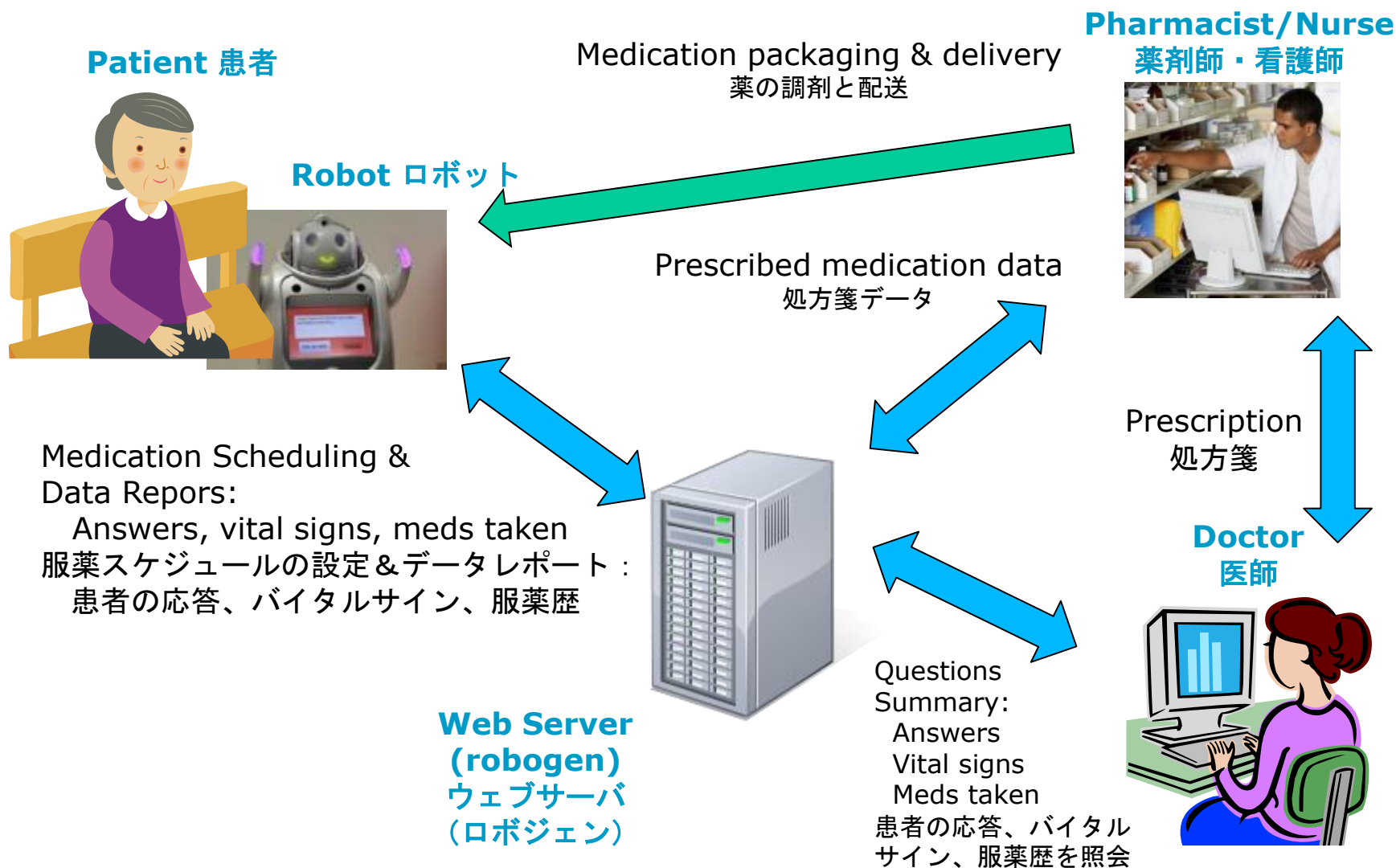
- **Develop a healthcare robotic platform** ヘルスケアロボットのプラットフォーム開発:
  - Robot hardware platform                      ロボットのハードウェアのプラットフォーム
    - Touch Screen / Camera / Sensors    タッチスクリーン / カメラ / センサー
  - Middleware                                      ミドルウェア
    - Interoperability                              相互運用
    - Speech / Dialogue                              スピーチ / 会話
    - Vision / Gestures / Emotions              視覚/ジェスチャー / 感情
    - Clinical guidelines / protocol              臨床ガイドライン / プロトコール
  - Robotic devices                                  ロボティックデバイス
    - Wired, wireless and wearable devices    有線、無線、ウェアラブルデバイス
- **Applications 用途**
  - COPD, Dementia, medication reminder, vital signs monitoring  
慢性閉塞性肺疾患、認知症、服薬リマインダー、バイタルサインのモニタリング

# Healthbot™

## Key Trials 主な実証調査

#	Time-frame 時期	Main goal 成果
1	2008	User requirements study 利用者のニーズ調査
2	2009	Acceptability study 利用者のロボット受容調査
3	2010-11	Feasibility study 実用可能性調査
4	2011-12	Risks/Benefits and deployment study リスク/ベネフィット分析、開発調査
5	2014	Pilot study 4 robots in people's homes ロボット4台を一般家庭に導入・実証
6	2014	Robot screens patients before seeing family doctor or nurse 医師・看護師に面会する前にロボットが患者をスクリーニング
7	2015-16	Robots in people's homes to help manage respiratory problems 家庭に導入されたロボットが呼吸疾患の管理を支援

# Healthbot™ ヘルスボット™ Eco-system エコシステム



# Healthbot™ in Action

Videos: <http://robotics.auckland.ac.nz>

# Healthbot™

## Environments 使用環境



*Paro* パロ

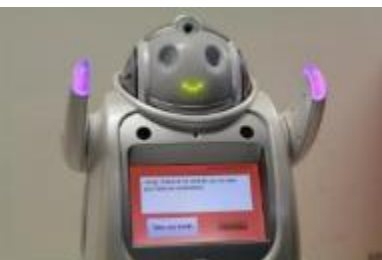
Public & Private places  
日常生活 & 公共の場

*Cafero*

Private places  
日常生活

*Friend*  
友人として

*iRobiQ*



Public places  
公共の場

*Guide*  
ガイド



# CARES – Study 1

## 実証調査1

2008

Goal: User requirements study

目的： 利用者のニーズ把握

Questionnaires, focus groups for staff,  
residents, relatives

介護施設の職員、利用者とその家族に対するアンケート  
を実施

Results 結果

- Identification of key tasks for a cognitive-  
support robot  
コグニティブ支援ロボットの主なタスクを特定



Broadbent, E., Tamagawa, R., Kerse, N., Knock, B., Patience, A., & MacDonald, B. (2009) *Retirement home staff and residents' preferences for healthcare robots*. Proceedings 18th IEEE International Symposium on Robot and Human Interactive Communication, Toyama, Japan, 27 September - 2 October, p. 645-650.



# CARES – Study 2

## 実証調査2

2009

Goal: Acceptability study

目的： 利用者のロボット受容調査

Residents meet and interact with a robot  
for a brief session

老人ホームの入居者がロボットと短時間対面し、コミュニケーションをはかった。

Results 結果

- Robot acceptable to older people  
お年寄りはロボット受け入れ可能



Stafford, R., Broadbent, E., Jayawardena, C., Unger, U., Kuo, I.H., Igic, A., Wong, R., Kerse, N., Watson, C., & MacDonald, B.A. (2010) *Improved robot attitudes and emotions at a retirement home after meeting a robot*. Proceedings of the 2010 IEEE International Symposium on Robot and Human Interactive Communication, pp. 82-87.

# CARES – Study 3

## 実証調査3

2010-11

Goal: Feasibility study

目的： 実用可能性調査

Robot deployed in older care facility for 4 months

老人ホームでロボット1台を4ヶ月間使用

Results 結果

- It is feasible to deploy a robot in different places in a retirement village to interact with residents and staff  
老人ホームの施設各所にロボットを導入し、入居者や職員と交流することは可能。



Stafford, R.Q., MacDonald, B.A., Jayawardena, C., Wegner, D.M., Broadbent, E. (2014) *Does the robot have a mind? Mind perception and attitudes towards robots predict use of an eldercare robot*. International Journal of Social Robotics. 6, 17-32.

DOI 10.1007/s12369-013-0186-y

# CARES – Study 4

## 実証調査4

2011-12

Goal: Risks/Benefits and deployment study

目的: リスク/ベネフィット分析と開発調査

25 robots deployed in a retirement village for four months

老人ホームで25台のロボットを4ヶ月間使用

### Results 結果

- Feasible deployment (proof of principle). Robots stimulate activity.  
No negative results. Some positive results: robots needs a proper operational role.

ロボットは導入可能(原則を証明)。ロボットは高齢者の活動を活発化。悪影響は見られなかった。ポジティブな結果として、ロボットは施設運営上、適切な役割が必要であることが分かった。



# CARES – Study 5

## 実証調査5

2014

Goal: Pilot study 4 robots in people's homes

目的: 患者家庭に4台のロボットを導入し実証調査

Cognitive aid for high risk patients

ハイリスク患者に対するコグニティブサポートを行う

Results 結果

- Robots may reduce hospitalizations, phone calls and visits to doctor.

患者家庭へのロボット導入により、入院や医師との電話・面会回数を低減できる可能性がある。



Orejana, J., MacDonald, B., Ahn, H.S., Peri, K., & Broadbent, E. (2015). *Healthcare robots in homes of rural older adults*. In Social Robotics, ed. ATapus, E Andre, JMartin, F Ferland, MAmmi, pp. 512–52. Berlin: Springer.

# CARES – Study 6

## 実証調査6

2014

Goal: Robot screens patients before seeing family doctor or nurse

目的: 医師・看護師に面会する前にロボットが患者をスクリーニング

Robots measure vital signs

ロボットがバイタルサインを測定

Results 結果

- Robots reduce doctor and nurse time. Cost savings pay for robot < 1 year (ROI)

ロボットは、医師・看護師の時間を節約。このコスト削減効果により、ロボットへの投資は1年で回収可能。



Broadbent, E., Orejana, J., Ahn, H.S., Xie, J., Rouse, P., & MacDonald, B.A. (Sept, 2015). *The cost-effectiveness of a robot measuring vital signs in a rural medical practice*. RO-MAN, Kobe, Japan. IEEE International Symposium on Robot and Human Interactive Communication.



# CARES – Study 7

## 実証調査7

2015-16

Goal: Robots in people's homes (4 months) to help manage respiratory problems (COPD)

目的: 患者家庭でロボットを4ヶ月間使用し、呼吸器疾患(COPD)の管理を支援する。

Randomised controlled trial 30+30

Robot integrated with wireless inhaler monitor and specialised COPD-aid software

ランダム比較試験(30+30)

ロボットには、無線呼吸モニターおよびCOPD患者支援用の専門ソフトウェアを内蔵。

Results 結果

- Robots reduce length of hospitalisations and improve patient adherence to medication schedule. ロボットは入院期間を短縮し、患者の服薬遵守率を改善。



*Scientific papers in preparation.*

# Other projects

- Dementia care robot design (Ewha's Women's University, Seoul + partners. 4 year project)
- Delivery robot evaluation (Yujin Robot, Seoul)
- Big data for older care robots (Yujin Robot, Seoul)



# Healthbot™

## Value Delivery (1)

### ヘルスボット™が創出する価値

#### Workforce supplementation 医療従事者の活動補助:

- |   |               |
|---|---------------|
| 1. Patient condition logging and alerts   | 患者の状態を記録、アラート |
| 2. Vital signs  | バイタルサイン       |
| 3. Repetitive care-processes  | 反復的なケアプロセス    |
| 4. Medical reminders  | 服薬リマインダ       |
| 5. Medication delivery  | 医薬品のデリバリ      |
| 6. Remote consultation  | リモート医療相談      |
| 7. Customisation / setup – variable to suit the patient/situation                   |               |
| カスタマイズ可能 / セットアップ – 患者さんの状況に沿って調整可能。  |               |
| 8. Additional services via third-party software/devices e.g. Life Time Health Diary |               |

外部ソフトウェア、デバイスを利用することでサービス内容の追加が可能。

例: タイムヘルス・ダイアリー



# Healthbot™

## Value Delivery (2)

### ヘルスボット™が創出する価値

Highly rated intangible value 目に見えない優れた価値:

- 9. Companionship and trust - valued by family and the elder  
人に寄り添い、安心感を与える - お年寄りとそのご家族が重視
- 10. Communicative connections - including elder-friendly Skype etc  
コミュニケーションを活性化 - お年寄りにも使いやすいSkype機能等
- 11. Entertainment - on robot or to remote display/TV  
エンターテインメント機能 - ロボットに搭載、またはディスプレイ・TVで表示

Intervention 連携:

- 12. Cognitive fitness 脳体操
- 13. Other third party service conduit 外部サービスとの連携が可能

# Conclusion まとめ

- ❖ Expert multidisciplinary healthcare robotics team

CARESヘルスケア・ロボティクスチームは、分野を横断する学際的な専門家が集う。

- ❖ Experienced – many international collaborations

経験 — 国際共同研究の実績多数

- ❖ New Zealand is a good testbed for older care technology

ニュージーランドは、高齢者介護テクノロジーの実証調査の場として適している

- ❖ Older people and robots can work together

高齢者とロボットは協力が可能

- ❖ Cost benefits are possible; need more evaluation

コストを上回るベネフィットが可能。さらなる評価を行う。

*There is much untapped potential for technology to help older people by empowering them to be independently living, healthy and happy. However it is crucial to evaluate and develop the technology in real environments.*

*お年よりが自立した生活を健康的に幸せに送るために、テクノロジーができることは大いにある。そのためには、テクノロジーを実際の生活の場で評価し、開発していくことが重要である。*

# Thanks

## ご清聴ありがとうございました

- > Please contact us for further information  
お問い合わせ先:
  - > Professor Bruce MacDonald ブルース・マクドナルド教授  
[b.macdonald@auckland.ac.nz](mailto:b.macdonald@auckland.ac.nz)
  - > Dr Pau Medrano-Gracia 梅保(パウ・グラシア)博士  
International Business Development Manager,  
Science & Engineering  
[p.medrano@auckland.ac.nz](mailto:p.medrano@auckland.ac.nz)



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ENGINEERING  
SCIENCE

<http://robotics.auckland.ac.nz>



THE UNIVERSITY OF  
**AUCKLAND**  
Te Whare Wānanga o Tāmaki Makaurau  
NEW ZEALAND

# User-centered Rehabilitation Technology Development

Richard Little  
Rex Bionics & Exsurgo Rehab

3<sup>rd</sup> March 2017

## User-centered Design – Playing to your Audience/Market

- You have to give your customers what they want/need.
- They might not know they need it until you provide your solution.
- Not every one of your customers will like all of your products but they are still your customers.
- Customers vote with their dollars.
- You're only as good as your last interaction with the customer.
- Your customers have a choice.



