



Exercise becomes potent medicine for the frail elderly in 12 eldercare facilities under Lien Foundation's latest \$2.2m 'Gym Tonic' initiative

Customised strength training programme designed with technology and evidence-based expertise gives frail elderly newfound strength and confidence

Elderly in successful pilot showed progress in physical, mental & emotional state

16 April 2015

Last year, 75 year-old retired teacher Jennifer Ng always had to pray fervently for her high blood pressure to come down before she could go for an outing. Today, the resident at The Salvation Army Peacehaven Nursing Home is not only able to go for weekly outings, she has started learning the fan dance. Her blood pressure has stabilised, and her standing and walking is steadier since being on the Gym Tonic pilot programme.

1. Indeed exercise can act as medicine to physical bodies even as age and mental deterioration kick in. This health tonic comes in the form of regular exercises designed and delivered in a programme using state-of-the art exercise machines that combines technology with expertise to customise strength training for the frail elderly so that their emotional state, physical and mental functions can be maintained, restored or improved. With better health, the overall costs and demands for healthcare services can be significantly reduced.
2. Over 2,000 elderly in Singapore will get Exercise-as-Medicine (EAM) as **Lien Foundation's** project **Gym Tonic** rolls out to six nursing homes and six eldercare centres as part of a Singapore-Finland partnership. Gym Tonic is led by local aged-care IT & technology company, **Pulsesync** and backed by research, experts and equipment from Finland, where EAM has proven effective. Contrary to popular belief, research has shown that physical functions can be improved despite age. Progressive resistance strength training has yielded positive results in a pilot study, with the elderly enjoying a better quality of life.

Combining Exercise As Medicine with I.T and Finnish know-how

3. “Exercises by strength training are key in the prevention, treatment and rehabilitation strategies of care for our frail elderly. There is a need to mainstream ‘exercise as medicine’ and to widen its beneficial reach through healthcare policy, practice and training,” said Mr Lee Poh Wah, CEO of Lien Foundation.
4. Targeted at the frail elderly with existing physical and health issues, one of the main goals of Gym Tonic is to help them stay as functionally independent as possible. It combines the expertise of physiotherapists and a state-of-the-art software system with evidence-based assessment protocols to deliver strength training for the elderly through safe pneumatic gym equipment.
5. The elderly’s physical and mental conditions are first pre-assessed with the help of WELMED, the Finnish-developed assessment protocol by Kokkola University, and interRAI, an international healthcare assessment system. This data helps to establish a baseline; from which a trained physiotherapist will then develop individual training plans tailored to help the elderly progressively improve their fitness. Its range of rehabilitative exercises also helps the elderly deal with acute events such as falls and strokes or low muscle strength and increased lateral sway.
6. Gym Tonic’s automated IT system using RFID technology allows the elderly’s progress to be easily tracked and assessed by physiotherapists and the nursing care team. The equipment also automatically adjusts itself to fit the elderly, based on a previous setting, upon identification. The results and post-assessments are key to helping the elderly stay active, as well as restoring, maintaining or improving their physical functions and overall wellbeing.

Successful pilot shows positive results

7. The pilot for Gym Tonic was conducted at The Salvation Army Peacehaven Nursing Home (Peacehaven) from end November 2013 to February 2014. A test group of 15 residents and control group of 11 residents, all with mild to moderate dementia, were involved. Over three months, the residents in the test group underwent the prescribed Gym Tonic exercise programme under the guidance of an exercise therapist.

8. For twice a week and up to 30 minutes each time, they did their exercises on pneumatic gym machines while the residents in the control group continued their usual exercise regime of walking. Both groups were assessed regularly and statistics were collated on their moods and physical abilities, which were submitted to the Finnish teams at Kokkola University and Raisoft, an interRAI developer, for assessment at the end of the pilot.
9. Despite the small data sample, results of the pilot showed that Gym Tonic had positive benefits for the elderly, not just for their physical functions, but also their emotional and cognitive abilities. Residents who did Gym Tonic exercises displayed a reduction in mood symptoms, increase in muscle strength, reduced blood pressure and improved cognitive functionality and sociability.
10. Mdm Low Mui Lang, Executive Director, The Salvation Army Peacehaven Nursing Home said, "Gym Tonic has blown my mind. I still remember the day my resident threw away his walking stick and started walking. At a broader level, caring for elderly who are at risk of falling is costly and taxing for nursing homes. I'm now turning my focus to prevention through Gym Tonic." The positive results of the pilot study has encouraged Mdm Low to introduce Gym Tonic to an additional 50 transitional care residents at Peacehaven's Grace Corner and more than 50 residents at Peacehaven Nursing Home.

