

Clinical Exercise Programmes in Community Settings

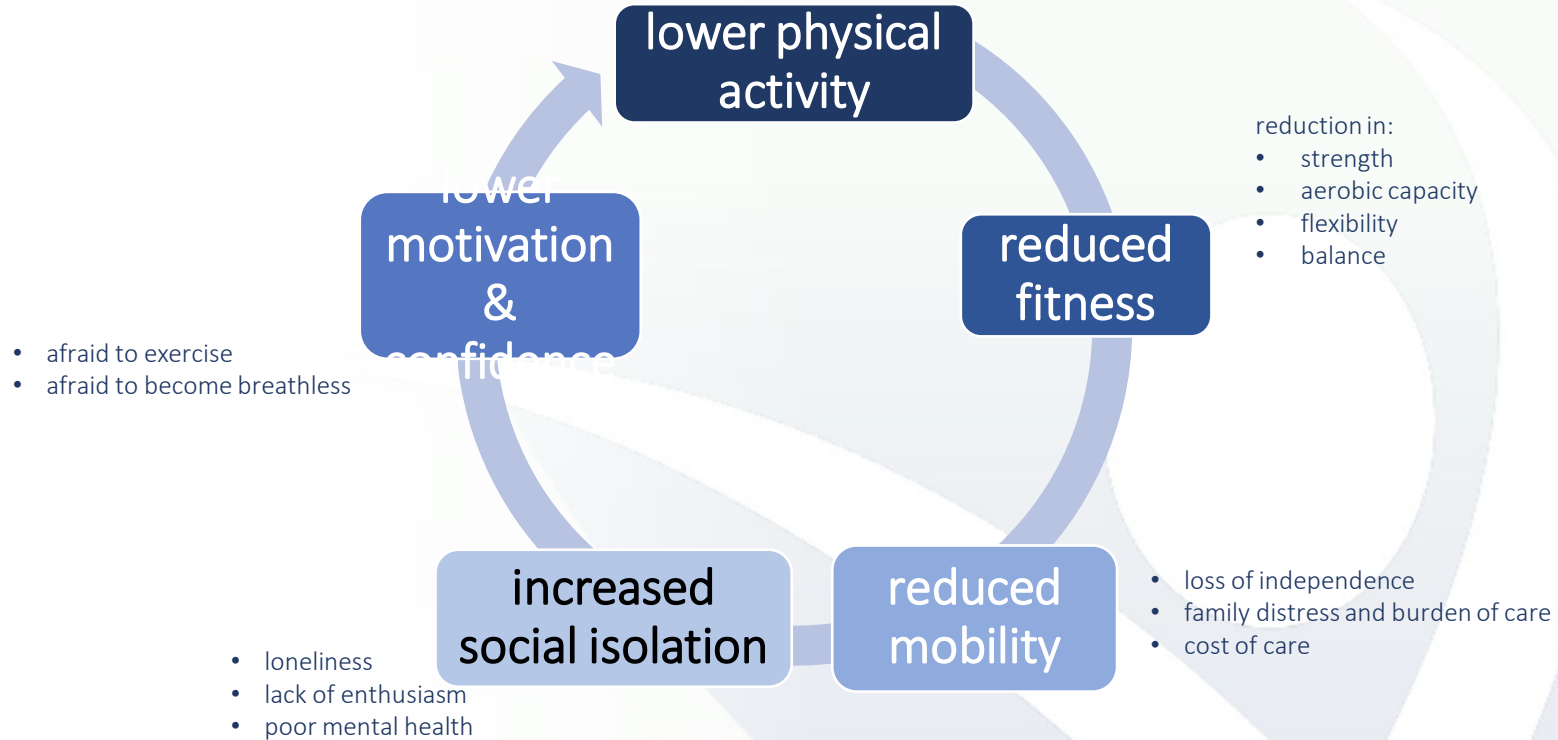
Rationale and Challenges

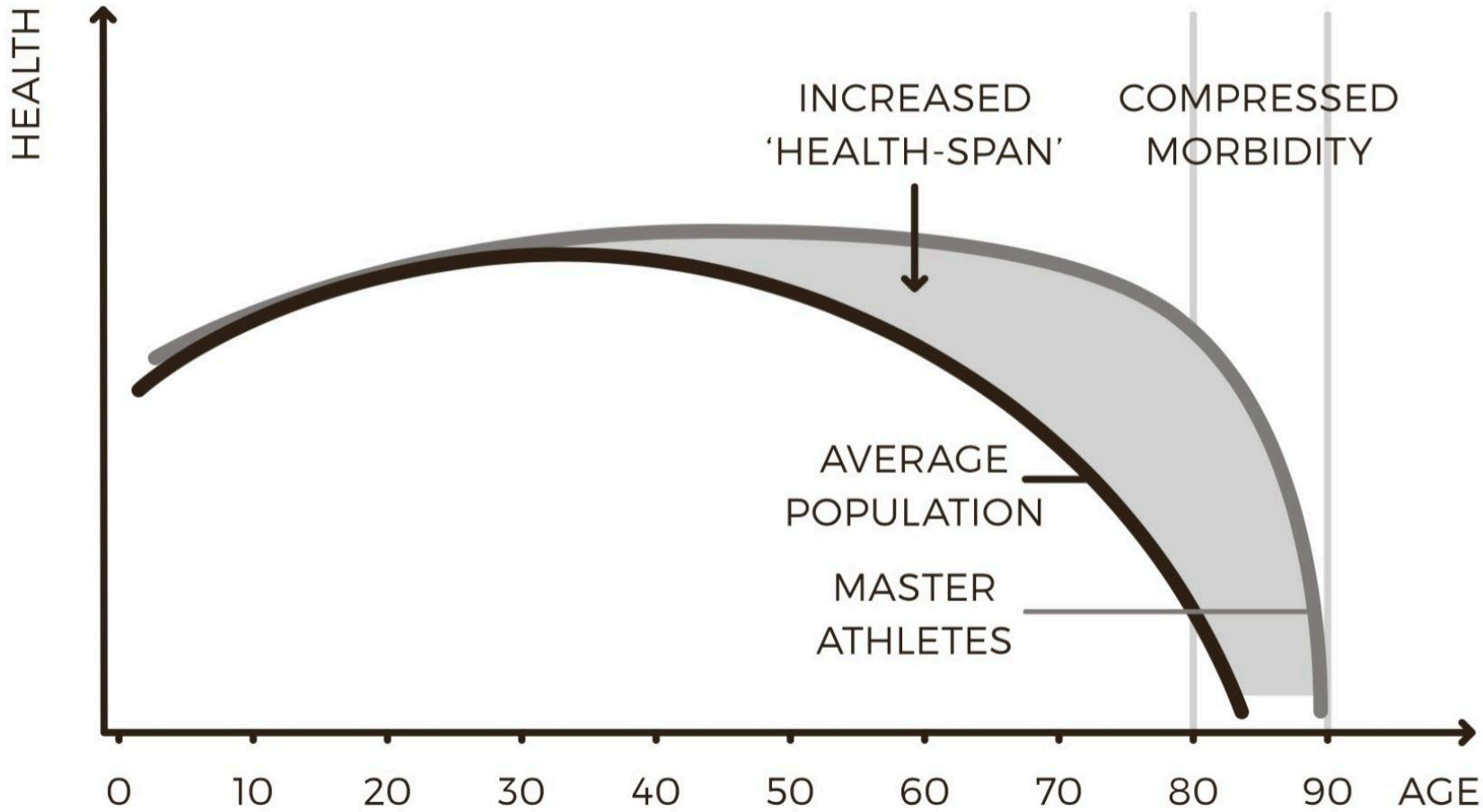


Dr. Noel McCaffrey

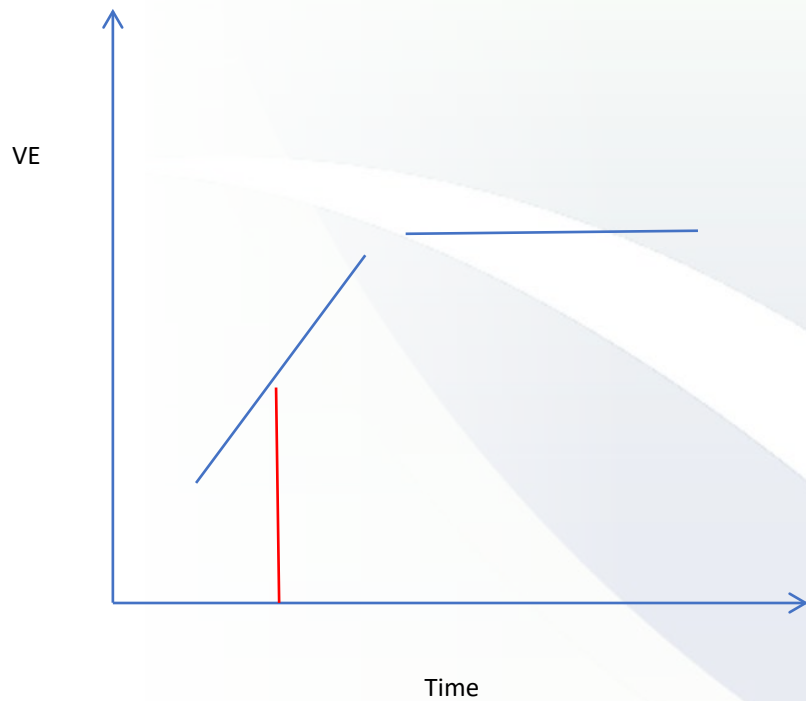
- The rationale
- The evidence
- Where does community-based clinical exercise fit ?
- ExWell Medical
- Practical Issues and Challenges

the downward spiral





Strength work alone improves aerobic capacity in COPD



	IR	T2DM	DysL	BP	Ob	COPD	CHD	CHF	IC	OA	RA	OP	FM	C	DEP	Asth
Path	A	A	A	A	A	D	A	A	A	D	D	A	C	D	D	D
spec symps	A	A	A	A	A	A	A	A	A	A	C	B	A	B	A	C
funct cap	A	A	A	A	A	A	A	A	A	A	A	B	A	B	A	A
quality of life	A	A	B	A	A	A	A	A	A	A	B	B	A	B	A	B

Evidence for exercise as a treatment in chronic disease Pedersen & Saltin, 2006

A = strong several high quality studies
 B = moderate at least one HQ, a number moderate
 C = little at least one moderate