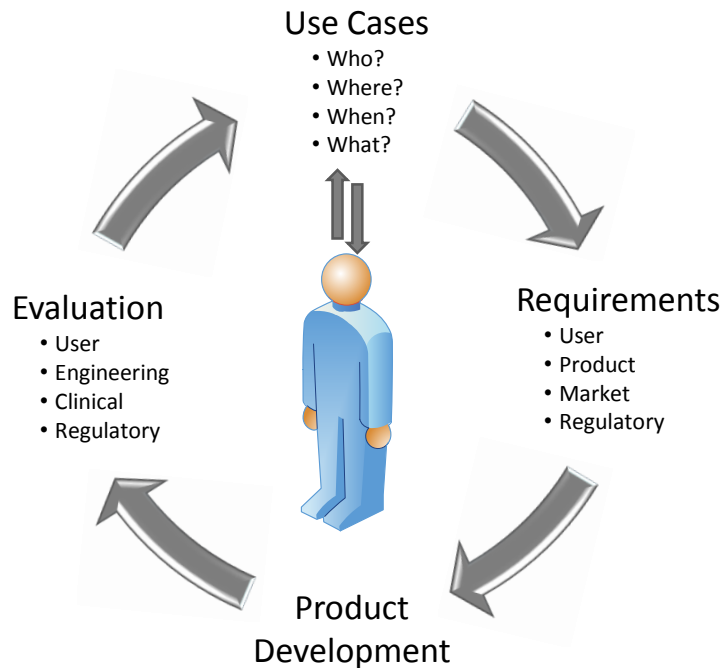
# Why User-centered Design

- Investment - US\$150M+
- USP – Can climb stairs
- Problem?  
A skilled engineer observed a man in a wheelchair struggling to get up a step outside a mall.
- Solution  
Design a wheelchair that can climb stairs.
- However  
With this wheelchair to go upstairs the user needs to lean back and manually tip the wheelchair backwards, the problem is people who use electric wheelchairs typically don't have the upper body strength to do that otherwise they wouldn't use an electric wheelchair.

The company went out of business!!!



# User-centered Design



## Cautions...

- “If I had asked the people what they wanted, they would have told me **faster horses.**” Henry Ford (probably not)
- Being a user doesn't necessarily make you an expert and not everyone's experience is the same.
- Continually evaluate your story even when you are in the market – things change.
- The development project will have different customers and their needs will be different e.g. investors, regulatory bodies as well as users.

## And Don't Forget



Customers come in many forms....

- End Users
- Family & Friends
- Health Funders
- Health Care Providers
- Clinicians

Healthcare Products have complex relationships...

- Researchers.....Prove it works
- Regulatory Bodies...Approve it
- KOLs.....Promote it
- Funders.....Pay For it





## Making it Work

In Auckland we have the Rehabilitation & Innovation Centre, a collaboration between:

- Industry
- Government
- Research Institutions
- & Community

What does that mean for industry?

- Access to clinicians
- Access to patients
- Use data in real time to feed into development
- Reduced development timeframes
- Clinical validation for regulatory bodies
- Better products!!!



# In the Clinic with Patients

- We learn about our customers needs by trying understand their experiences, by listening to them and sharing their journey/experience/product interactions as much as we can.
- Design your products to meet the customers needs.
- Let customers test and validate your designs in real clinical use, use the learnings.

The use of the **REX Robotic Exercise System**, not for walking but for **pain management and rehabilitation** in the neck and shoulders of a 35 year-old male with a **Spinal Cord Injury**.

**connect**  
**neuro**  
PHYSIOTHERAPY

## A SINGLE CASE REPORT

The participant had a complete T5 SCI from a traumatic accident 10 years ago. He has been living an independent lifestyle from his wheelchair since and has suffered with chronic right shoulder, neck and thoracic spine pain with intermittent headaches for the past 7 years.



## RESULTS

Significant improvements were recorded in the participant's quality of life and a perception of pain in the neck, shoulders, and upper thoracic spine; as well as a complete elimination of headaches.

- GAS improved significantly from -4 to +3
- COPM improved significantly from 6 to 20
- Numeric Pain rating scale improved with current pain reducing from 4/10 to 2/10, best pain reducing from 4/10 to 1/10 and worst pain reducing from 9/10 to 4/10.

Goal Attainment Scale	Pre-Treatment Scores	Post 12-week Rehab Treatment Scores
1. Reduced pain in bilateral shoulders	1 = No shoulder pain (not done)	1 = No shoulder pain
2. Increased shoulder mobility for long term use	1 = Functional shoulder mobility	1 = No functional shoulder mobility
3. Strengthen shoulder for long term use	1 = Increased shoulder strength	1 = Functional shoulder strength for 10%
4. Improving sitting posture	1 = Improved sitting posture	1 = Improved sitting posture
Canavan Occupational Performance Measure		
Score through the right without walking up and down the stairs and shoulders	6/10	10/10 Performance and satisfaction

## INTRODUCTION

A serious Spinal Cord Injury (SCI) can result in the long-term use of a wheelchair and up to 78% will suffer with ongoing shoulder, neck and back pain as well as instability, potentially causing irreversible damage affecting an individual's independence and quality of life. To date upper limb rehabilitation and management for SCI individuals is often delivered in a sitting position which has postural limitations.

Exoskeletons and robotic mobility aids have started to impact neurological rehabilitation in SCI offering carefully-selected patients the opportunity of robot-supported walking. The REX is currently the only free standing robotic mobility aid and allows several rehabilitation angles to be addressed separate from gait training. A robotic device could increase its clinical impact if it could provide more outcomes for an individual than just the opportunity to walk and could provide a much wider range and depth of rehabilitation to be delivered.

The aim of the treatment described in this case report was to see if upper limb rehab provided in the REX in several different stance positions could accelerate upper limb rehabilitation and achieve better overall outcomes in addition to the positive effects of standing.

## METHOD

The participant received once a week therapy for 1 hour focusing on upper quadrant rehabilitation including scapular setting exercises, core stability and cardiovascular exercise with the upper body in REX robotic exercise system. Time spent in the REX varied between 10 minutes to 45 minutes per session. The participant also completed a progressive home program over the 10 weeks.

Outcome measures include: Goal Attainment Scale (GAS), Canadian Occupational Performance Measure (COPM) and the Numeric Pain Rating Scale.

## DISCUSSION

The results have demonstrated that upper limb rehabilitation delivered in a robotic exercise device resulted in significant improvements in upper body pain management and quality of life for a SCI individual. The results follow extensive research confirming that chronic SCI can still benefit from targeted upper quadrant rehabilitation to reduce pain and improve overall function of the upper body.

From a clinical application, the REX was easy to use as a single therapist, it kept the participant in the correct lower limb alignment while allowing a range of upper torso positions to be achieved to provide functional retraining of the upper quadrant. Other benefits reported from the case report was the psychological benefits of being upright and moving in a robotic mobility aid.

To date the advances in technology have provided the rehabilitation world with robotic mobility devices such as exoskeletons with a focus on walking. However, this case report demonstrates that a stand-alone device can provide rehabilitation to the upper body in not only a standing position but in several dynamic and static upright positions. These results will hopefully encourage further research to be completed into the diversity of impact that robotic exercise device can impact clinical rehabilitation.

## THE REX

Is stable enough to walk, move and stand with supervision without the participant having to use crutches or a frame, allowing the participant's hands and upper body to be able to move freely. The REXercise program allows several different static and dynamic standing positions to be achieved, increasing its clinical application in respect to body positions and allowing easy movement around the clinic between equipment.

We would like to thank Rex Bionics for allowing us to use the REX in our clinic



**REX BIONICS** (Rex Bionics Ltd, Auckland, New Zealand)

"I now feel I have a freedom from pain and fatigue to live my life to my full potential"  
- SCI Participant



## CONCLUSION:

Standing while completing upper body rehabilitation and strengthening in a stand-alone robotic exercise device can significantly enhance neck and shoulder pain management and improve quality of life. Highlighting that robotic exercise devices can offer a range of rehabilitation opportunities as well as gait training.

Want to see some of the clinical program watch this short video [https://youtu.be/rbsZTHh\\_gaQ](https://youtu.be/rbsZTHh_gaQ)

Author: Gilly Davy,  
Senior Neurological Physiotherapist and Clinical Director  
gilly@connectneurophysiotherapy.com

[www.connectneurophysiotherapy.com](http://www.connectneurophysiotherapy.com)

## User-centered Design - The Results

**“Miracle!**

I woke this morning with no discomfort in [my] hip. I didn't realise the low grade pain until it wasn't there. The session yesterday worked wonders.  
**Thank you so much”**

# Questions ?



Exsurgo  
Rehab Ltd

**REX**  
BIONICS



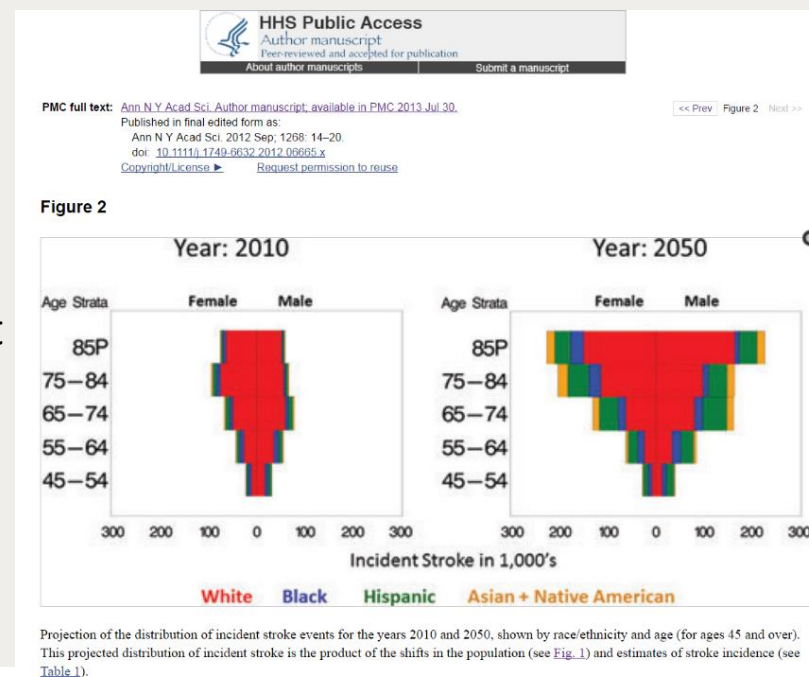
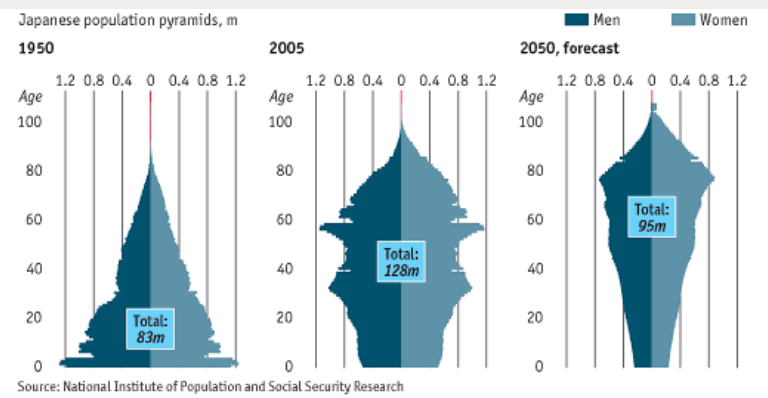
[www.im-able.com/](http://www.im-able.com/)

Callaghan Innovation

accelerating neuro recovery: stroke, dementia, cerebral palsy

# The problem: stroke

- The most prevalent cardiovascular disease
- The greatest YLL (years of life lost)
- The greatest cause of disability amongst adults
- In the next 40 years stroke incidence will double
- Upper limb impairment = loss of independence
- Conventional upper limb rehabilitation is insufficient



# The collaborations

Callaghan Innovation (Industrial Research Ltd)

CDHB: Burwood Spinal Unit

Brain Injury Rehabilitation Service

The Princess Margaret Hospital

University of Otago

Victoria University of Wellington

Auckland University of Technology

Laura Fergusson Trust

ABI Rehabilitation

University of Melbourne

# initial research: computer gaming by stroke survivors



## What stroke survivors want

- Social interaction
- Feedback
- Intellectual stimulation
- Easy to understand/Relate to game
- Tolerance for disabilities
- Physical benefit

*King et. al. 2010 Dis and Rehab*

## What gamers want

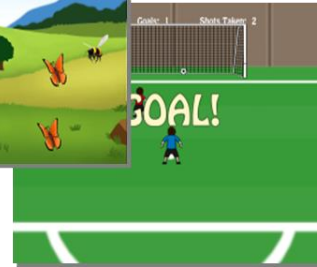
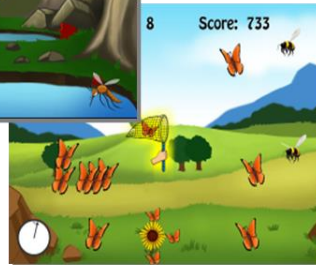
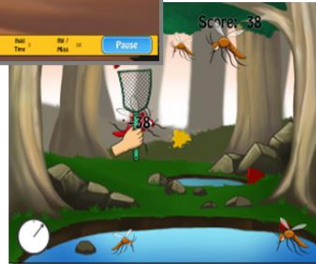
- Social interaction
- Feedback
- Concentration
- Challenge
- Player skills
- Clear goals
- Immersion
- Control

*Sweetser et. al. 2005 ACM computers in entertainment*

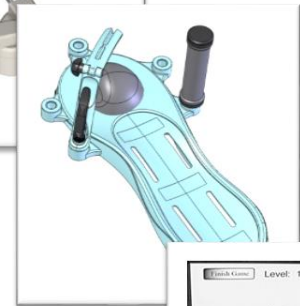
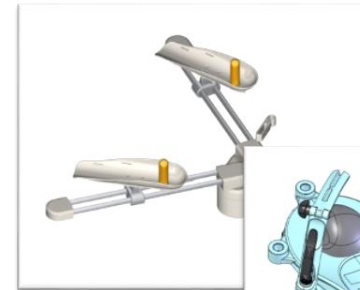


# The solution: a gamified rehabilitation system

## Games



## Devices



Grade 0 1 2 3 4 5

Able-B

Able-M

Able-X

Grade 5 Muscle contracts normally against full resistance.