EAM to transform eldercare & enlarge skills of physiotherapists

11. Embarking on Gym Tonic are 12 eldercare facilities that span the range of services from nursing homes and community hospitals, to community rehab and care centres. They represent the key leaders and operators of Singapore's eldercare sector: The Salvation Army Peacehaven Nursing Home, St Andrew's Nursing Home, St Joseph's Home, Apex Harmony Lodge, Man Fut Tong Nursing Home, Kwong Wai Shiu Hospital, Peacehaven Bedok Multi-Service Centre, AWWA Health and Senior Care, St Luke's Community Hospital, St Luke's Elderly Care and NTUC Health. Each facility will have a range of six pneumatic gym equipment and three measurement machines from Finnish company, HUR, installed in their very own Gym Tonic exercise area at the end of 2015. There will also be regular workgroup sessions for partners to improve, share and learn from each other.

12. At least two representatives from each VWO partner will be trained at Kokkola University. They will learn the EAM concept prescribed by Gym Tonic and be trained to perform assessments and measurements, and to read and interpret the exercise data. They will also receive post training, mentoring and support to train other staff in their respective VWOs and become drivers for change in the eldercare sector. Gym Tonic's EAM will enlarge the therapists' skills and nudge them towards using exercise as preventive medicine.

Preventive healthcare with EAM

13. Gym Tonic offers a cost effective and sustainable strategy for fall prevention. One of the biggest challenges faced in the care of the elderly is the risk of falls that could lead to fractures or injuries requiring them to seek costly corrective surgeries or even institutionalisation. In addition, due to their fear of falling, the frail elderly are often caught in the vicious cycle of inactivity that worsens their health.
14. Gym Tonic empowers therapists with the means to help the elderly address the primary causes of falls with advanced technology such as pneumatic gym exercise machines, balance platforms and analysers. They also guide and encourage the elderly in their progress, giving them the added boost to stay active. Gladwin Henry, senior physiotherapist at The Salvation Army Peacehaven Nursing Home said, "In my 18 years as a physiotherapist, I have always focused on qualitative outcomes. Now, Gym Tonic allows me to quantify the improvements I see in my patients, making my intervention more effective."

Tonic for the soul, not just the body

15. "While Gym Tonic could reduce healthcare costs, one of the most important benefits is its impact on the overall wellbeing of the residents," said Mdm Low. "For instance, the abduction machine exercises pelvic floor muscles and helps those with incontinence gain better control. When they do not have to wear diapers, they regain their dignity and confidence, with much better moods." Besides the elderly, the advantages of Gym Tonic extend to enhancing productivity in the eldercare sector too.

Innovative use of IT to combat manpower shortage

16. Addressing the shortage of physiotherapists in Singapore, Gym Tonic's project lead, Mr Ken Tan, Founder and Managing Director of Pulsesync said, "Through technology, we

can facilitate and ease the physiotherapists' work by enhancing their productivity. Instead of requiring burdensome paperwork and a manual input of exercise data, the system automatically collects physical assessment data and exercise records to track each participant's progress. So at a glance, the physiotherapist has all the information he needs to finetune or tailor the elderly's exercises to tackle certain issues or maintain their physical strength. The data can also be analysed and used for evidence-based interventions to plan better exercise regimes." The knowledge gathered across the sector will also allow the development of exercise regimes for the elderly across a range of ages, cognitive and physical abilities, and set benchmarks for even better comparisons, interventions and programmes.

Treasure trove of data for improving care

17. Data gathered from Gym Tonic's 12 facilities would be used to research and validate the quantitative and qualitative benefits of EAM. "We hope to develop and refine exercise protocols based on the evidence gathered through Gym Tonic, so that in future, purposeful exercise can be individually tailored and prescribed optimally like other medical treatment," said Mr Lee.

18. The potential behind exercise as medicine is most pertinent to the eldercare sector that has to deliver care under the pressure of growing demand, tight manpower, limited resources and capabilities. Delaying the decline of the elderly through such a structured exercise programme like Gym Tonic helps moderate healthcare costs in Singapore's over-stretched eldercare sector. It also moves the mindset away from waiting for degradation to actively looking and planning for sustaining and regaining health and improving quality of life. As the sector takes its first Gym Tonic shot, some 2,000 elderly could be in for pleasant surprises of what they can do in age-defying pleasure.