 D = none none

Beat It Programme

- Twice weekly exercise sessions
- Supervised by ex professional with specific certification
- Initial one-to-one session
- Personalised programme designed and carried out, under supervision, within group settings
- Medical clearance from GP of fitness to participate was required
- Max 15 per group

Table 3. Classification of participants at baseline and post program for clinical and fitness measures.

	Male			Female		
	Baseline	8 Weeks	<i>p</i> -Values	Baseline	8 Weeks	<i>p</i> -Values
BMI						
Normal (18.5–24.9)	24 (8.4)	25 (8.7)		43 (14.2)	46 (15.2)	
Overweight (25.0–29.9)	123 (43.0)	126 (44.1)		101 (33.4)	100 (33.1)	
Class I obesity (30.0–34.9)	93 (32.5)	98 (34.3)		76 (25.2)	77 (25.5)	
Class II obesity (35.0–39.9)	39 (13.6)	30 (10.5)		56 (18.5)	53 (17.5)	
Class III obesity (≥ 40)	7 (2.4)	7 (2.4)	0.03	26 (8.6)	26 (8.6)	0.185
Waist Circumference (cm) ^a						
Normal range	23 (8.0)	27 (9.4)		7 (2.3)	8 (2.6)	
Risk of chronic disease	263 (92.0)	259 (90.6)	0.100	295 (97.7)	294 (97.4)	0.313
Chair Sit and Reach (cm) ^b						
below standard	126 (46.7)	89 (33.0)		127 (45.7)	96 (34.5)	
meets or above standard	144 (53.3)	181 (67.0)	<0.001	151 (54.3)	182 (65.5)	<0.001
30 s Chair Stand (#) ^b						
below standard	155 (54.2)	102 (35.7)		162 (536.6)	84 (27.8)	
meets or above standard	131 (45.8)	184 (64.3)	<0.001	140 (46.4)	218 (72.2)	<0.001
Six Minute Walk Test (m) ^b						
below standard	260 (90.9)	208 (72.7)		272 (90.1)	222 (73.5)	
meets or above standard	26 (9.1)	78 (27.3)	<0.001	30 (9.9)	80 (26.5)	<0.001
30 s Arm curl (<i>n</i> = 223) ^{b,c}						
below standard	69 (61.1)	29 (25.7)		72 (63.7)	25 (22.1)	
meets or above standard	44 (38.9)	84 (74.3)	<0.001	41 (36.3)	88 (77.9)	<0.001