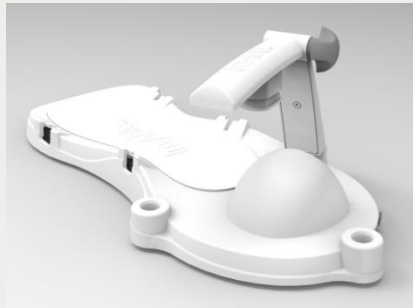
Grade 4 Muscle strength is reduced but muscle contraction can still move joint against resistance.

Grade 3 Muscle strength is further reduced such that the joint can be moved only against gravity with the examiner's resistance completely removed.

Grade 2 Muscle can move only if the resistance of gravity is removed.

Grade 1 Only a trace or flicker of movement is seen or felt in the muscle or fasciculations are observed in the muscle.

Grade 0 No movement is observed.



## Control devices and therapy games

Clinical efficacy proven

FDA cleared

CE marked

1500+ patient interventions



## AbleX independently funded research

1. Galea, M., Khan, F., Amatya, B., Elmalik, A., Klaic, M., Abbott, G. 2016. Implementation of a technology-assisted programme to intensify upper limb rehabilitation in neurologically impaired participants: a prospective study. *Journal of Rehabilitation Medicine* 2016; 48: 522-528.
2. Khan, F., Amatya, B., Elmalik, A., Lowe, M., Ng, L., Reid, I., Galea, M. 2016. An enriched environmental programme during inpatient neuro-rehabilitation: a randomised controlled trial. *Journal of Rehabilitation Medicine* 2016; 48: 417-425.
3. Jordan K et al. 2014. Gravity-supported exercise with computer gaming improves arm function in chronic stroke. *Archives of Physical Medicine & Rehabilitation* 2014; 95: 1484-9
4. Hijmans J et al 2012. The use of an off-the-shelf gaming technology for tracking movement and upper limb stroke rehabilitation. *Gait & Posture*; [Volume 36, Supplement 1](#) , Pg S75.
5. King M et al. 2012. Home-based Stroke Rehabilitation using Computer Gaming. *NZ Journal of Physiotherapy*. 40(3) 128-134.
6. Hale L et al. 2011. Participant perceptions of the use of Cywee as an adjunct to bilateral rehabilitation of upper limb function following stroke. *Journal of Rehabilitation Research and Development*; Volume 49, Number 4, 2012 Pages 623–634
7. Hijmans J et al. 2011 Bilateral upper limb rehabilitation after stroke using a movement based game controller. *Journal of Rehabilitation Research and Development*. 48(8): 1005-1014
8. Sampson M et al. 2011 Bilateral Upper Limb Trainer with Virtual Reality for poststroke rehabilitation: case series report. *Disability and Rehabilitation: Assistive Technology*. Posted online March 29. (doi:10.3109/17483107.2011.562959)
9. King M et al. 2010 An affordable, computerized, table-based exercise system for stroke survivors. *Disability and Rehabilitation Assistive Technology* Jul;5(4):288-93.
10. de Ruiter N et al. 2010 A Variable Resistance Virtual Exercise Platform for Physiotherapy Rehabilitation Intelligent Systems technologies and Applications 8, 261-275

# Hand Hub implementation study

$n = 92$ ; individuals and groups of 5

Typically in OP phase, deliberately wide inclusion criteria to reflect clinical practice, no control group

Administered by 1 OT and 1 therapy assistant

ableX and ableM devices, plus ReJoyce. Protocol had no fixed prescription.

18 hours of extra rehab per patient over 6 weeks



The Royal  
Melbourne Hospital



*J Rehabil Med* 2016; 48: 522-528

(<http://www.ncbi.nlm.nih.gov/pubmed/27068229>)

# A transformative solution

ableX gamifies intensive UL rehabilitation to stimulate neuroplasticity.

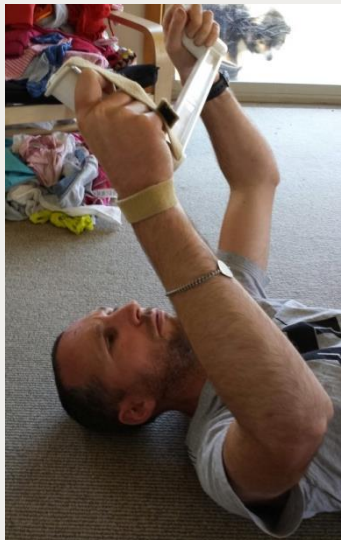
Promising evidence from practising clinical environments.

Opportunity to improve expected and longer term outcomes vs standard of care.

This solution continues to evolve as a result of progressive clinical use.



## Used in multiple healthcare settings



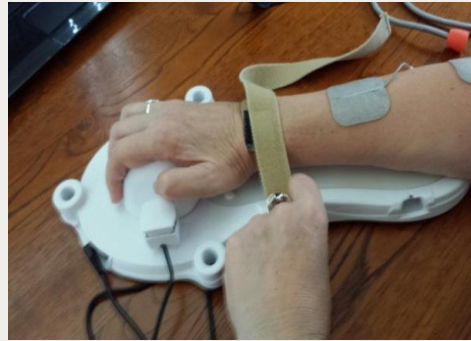
Stroke, Dementia, Cerebral Palsy, Autism, Traumatic brain injury, Spinal injury, Depression...  
Acute care; rehabilitation units; residential care; home; community professionals...



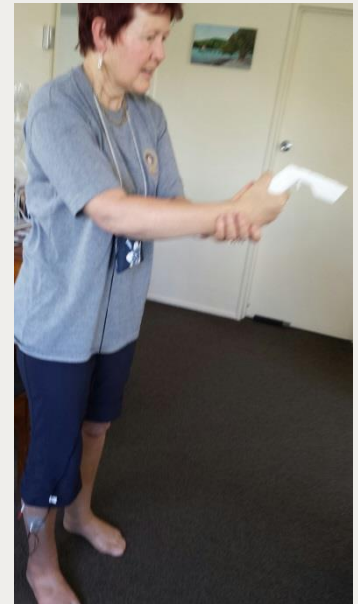
## Used in multiple healthcare settings



First use  
(7 years post-stroke)  
Minimal function



T+1 month  
Lower tone, individual  
finger control



# Gaming for dementia: a current PhD project





Future opportunities for research and implementation of:

- change of practice
- community care
- homecare use
- dementia
- TBI



# Japan-NZ Bilateral Workshop in Technologies for Elderly Care March 2017

**Research at the ABI and the MedTech CoRE  
related to aging and medical robotics**

**Peter Hunter and Thor Besier**

# Instrumentation & Implantable Devices Group

David Budgett, Daniel McCormick, Poul Nielsen

## Hip protector adherence and the Internet of Things (IoT)

Hip protectors prevent fractures...but only if they are worn

- In aged residential care they work
- In the community setting they don't
- The difference is adherence: in aged care they are worn because of the influence of staff
- We can accurately measure adherence using temperature and acceleration data\* – Can we use the IoT to close the loop in order to monitor and encourage adherence?
- Clinical trials planned for 2018



\*Evans, K.R., et al., Quantitative measurement of hip protector use and compliance. Medical & Biological Engineering & Computing, 2014. 52(1): p. 9-15.

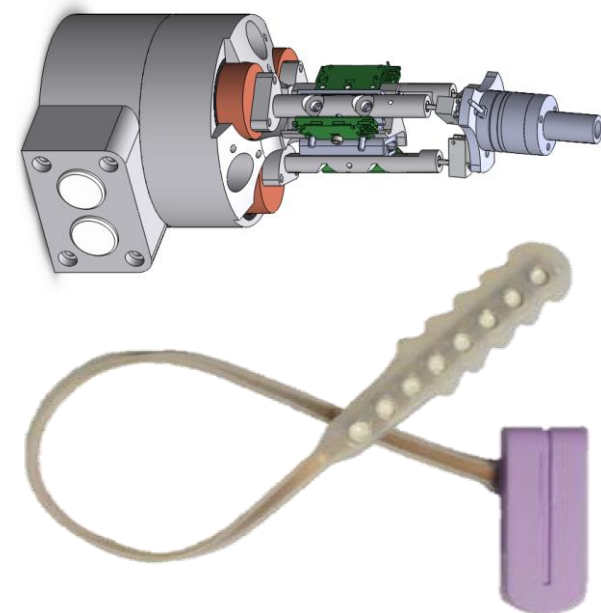
# Robo-bed

- Soft transducer technology (integrated length actuator and force sensor)
- Configured into arrays of transducers that can dynamically support patients and move patients on and off the bed



# Skin (and other soft tissue) mechanics

- Dynamic dexterous 3D parallel robot to provide controlled rapid deformations and measure mechanical properties of skin in vivo
- Super-resolution image registration algorithms to measure subtle differences in (multi-dimensional) images of patients
- Diagnose skin pathologies and monitor wound healing



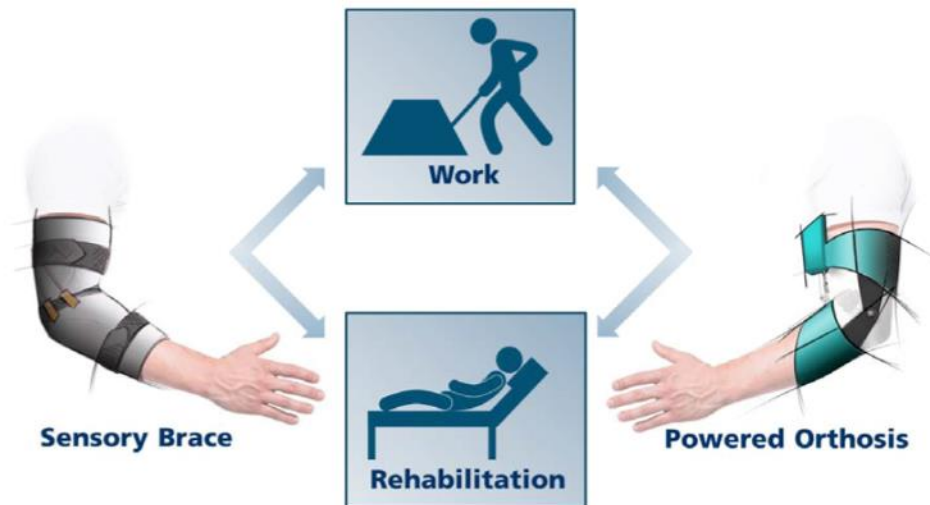
# Pelvic floor health

- Development of devices to assess pelvic floor health and provide feedback on training to improve levator ani muscle fitness (FemFit)
- Finite element models of pelvic floor mechanics to assess tissue injuries

# Human Joint Sensing and Actuation in Preventive Ergonomics and Rehabilitation Therapy and Monitoring in an Ageing Society

**Dr Thor Besier, Associate Professor**

Auckland Bioengineering Institute & Department of Engineering Science  
University of Auckland