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For testimonials and more information on Gym Tonic, please visit <http://gymtonic.sg>

Annex A: About Gym Tonic

Annex B: Gym Tonic - Exercise as Medicine for the Elderly

Annex C: Demo by The Salvation Army Peacehaven Nursing Home participants

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ABOUT THE LIEN FOUNDATION

www.lienfoundation.org

The Lien Foundation is a Singapore philanthropic house noted for its model of radical philanthropy. It breaks new ground by investing in innovative solutions, convening strategic partnerships and catalysing action on social and environmental challenges. The Foundation seeks to foster exemplary early childhood education, excellence in eldercare and effective environmental sustainability in water and sanitation. It supports innovative models of eldercare, advocate better care for the dying and greater attention on dementia care.

Since 2005, the Foundation has harnessed IT for capacity building and enhanced the quality of care in healthcare nonprofits like hospices and nursing homes. In 2010, the Foundation commissioned the first-ever global Quality of Death index ranking 40 countries on their provision of end of life care. It has published research that unveiled the views of doctors and thought leaders on what would improve end-of-life care in Singapore



Annex A: Gym Tonic Factsheet

A. About the Project

1	What it is	<p>Project 'Gym Tonic' is an initiative to make exercise a key and intentional intervention in improving the physical functions of the elderly. This is a radical movement to effect systemic change in the care of the elderly spurring the adoption of Exercise-as-Medicine (EAM).</p> <p>Spearheaded by the Lien Foundation, the initiative involves partnership with a renowned university and technology companies from Singapore and Finland, covering 12 eldercare facilities.</p> <p>'Gym Tonic' targets the elderly who are frail, prone to falls and idle. It promotes EAM primarily through strength training, complemented by targeted, measurable, and trackable assessments to improve the well-being and functional abilities of the elderly. This will help our elderly remain active, and to restore, improve, maintain and delay their functional decline in normal aging or in the event of acute events such as falls and strokes.</p> <p>To ensure long term sustainability, 'Gym Tonic' offers an all-encompassing solution including modern pneumatic gym equipment, measuring instruments, standardised assessment protocols and a state-of-the-art software system to make EAM "S.M.A.R.T" (Safe, Measurable, Automated, Rehabilitative and Targeted).</p>
2	The People Behind it	<p><u>Singapore</u></p> <ol style="list-style-type: none"> 1. Catalysed and made possible by the Lien Foundation 2. Project Lead and Gym Tonic Architect = Pulesync Pte Ltd 3. 12-week Gym Tonic Pilot conducted at The Salvation Army - Peacehaven Nursing Home <p><u>Finland</u></p> <ol style="list-style-type: none"> 1. Research, assessment and performance tracking protocol by Kokkola University Consortium Chydenius, Finland 2. Pneumatic gym equipment by AB HUR Oy 3. Elderly health assessment instrument, interRAI, by Raisoft Oy Ltd

3	Who is it for	<p>Elderly in 6 community care and 6 residential care facilities</p> <p><u>COMMUNITY CARE FACILITIES</u></p> <ol style="list-style-type: none"> 1. AWWA - Health and Senior Care 2. NTUC Health 3. St Luke's ElderCare (Clementi) 4. St Luke's ElderCare (Tampines) 5. St Luke's Hospital 6. The Salvation Army - Peacehaven Bedok Multi-Service Centre <p><u>RESIDENTIAL CARE FACILITIES</u></p> <ol style="list-style-type: none"> 7. Apex Harmony Lodge 8. Kwong Wai Shiu Hospital 9. Man Fut Tong Nursing Home 10. St Andrew's Nursing Home 11. St Joseph's Home 12. The Salvation Army - Peacehaven Nursing Home
4	Estimated number of users	More than 2,000
5	When	
	Pilot	End Nov 2013 to Feb 2014 (at Peacehaven Nursing Home)
	Installation of 'Gym Tonic' gym	<p>First batch: May to June 2015</p> <p>Second batch: July to August 2015</p>
	Formal Training / Certification	<p>Kokkola University, Finland</p> <p>First batch: June 2015, 12 to be trained</p> <p>Second batch: August 2015, 12 to be trained</p>
	Full deployment	August 2015