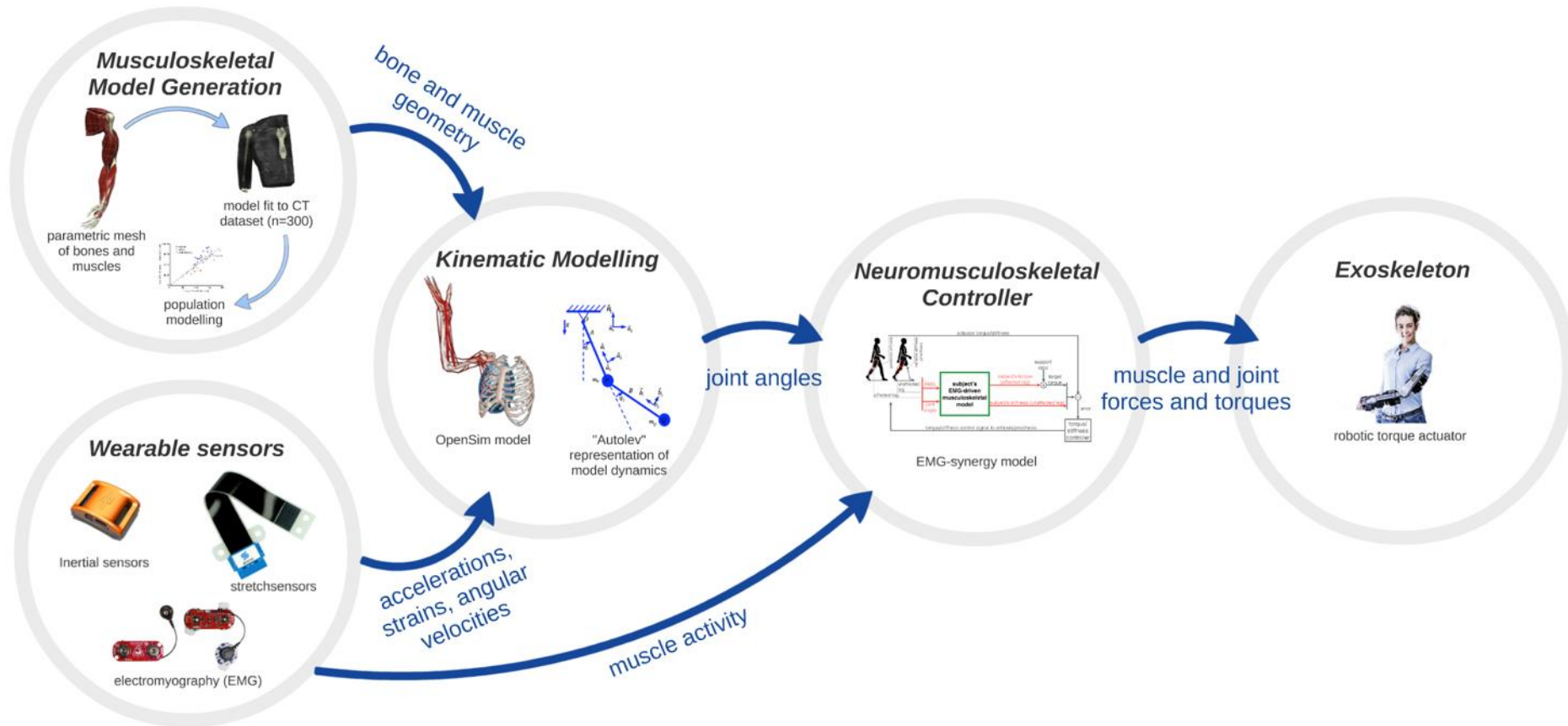
# The first generation of highly integrated sensing and actuation technology for human exoskeletons

## Challenge to be solved

- to assess activity in heavy physical work in an ageing working population
- to assist at work with light weight, smart, powered exoskeletons
- to assess rehabilitation success and assist in daily activities e.g. stroke recovery
- to monitor activity for homecare needs



# Components of a neuromusculoskeletal controller

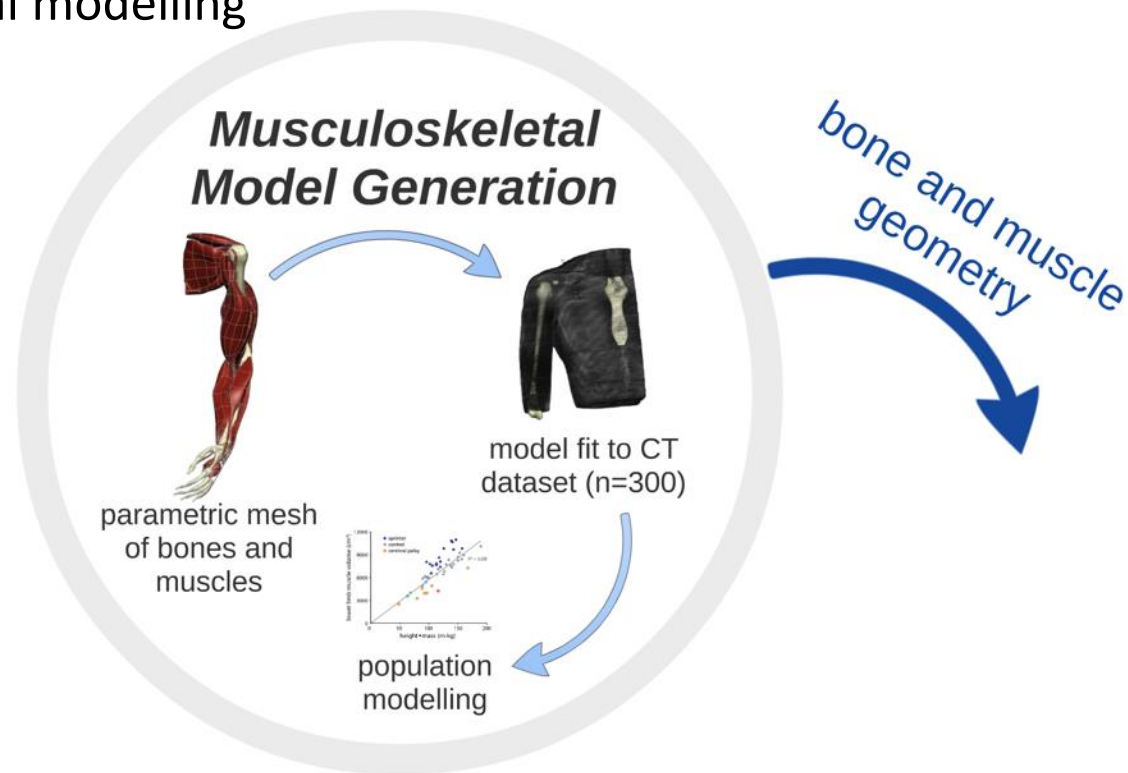




# Musculoskeletal Model Generation



**Goal:** To develop a statistical shape model of the upper limb to rapidly generate anatomical models of bone and muscle geometry for musculoskeletal modelling





# The Musculoskeletal Atlas Project: An anatomical and functional atlas of the musculoskeletal system



## MAP

Musculoskeletal  
Atlas Project



## MAP Database



## MAP Query



Imaging &  
Functional Data



[ CT, MRI, EMG, motion capture ... ]



## MAP Client

Mesh / Model  
[.stl mesh, .inp file]

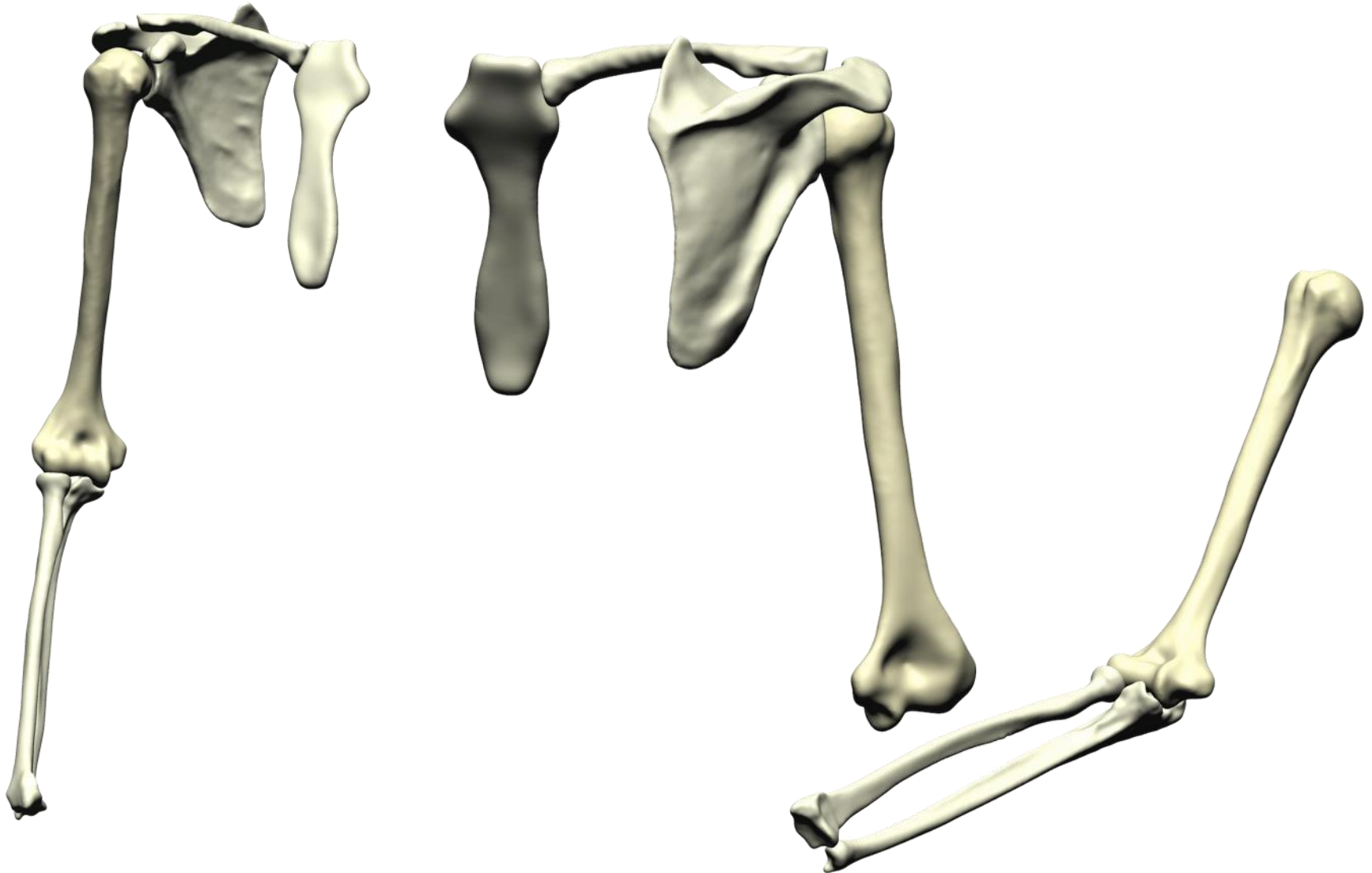


NMS PHYSIOME  
Personalized models of the musculoskeletal system



FEBio  
Software Suite ...

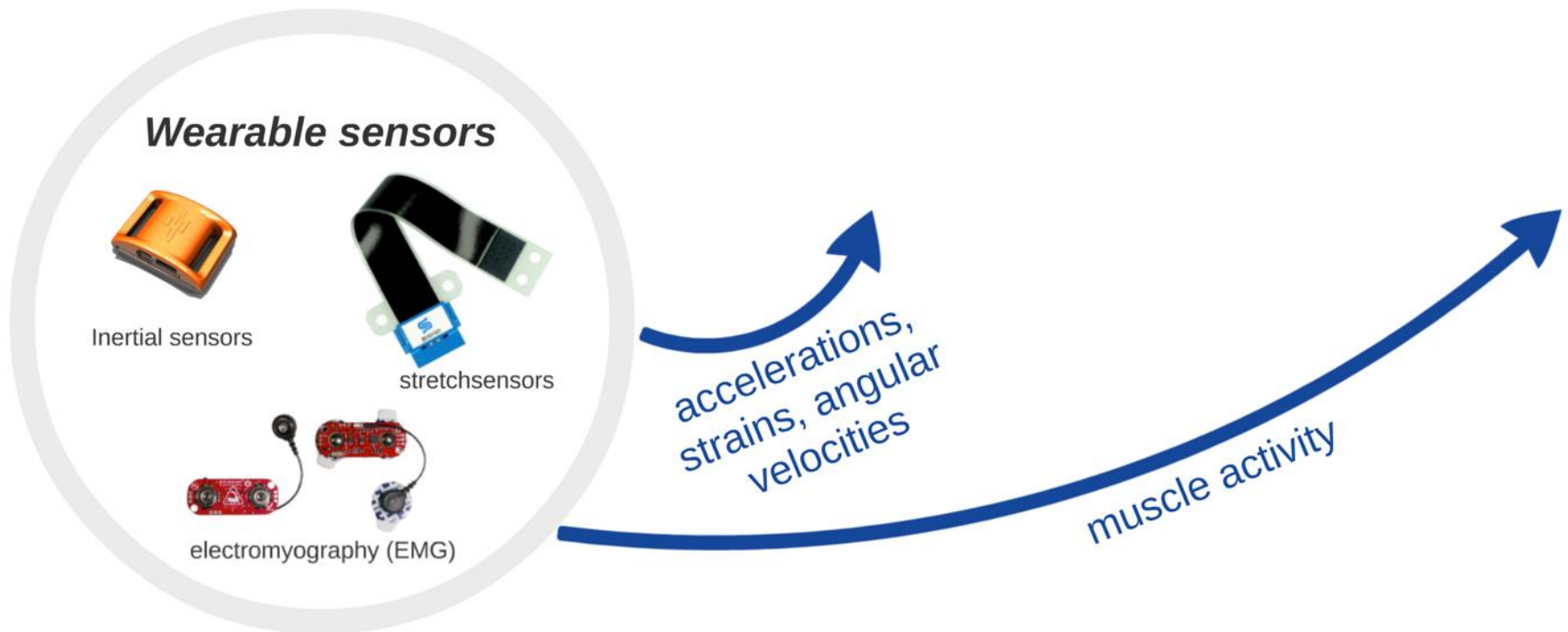
Parametric meshes of the upper limb fit to 1000 CT scans from the Victorian Institute of Forensic Medicine (VIFM)



# Wearable Sensors



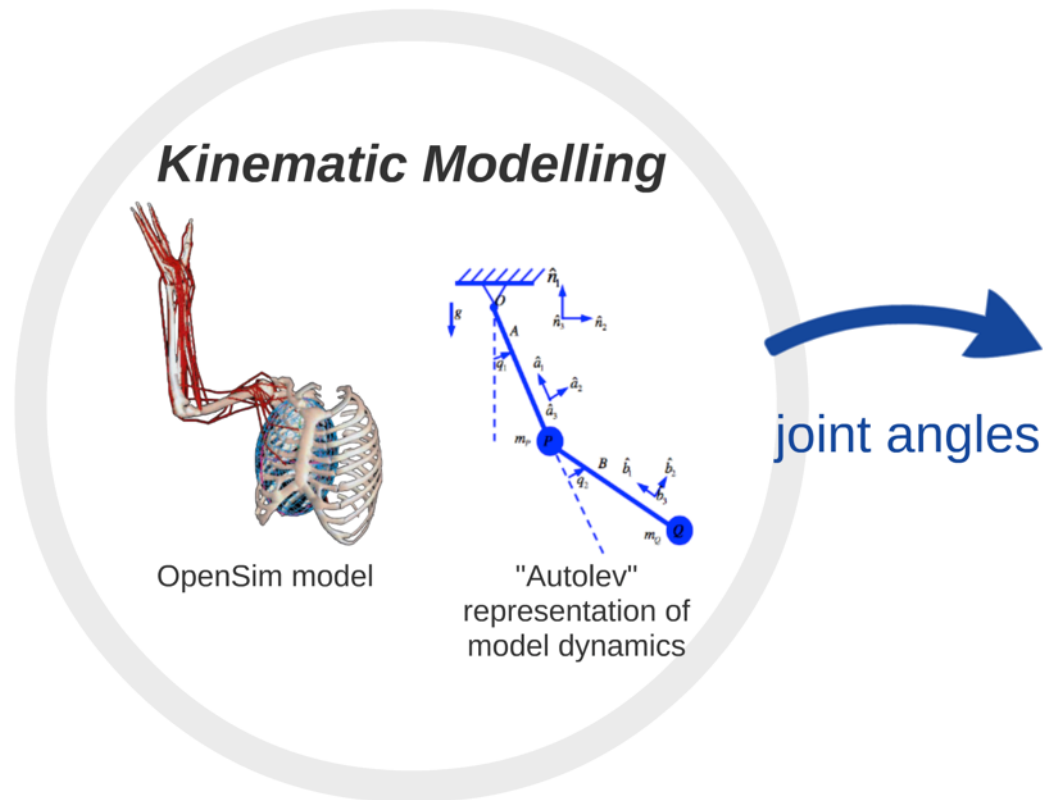
**Goal:** To integrate inertial, stretch, and EMG sensors into a comfortable arm sleeve to measure arm motion and muscle activity



# Kinematic Modelling



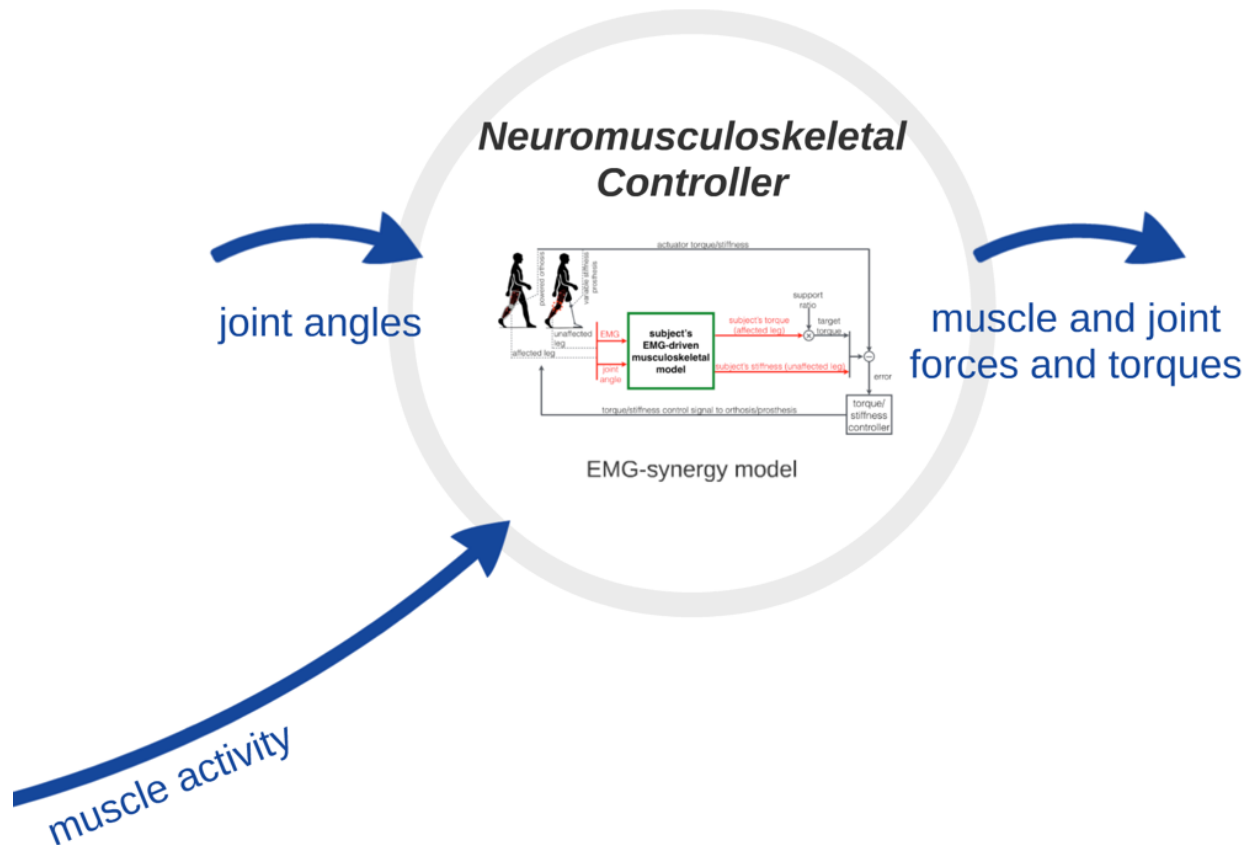
**Goal:** To develop a computational model of the upper extremity to estimate kinematics of the upper arm in real-time



# Neuromusculoskeletal Controller



**Goal:** To develop an EMG-synergy-driven model of the upper limb to predict muscle forces and joint torques in real-time





# REHABILITATION INNOVATION CENTRE



# About Us

The Rehabilitation Innovation Centre (RIC) is a **partnership** between **industry** and **research**, supported by Callaghan Innovation and spearheaded by AUT University.

## Vision

By working **collaboratively** with industry and end-users the Rehabilitation Innovation Centre will be a world leader in the **evaluation** and **development** of **rehabilitation technologies** that can positively impact the lives of people experiencing disability.



# About Us

## Directors

- Dr Denise Taylor, Professor of Rehabilitation
- Dr Nada Signal, Senior Research Fellow
- Dr Nicola Kayes, Associate Professor of Rehabilitation

## Researchers

- Dr Imran Niazi, Post Doc Fellow   Gemma Alder, Research Officer
- Dr Mark Boocock, Professor of Ergonomics and Biomechanics
- Nicola Saywell, Lecturer in Physiotherapy
- Sharon Olsen, Research Officer   Bronwyn Harmen, Lecturer
- Ruth McLaren, Research Officer

## Students

- Nitika Kumari, PhD Physiotherapy, Usman Rashid, PhD BioEngineering
- Kate Charlesworth, Masters Occupational Therapy
- Fawad Zaidi PhD, Game Design, Keith Chan, PhD Electrical Engineering





# Rehabilitation Technology Development



# Development: ArmBoost



**ArmBoost** uses accelerometry (movement) data to provide information about the amount, type and symmetry of arm and hand activity following stroke.

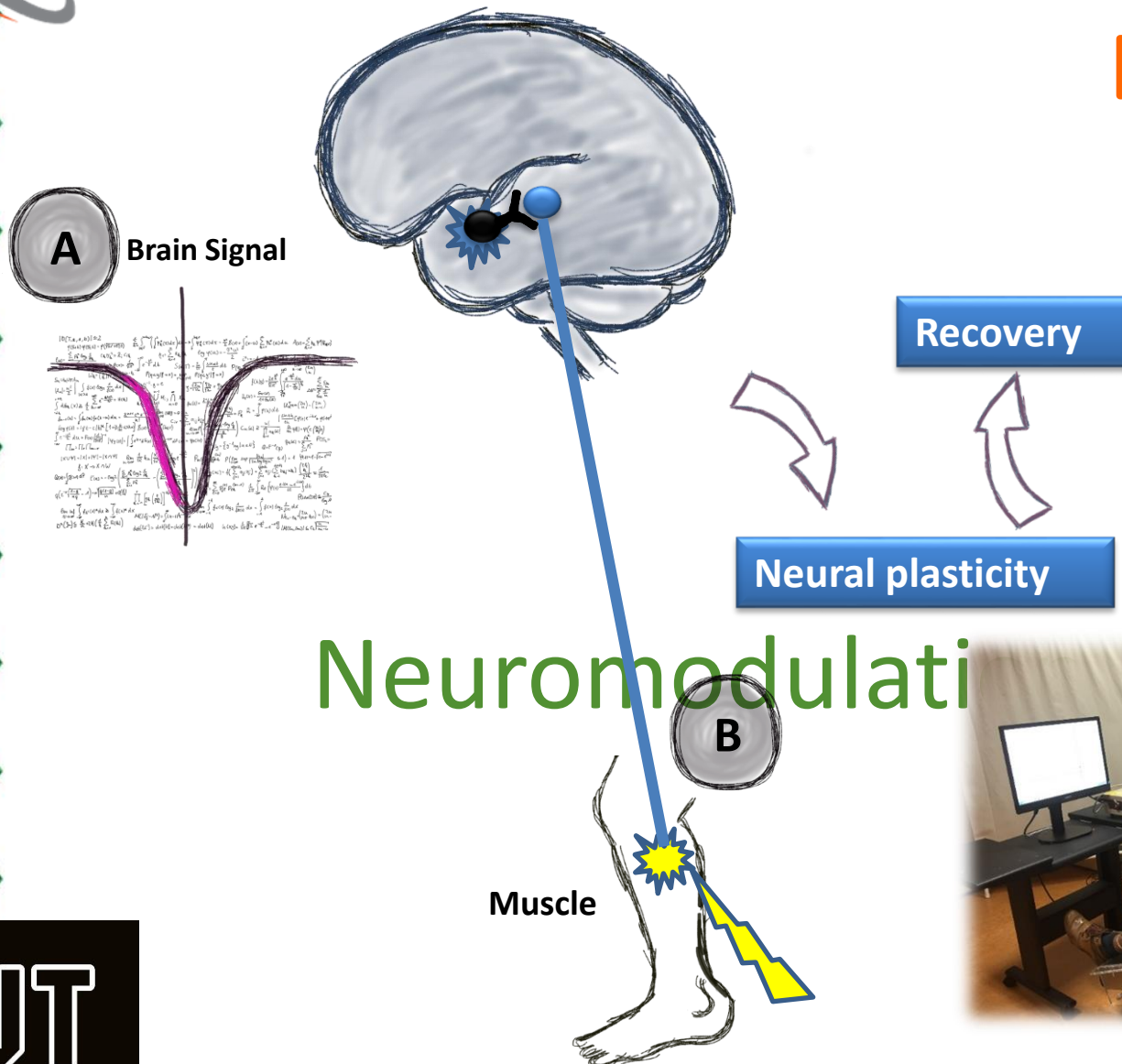
- Increased dose of rehabilitation
- Patient engagement
- Family engagement
- Measuring outcomes of importance



CallaghanInnovation



# Development: ExciteBCI





# Development: iVR<sup>2</sup>



iVR<sup>2</sup>- an immersive Virtual Reality Vestibular Rehabilitation system designed for patients with vestibular disorders to provide graded exposure to increasingly complex visual imagery.





# Rehabilitation Technology Evaluation

**REX**  
BIONICS



# Consultation

## Focus

- Expert advice and review of clinician training methods and materials.
- Exploration of REX<sup>®</sup> potential as a rehabilitation device in various neurological populations.
- Expert review of relevant clinical evidence and research.
- Identification of key challenges to implementing REX<sup>®</sup> in clinical practice

User Name \_\_\_\_\_ Date \_\_\_\_\_

### 2 User Measurement

	Left	Right	Device Requirements
Height			Approx. 1.42 – 1.93 m (Approx. 4'8" – 6'4")
Weight			Approx. 40 – 100 kg (Approx. 88 – 220 lbs)
A	Floor to Ankle		96 – 116 mm
B	Ankle to Hind foot		46 – 92 mm
C	Ankle to Knee		366 – 470 mm
D	Knee to Hip		380 – 470 mm
E	Calf Lateral Diameter		< 100 mm
F	Thigh Lateral Diameter		< 135 mm
G	Skeletal Hip Width		< 380 mm
H	Overall Leg length= C + D		745 – 940 mm

Are measurements consistent between trials and/or measurers?  
If NO, Why? \_\_\_\_\_

Are the individuals' measurements within the anticipated range for their height?  
If NO, Why? \_\_\_\_\_

Are the measurements consistent between the Left and Right sides?  
If NO, Why? \_\_\_\_\_

Are the individuals' measurements within the acceptable range for the REX?  
YES / NO

Rex Bionics Ltd | TF-03 User Measurement and Set-Up Guide | REX-0994 | v4.0 | November 2016 | 5







# Scientific Validation

## Research Aim

- Describe;
  - Motion of User and REX<sup>®</sup>
  - Muscle activation patterns
  - Pressure distributionduring REX<sup>®</sup> locomotor tasks.
- In comparison to unsupported locomotor tasks in healthy people.
- In people with SCI and people with stroke.





# Scientific Validation

- Promote the future development of REX®.
- Address questions commonly asked by clinicians when evaluating the suitability of REX® for their patients.
- Support clinical reasoning by clinicians during REX® use.



**REX**  
BIONICS





# Clinical Validation

## Research Aim:

The feasibility, safety and acceptability of the REX robotic exoskeleton for ambulation and upper body exercise in people with SCI

## Research Method:

A prospective, international, cohort study in people SCI (n=56).

- Feasibility; successful transfer, device control, the timed up and go test (TUG) and completion of upper body exercise.
- Safety; adverse events reporting.
- Acceptability; User questionnaire.
- Explored patient reported outcomes.