B. Nursing Homes in Singapore¹

6	No. of nursing homes	66
7	No. of inpatient beds	10,780
8	No. of Day Rehabilitation Centres / Day Care Centre	50

1-Available stats as of 13 Mar 2015, https://www.moh.gov.sg/content/moh_web/home/statistics/Health_Facts_Singapore/Health_Facilities.html

C. Physiotherapists

9	No. of physiotherapists in Singapore ²	Slightly more than 1,000 or approximately 1 per 5,400 people (as of 2014)
10	No. of physiotherapists in Hong Kong ³	1 per 2,862 people (as of end 2013)
11	No. of physiotherapists in Australia ^{4,5}	1 per 930 people (as of end 2013)
12	Physiotherapy diploma courses in Singapore	1 – Nanyang Polytechnic
13	Physiotherapy degree courses in Singapore ⁶	1 – Singapore Institute of Technology (Starting Sep 2016) <ul style="list-style-type: none"> - Four year degree programme - One year full-time degree programmes for polytechnic graduates Estimated to add 90 physiotherapists a year ⁶

2 – 26 Sep 2014, <http://www.straitstimes.com/premium/forum-letters/story/vital-retain-physiotherapists-public-sector-20140926>

3 – Health Facts of Hong Kong, 2014 Edition, http://www.dh.gov.hk/english/statistics/statistics_hs/files/Health_Statistics_pamphlet_E.pdf

4 – Number of physiotherapists in Australia, Dec 2013, file:///Users/joanneleemacbook/Downloads/Physiotherapy-Board---Registration-Data-Table---December-2013.PDF

5 - Population in Australia, end Dec 2013, [http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/E1FFDD84F70BC5C0CA257CFB0014E932/\\$File/31010_dec%202013.pdf](http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/E1FFDD84F70BC5C0CA257CFB0014E932/$File/31010_dec%202013.pdf)

6 - <http://www.moe.gov.sg/media/press/2014/11/new-allied-health-degree-programmes-at-singapore-institute-of-technology-to-meet-evolving-ealthcare-needs-of-singaporeans.php>

7 - <http://yourhealth.asiaone.com/content/more-allied-health-professionals-needed>

D. Project Investment

14	Total investment by Lien Foundation	\$2.2 million
	Investment includes:	Each partner facility will receive: <ul style="list-style-type: none"> - 6 HUR pneumatic equipment - 3 measuring instruments / devices - Implementation costs - Travel, training/certification and study trip expenses for 2 representatives to Finland - 3-year maintenance/support for equipment, hardware and software
	Common/Shared costs	<ul style="list-style-type: none"> - Software development / software-machine integration - Full time 'Gym Tonic' programme manager - Research support

Annex B Gym Tonic – Exercise as Medicine for the Elderly

Pre-Assessment

Therapists conduct objective (WELMED) and subjective (interRAI) assessment to evaluate the elderly's current health and physical function status.

These include physical measurements & functional tests on their gait, sitting & balance, and questions on the elderly's wellbeing (e.g. presence of pain)



Measurement

Using specialised equipment like the Body Composition Analyzer, Balance Platform and Performance Recorder, the elderly are assessed for their isometric muscle strength, balance, metabolic rate, fat and muscle composition. The Gym Tonic system will present a preliminary assessment report to show where they stand as compared to other elderly in their age group, their potential, and exercise recommendations tailored to suit their health and physical function conditions.

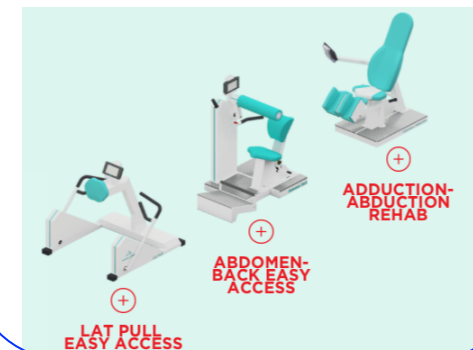


Exercise and Intervention

Before they start their workout, the elderly's vital signs are taken to ensure their fitness. They then sign into Gym Tonic with their personal RFID wristband. The gentle pneumatic gym machines have their recommended routine pre-programmed in the system which then guides the elderly to complete the exercise repetitions and circuit. It also allows their strength training resistance to be raised progressively.

Their exercise performance is automatically captured and tracked in the IT system. (e.g. achieved, underperformed or over performed)

The workouts improve their strength & balance, helping them to walk more confidently, prevent falls, and even improve continence.



Analysis

Through the Gym Tonic system, all assessment and measurement data are made anonymous, and captured in a repository for evidence-based research.