# Clinical Validation

*“This study highlights that, distinct from other robotic exoskeletons, REX<sup>®</sup> is suitable for people with high level lesions and enables a range of rehabilitative activities to be undertaken.”*





# Clinical Validation

Planning underway for a multicentre international clinical trial investigating the efficacy of REX® Rehabilitation in people with moderate to severe stroke.





**By working collaboratively  
with rehabilitation  
technology developers,  
industry and end-users the  
Rehabilitation Innovation  
Centre will be a world leader  
in the evaluation and  
development of rehabilitation  
technologies that can  
positively impact the lives of  
people experiencing  
disability.**

## **Summary**

**Professor Denise Taylor**  
+64 9 921 9680  
E [denise.taylor@aut.ac.nz](mailto:denise.taylor@aut.ac.nz)

**Dr Nada Signal**  
+64 21 929144  
E [nada.signal@aut.ac.nz](mailto:nada.signal@aut.ac.nz)

**Associate Professor Nicola Kayes**  
P 09 921 9999 ext 7309  
E [nicola.kayes@aut.ac.nz](mailto:nicola.kayes@aut.ac.nz)

# The world of Bupa

2017



## About Bupa

Bupa is a leading global health and care company with unique breadth, scale, influence and expertise. Our aim is to improve and engage millions of people in their health and wellbeing across the globe.

We serve 32 million customers in more than 190 countries, and employ almost 84,000 people world-wide. We deliver a broad range of services to fund and provide healthcare.



# Bupa around the world



We have over  
**32 million**  
customers



We employ almost  
**84,000**  
people



In over  
**190**  
countries

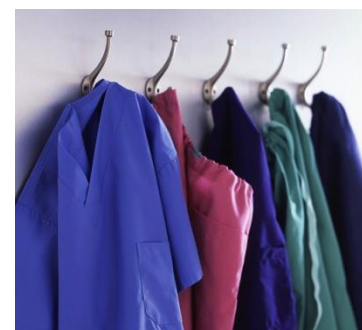
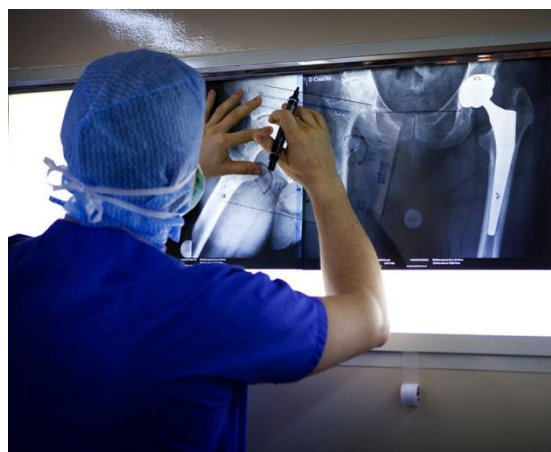


Principally in the UK, Australia, Spain, Poland, New Zealand and Chile, as well as Saudi Arabia, Hong Kong, India, Thailand, USA and Latin America.

## Who we are

Our status as a private company, limited by guarantee, means we have **no shareholders** and are not driven by short-term profit.

This means we behave commercially and focus on our customers, whilst taking a long-term view and reinvesting our profit to provide more and better healthcare, fulfilling our purpose: ***longer, healthier and happier lives.***





# Australia and New Zealand

## BUSINESS UNITS

- Bupa Australia Health Insurance
- Bupa Aged Care Australia
- Bupa Care Services New Zealand
- Bupa Health Services Australia



### HEALTH INSURANCE

Bupa Australia is the largest privately owned health insurance provider in the country with 4.7m customers.



### CARE SERVICES

Bupa Aged Care in Australia and New Zealand is the largest privately-owned aged care provider in the region.

We offer 125+ care homes, 36 retirement villages and 7 rehabilitation sites. We also provide telecare services via a personal alarm network.



### GP CLINICS

In October 2014 Bupa offered GP services for the first time at a flagship clinic in Sydney. There are plans to open five more.

### BUPA MEDICAL VISA SERVICE

We are a delivery partner for the Australian government, and will carry out around 250,000 visa medical assessments each year.

# New Zealand

## BUSINESS UNITS

- Care Homes
- Retirement Villages
- Medical Alarms
- Rehabilitation
- Dental



## HEALTH & CARE

Bupa Aged Care New Zealand is the largest privately-owned aged care provider.

We offer 62 care homes, 36 retirement villages and 7 rehabilitation sites. We also provide personal alarms.

4,000+ employees

5,000+ residents

9,000+ medical alarm customers

25 dental clinics

## Current Technology



### So what is mPERS?

- A MOBILE Personal Alarm
- Limitation of traditional alarms is the client can only call for help when in radius of their base unit e.g. garden or letterbox
- Our clients are more independent and demanding the freedom to call for help 'beyond the gate'

### Traditional Medical Alarms

#### Personal Emergency Response System (PERS)

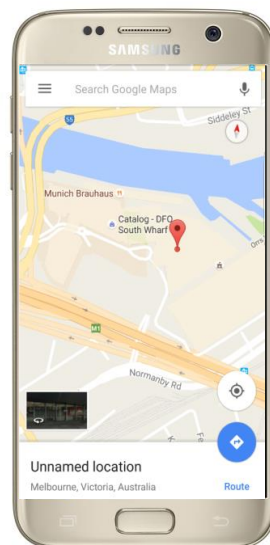
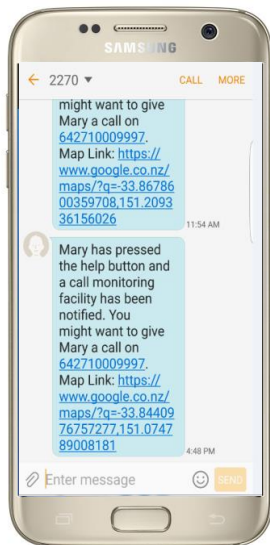
- Base unit plugged into the phone line or built in SIM
- Programmed to communicate with Bupa's central monitoring station when the pendant worn by the client is pushed
- Using two way voice, the monitoring station communicates via the speaker in the alarm to establish help required
- When the alarm is activated, the monitoring station knows who the person is and where they live from details provided at the time of installation.



# Bupa Watch - Wearable Alarm Project

## What does it DO?

- A wearable device (Samsung Gear 3G) that can be activated to request help to be sent to wherever the wearer is at that point in time (nationally)
- Standalone device - separate mobile not required
- Wearer's location supplied to Bupa's central monitoring station
- Two way voice communication through the watch with Bupa's monitoring station



## The Players

Bupa has a financial investment in Jupl and BCNZ has an existing supply agreement.

The latest product that Jupl is developing is in partnership with Samsung to provide an mPERS solution.

## Bupa's Advantage

The solution is not yet available in-market and Bupa have the following advantages prior to full market launch:

- Facilitates interaction with wearers support network - e.g. informal or formal carers and nominated contacts via Jupl's Friends & Family text and app services

- Undertake live customer trials
- Conduct presale activities with consumers (B2B & B2C)
- Onboard potential resellers

## Future Possibilities

- **Geofencing** - alerting carer should the wearer leave or arrive at a designated boundary
- **Fall Detection** - self activation should the watch detect the wearer has had a fall
- **Health & Care Partner** - once devices are with customers, layering of additional Health & Care applications (including Telehealth) as 'add on' subscribed services is possible





Thank you



[bupa.co.nz](http://bupa.co.nz)



[twitter.com/BupaNZ](https://twitter.com/BupaNZ)



[facebook.com/BupaNZ](https://facebook.com/BupaNZ)





The private photo album that connects generations

# Our sweet spot



## Grandparents

- 30% of population

## Parents with kids at home

- 30% of population

## Kids 4 - 14 years old

- 15% of population

## Expat families

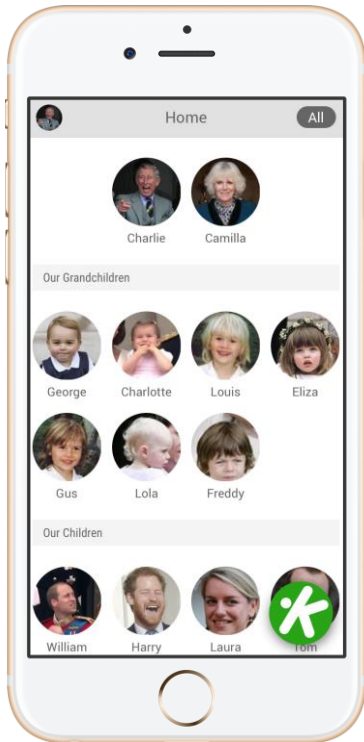
- 20% of population



## What makes kin2kin different for families?



# Our emotional, unique and simple solution



## Grandparents

- Organised photos and direct relationships

## Parents with kids at home

- Quickly connect family via photos they share

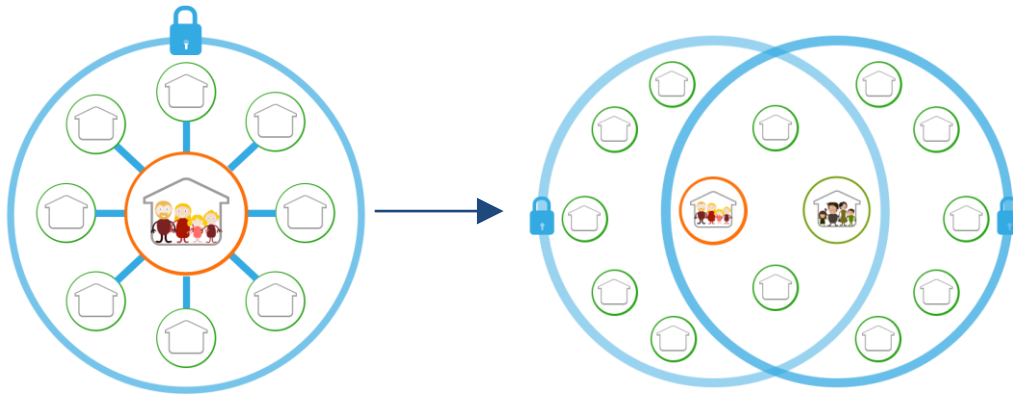
## Kids 4 -14 years old

- Safely included

## Expat families

- No time zone challenges

# The kin2kin private network for modern families

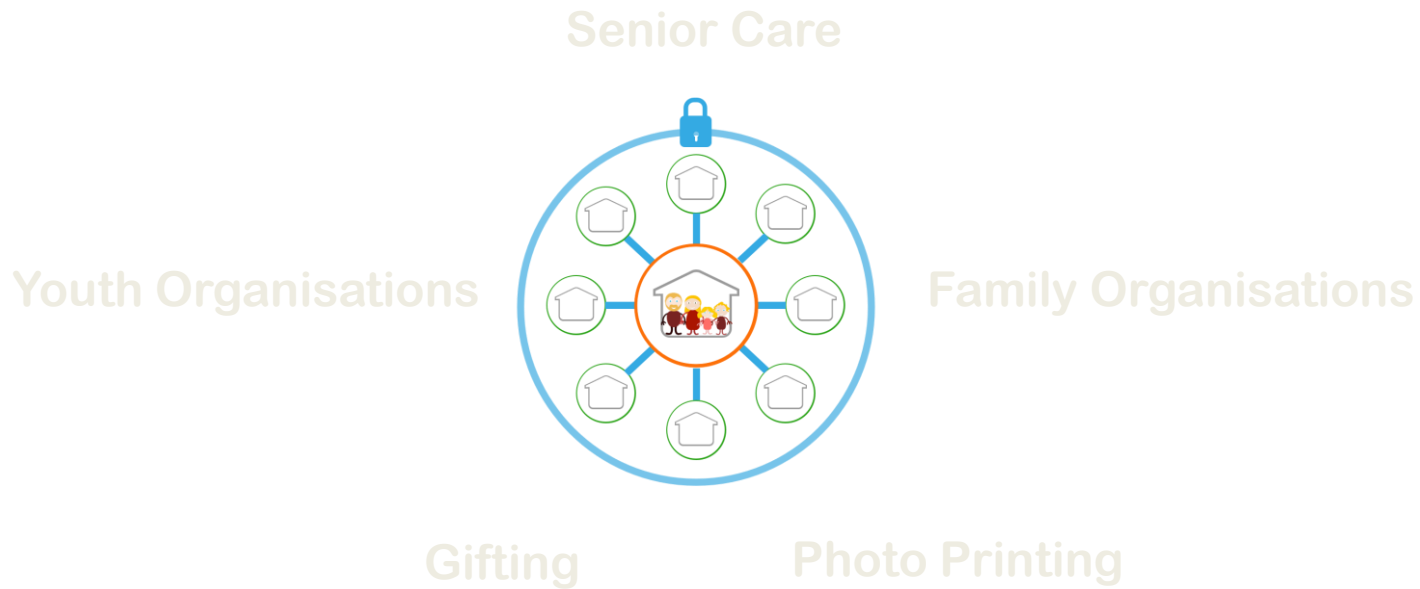


Households

Naturally overlap

- 30% of grandparents are separated
- 55% of kids live in non-traditional households
- Average first internet use is now 3 years old

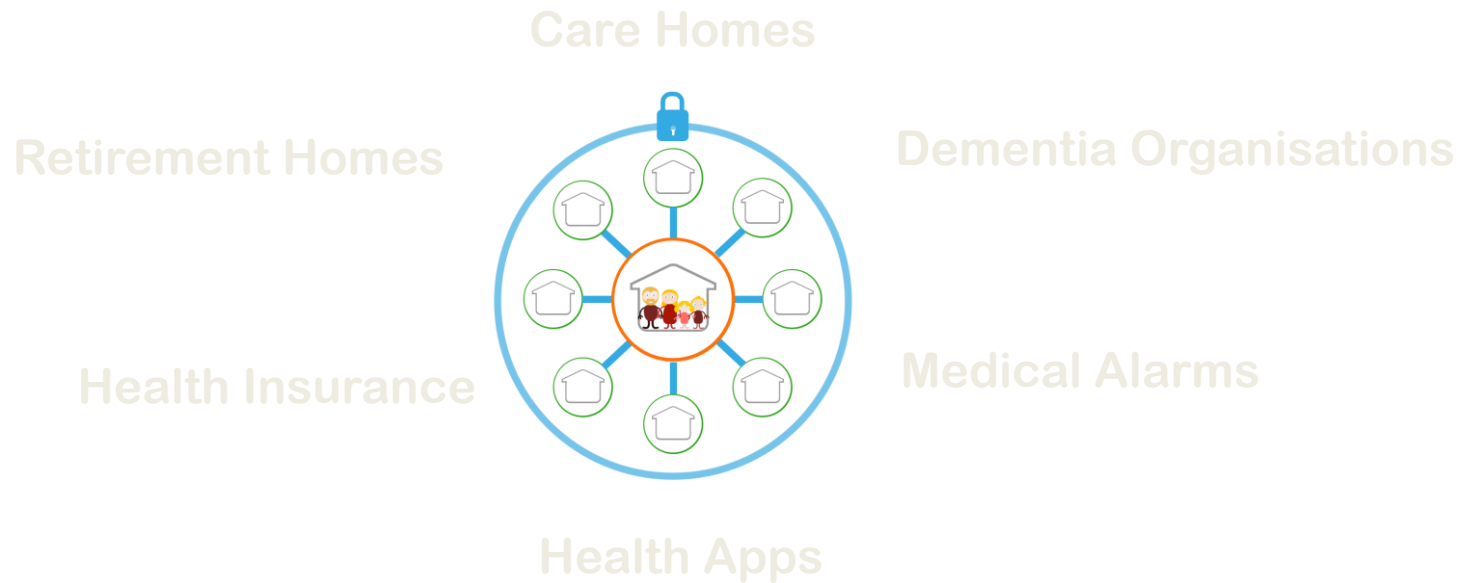
We have solutions for these highly engaged and private networks through:





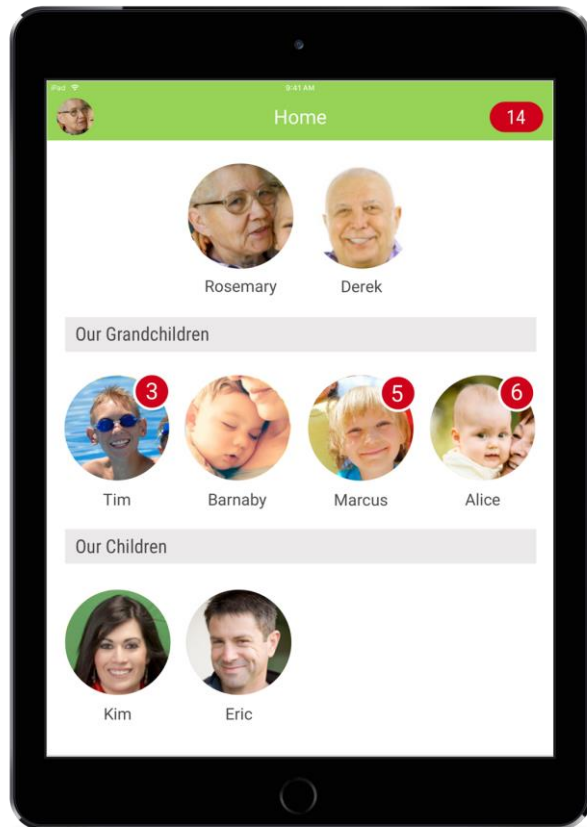
Solutions for aged care organisations

Connecting highly engaged family support networks to:



**We are seeking international strategic partners**

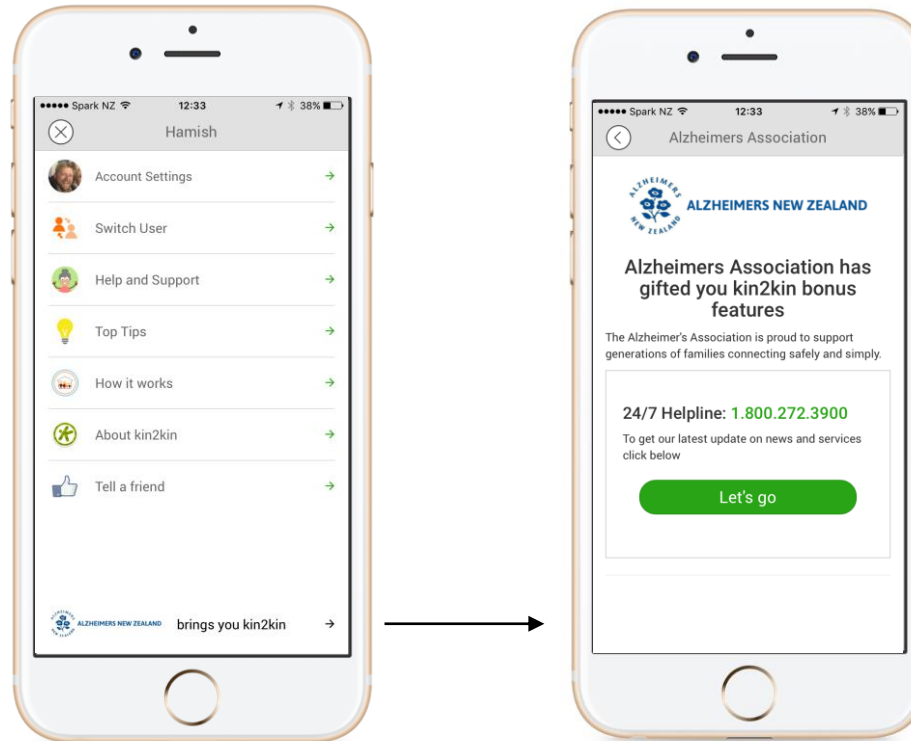
# Families living with Dementia



- The proven benefits of memory books
- The power of love and support networks
- The positive results from organised photos with faces, names and relationships
- Alzheimer's impacts 1/3 of all families

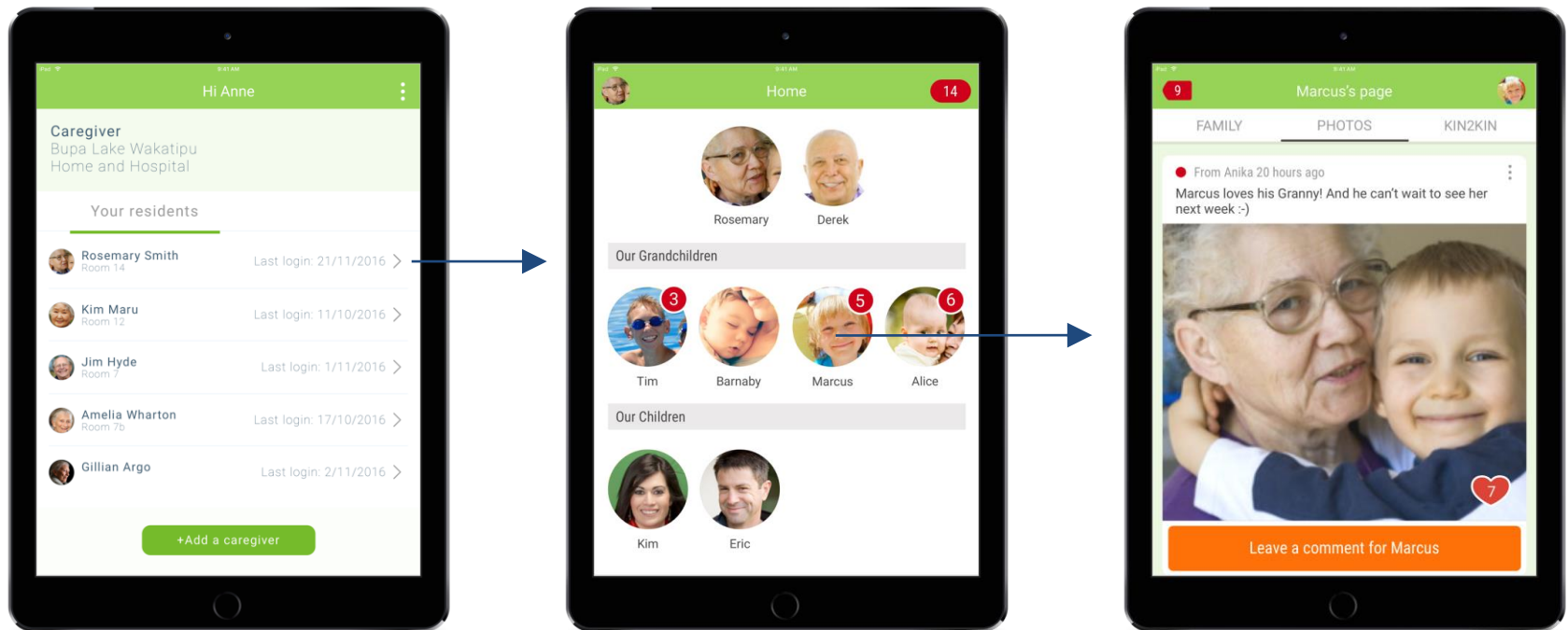


# Organisations supporting those living with Dementia



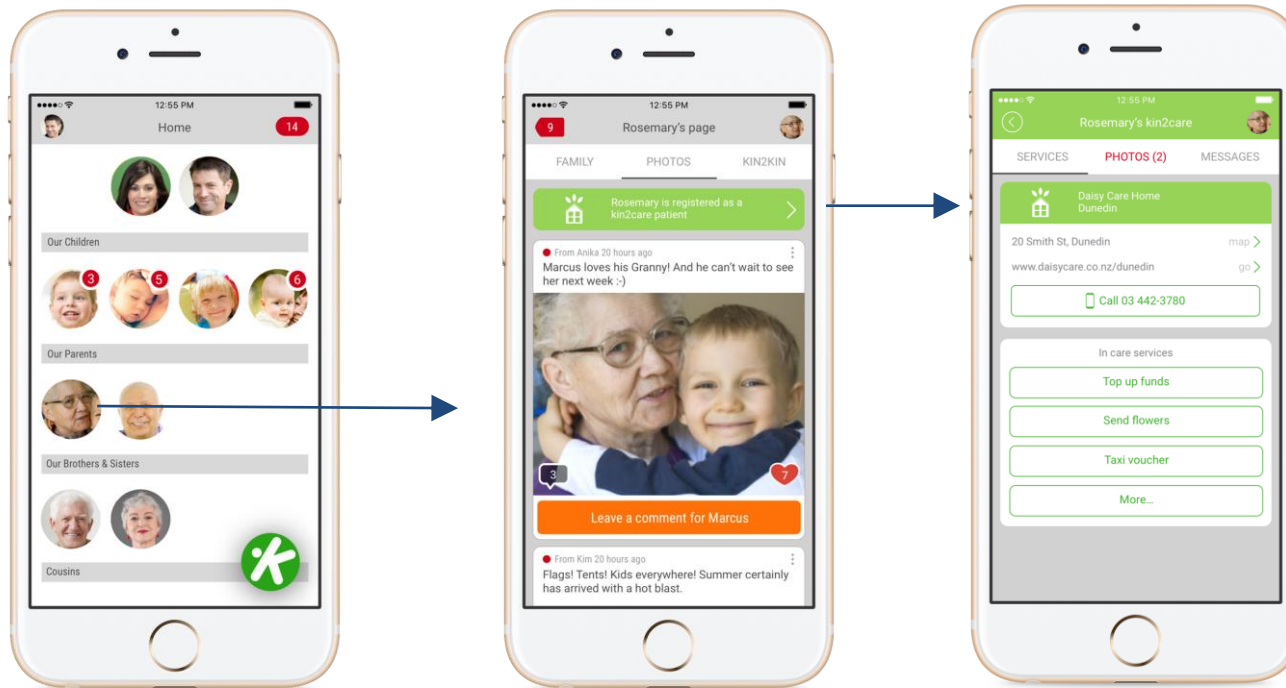
Communication with full family network possible

# Care homes working with Dementia



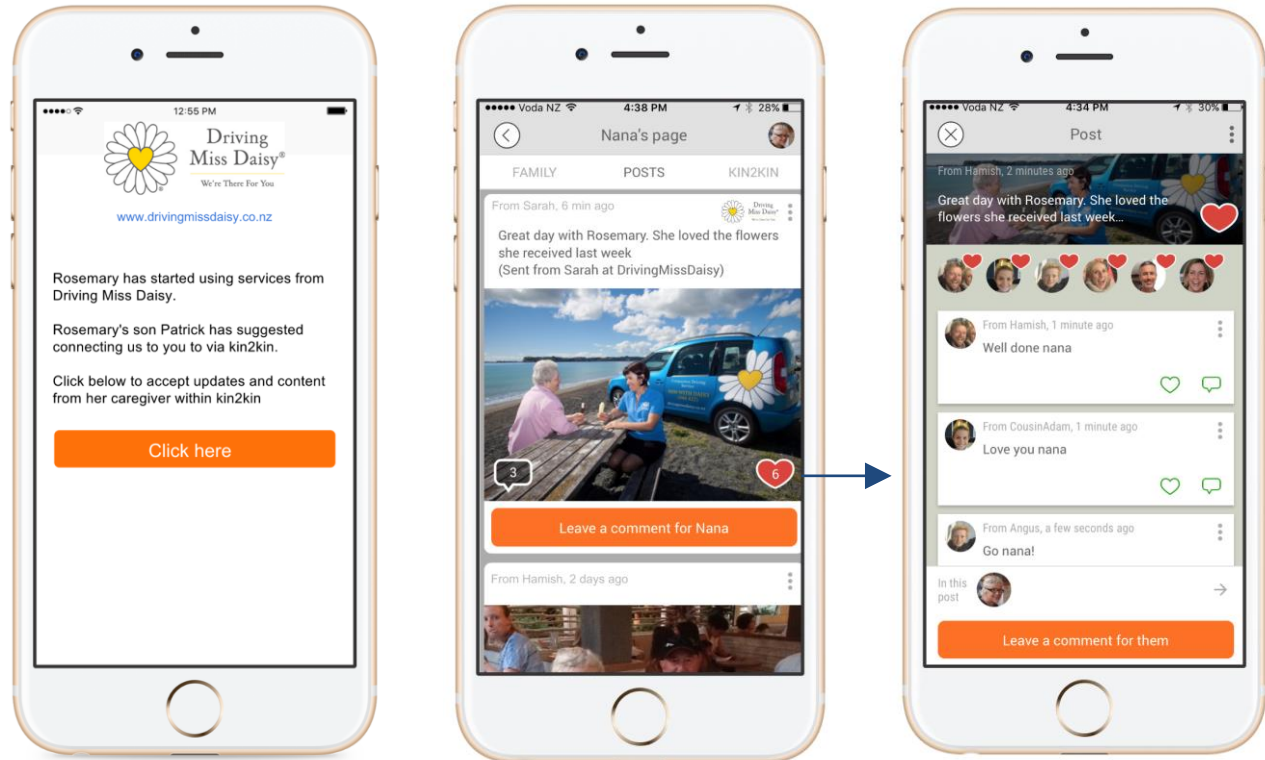
Caregivers assist residents in connecting with family