The research team at the University of Kokkola will analyse the data and provide their findings to help the GT team fine-tune the programme and also derive more effective interventions.



Follow Up Assessment

The therapists will reassess the health and physical function status of the elderly every 3 or 6 months, or when necessary (e.g. significant change in medical condition). They will then discuss the progress with the elderly and possibly, their care-givers.

The therapist also makes the recommended changes and fine-tunes the elderly's exercise regime/intervention, and motivates them to gradually step up their exercises.

ANNEX C: Demonstration by Residents of The Salvation Army Peacehaven Nursing Home
Presented by Andrew Tan, Exercise Therapist



Exercise Equipment (Part of the basic set of six all Gym Tonic gyms will have)



1 Leg Extension / Curl Rehab

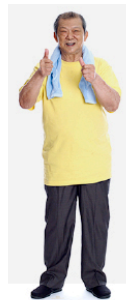
- Designed to strengthen the elderly's hamstring and quadriceps muscles
- This helps to exercise the muscles they use to sit, stand and climb stairs

Demonstrated by: **Mr Tan Cheng Hong**

"I am overcoming my fear of falling."

Mr Tan Cheng Hong suffers from arthritis and was constantly plagued by the fear of falling down before he started on Gym Tonic.

Gym Tonic strengthened his arthritic knees. From using near-zero weight resistance, he now uses 3kg regularly.



2 Leg Press Rehab

- Designed to exercise all leg muscles.
- Features a lock function that allows therapist to limit the elderly's exertion to only the final range of the motion if necessary.
- Back support is adjustable and elderly can choose from different starting positions.
- This helps to exercise the muscles they use to sit, stand, walk and climb stairs

Demonstrated by: **Mr Ng Lak Soon**

Mr Ng Lak Soon has been on Gym Tonic for one year. Relatively fit from the start, he has since become even fitter and stronger. His resistance value for the leg press machine has increased from 7 kg to 17 kg, and he continues to exercise with enthusiasm weekly.





3 Abdomen / Back Easy Access

- Wheelchair-friendly
- Exercises both abdominal and back muscles
- Features reversible back support and reversible roller to make it easy for elderly to enter and exit

Demonstrated by: **Mr Tan Kan Boo**

"I make friends more easily now."

Mr Tan Kan Boo suffers from Parkinson's disease and had trouble getting along with his fellow residents.

Since he started on Gym Tonic, he has become more sociable and argues less often with his fellow residents. He gained 1 kg of muscle mass on his lower legs in just 12 weeks and continues to look forward to each exercise session.



4 Chest Press Easy Access

- Wheelchair-friendly
- Designed to strengthen elderly's upper body muscles, especially chest muscles
- Both lever arms move independently

Demonstrated by: **Mdm Ng Ah Yook**

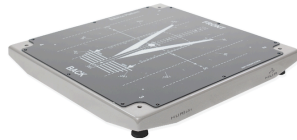
"I have something to be proud of."

Mdm Ng Ah Yook suffered a fall a few years ago and is often in a wheelchair now although she can use a walking frame for short distances.

Having only started on Gym Tonic three months ago, she has been very motivated by the improvements she saw. Her legs have greatly strengthened and her leg press resistance values have increased from 7 kg to 13 kg after just 15 sessions.



Measurement and Assessment



5 Balance Platform with Support Rail

- Measures a person's balance and amount of sway, and calculates a Romberg score which translates into one's risk of falling
- Portable machine

Demonstrated by: Mdm Jennifer Ng

"I don't need to pray before outings anymore."

Mdm Jennifer Ng used to worry about her high blood pressure. Since starting on Gym Tonic, her blood pressure has stabilised and she now feels more stable and less likely to fall while walking and standing.



6 Body Composition Analyser

- Measures the body weight, muscle mass, fat mass, water content of the entire body as well as the different segments (individual arms, legs, trunk)
- Also calculates BMI



7 Functional Pulley

- Wheelchair-friendly
- Pulley height easily adjustable
- Versatile. Can be used for a wide variety of exercises for the upper body, hips, and lower body

Demonstrated by: Mdm Chew Aye Wah

"It reminds me of my younger days."

Mdm Chew Aye Wah enjoys the individual attention and encouragement she gets during her Gym Tonic sessions, and says that Gym Tonic reminds her of her younger days when she played basketball in school. She has been steadily getting stronger since starting on Gym Tonic, and is now able to use a resistance level of 10-12 kg for the leg press.