# Care home and retirement home services easily paid for by family



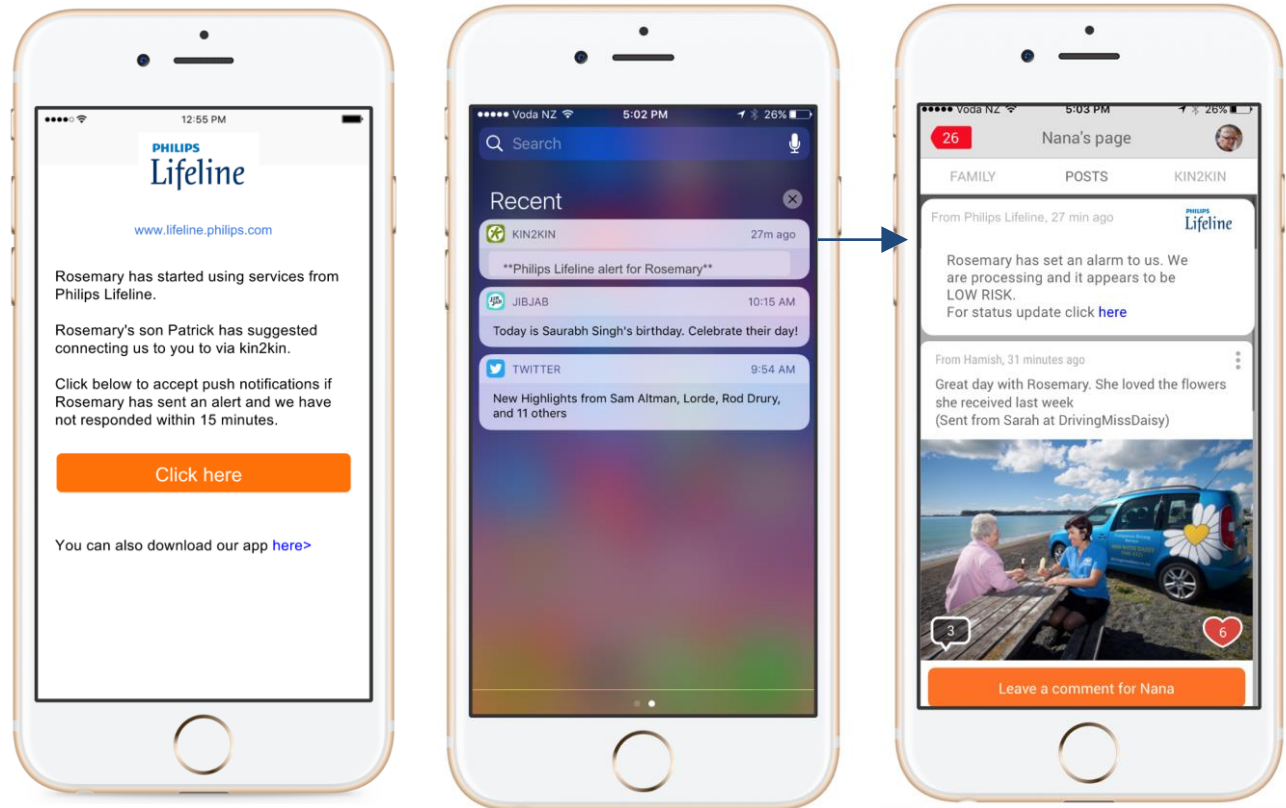
Families can meet both the emotional and financial needs of seniors

# Self-directed care organisations



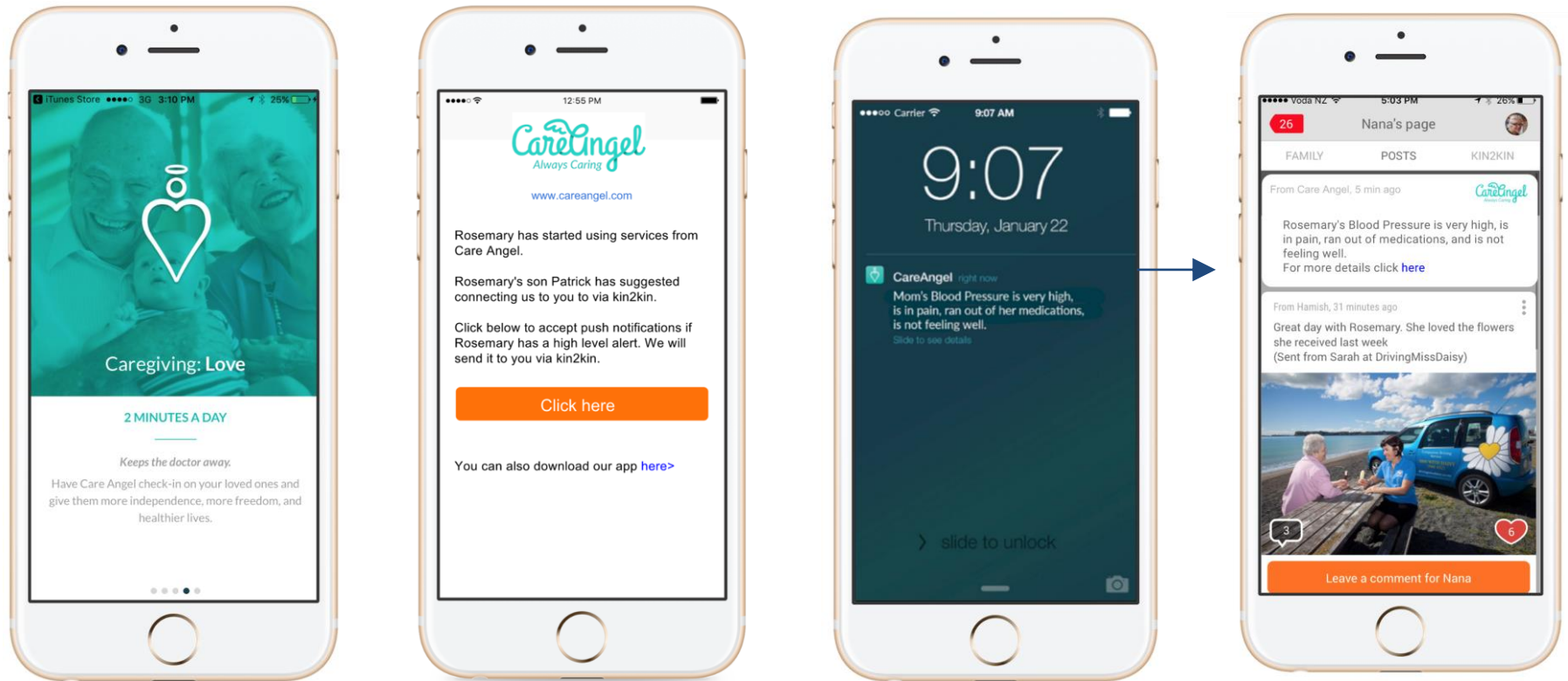
Win-win relationship via connecting Seniors and promoting services

# Extension to medical alerts



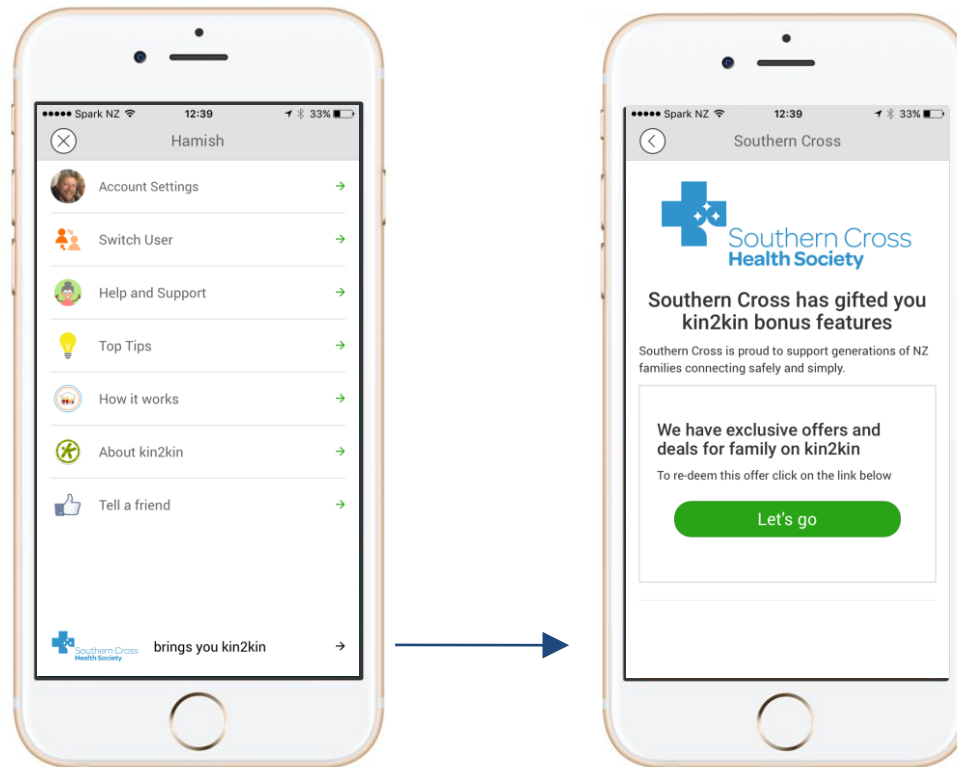
kin2kin can amplify the reach of brands and services

# Similar extension to medical apps



Not all family are primary caregivers. kin2kin can extend the reach.

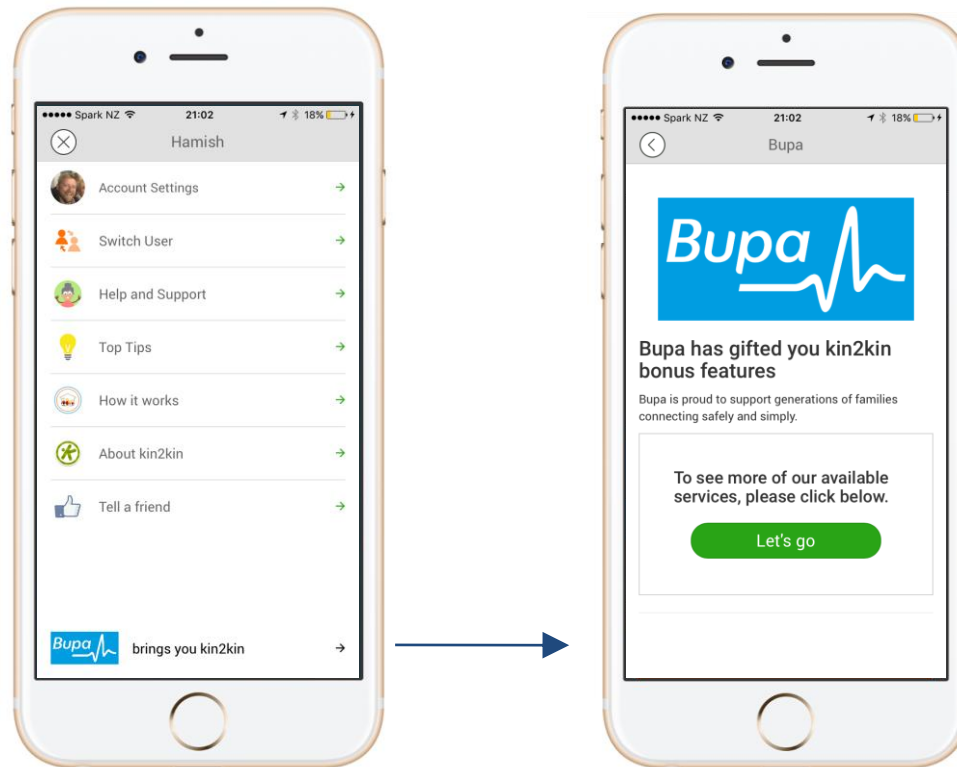
Finally, branded kin2kin for life insurance companies...



Maintain a meaningful and segmented conversation with customers



....and international senior care organisations





The power of family support networks

**We are keen to talk to new  
international partners in senior care**

## Appendix:

1. kin2kin website: [www.kin2kin.com](http://www.kin2kin.com)
2. kin2kin explainer video:  
<https://vimeo.com/kin2kin/whatmakeskin2kindifferent>
3. kin2kin reviewed on TVNZ Breakfast Show:  
<https://vimeo.com/167217745>