^a Criterion cut-off value for high risk of chronic disease obtained from Royal Australian College of General Practitioners [17]. ^b Criterion referenced fitness standards for age and gender obtained from Rikli and Jones [18]. ^c Participants with wrist, elbow, upper limb injuries, or who had recent surgery were excluded from this test.

Issues

- No follow up
- No control group
- Practicality of ...
 - Individual initial assessments
 - Personalised programmes within group setting
- Non integration impacts scalability

comorbidities

concordant

- Hypertension
- CVD
- Renal disease

discordant

- Depression
- Arthritis
- Thyroid disease
- COPD

The comorbidity burden of type 2 diabetes mellitus: patterns, clusters and predictions from a large English primary care cohort

Magdalena Nowakowska^{1,2*}, Salwa S. Zghebi^{1,2}, Darren M. Ashcroft^{1,3,4}, Iain Buchan^{5,6}, Carolyn Chew-Graham⁷, Tim Holt⁸, Christian Mallen⁷, Harm Van Marwijk⁹, Niels Peek^{4,5,10}, Rafael Perera-Salazar⁸, David Reeves^{1,2,11}

- Clinical Practice Research Datalink (CPRD)
- patients diagnosed with T2DM between 2007 and 2017 identified.
- n = 102,394

Females

1. Hypertension
2. Depression

- Hypothyroidism
- Asthma
- CKD
- CHD
- COPD (lower SEG)

Males



1. Hypertension
2. CHD

- Depression
- COPD (lower SEG)
- CKD
- Asthma



Article

Implementing Low-Cost, Community-Based Exercise Programs for Middle-Aged and Older Patients with Type 2 Diabetes: What Are the Benefits for Glycemic Control and Cardiovascular Risk?

Romeu Mendes ^{1,2,3,*} , Nelson Sousa ^{2,4} , Victor Machado Reis ^{2,4} and Jose Luis Themudo-Barata ⁵

- 9 month programme
- 3 per week ex classes
- low cost / community facilities
- n = 124 participants / 85 controls

All measures improved

- HbA1c
- Lipid profile
- Fasting glucose
- Blood pressure (sys / diast)
- 10 yr CHD risk

Original Investigation | Diabetes and Endocrinology

Effectiveness of a Community-Based Structured Physical Activity Program for Adults With Type 2 Diabetes A Randomized Clinical Trial

Aishee B. Mukherji, BA; Di Lu, MS; FeiFei Qin, MPH; Haley Hedlin, PhD; Neil M. Johannsen, PhD; Sukyung Chung, PhD; Yukari Kobayashi, MD; Francois Haddad, MD;

- IMPACT Study California 2016-2019
- n = 357
- Usual care / once weekly exercise / 3 times weekly exercise
- 6 months

- HbA1c levels improved only on the 3 / week group

Diabetic Foot Ulcers


- treatment of foot infection
- appropriate dressing plans with regular sharp debridement of nonviable tissue
- revascularisation (if indicated)
- pressure offloading
 - offloading device (cast)
 - Controlled Ankle Motion walker
 - rest (exercise avoidance)
- IWGDF has guidelines for reducing risk of developing DFU
- But can exercise improve DFU healing?
- This would avoid the risks of inactivity

REVIEW

Open Access

Does exercise improve healing of diabetic foot ulcers? A systematic review



Morica M. Tran^{1*}  and Melanie N. Haley²

- 3 RCTs
- Non weight bearing exercise x 12 weeks
- One supervised, 2 non supervised
- No strong evidence in support
- All showed some degree of wound size reduction

- NWB exercise recommended

RESEARCH

Open Access



Exercise in adults admitted to hospital with diabetes-related foot ulcers: a pilot study of feasibility and safety

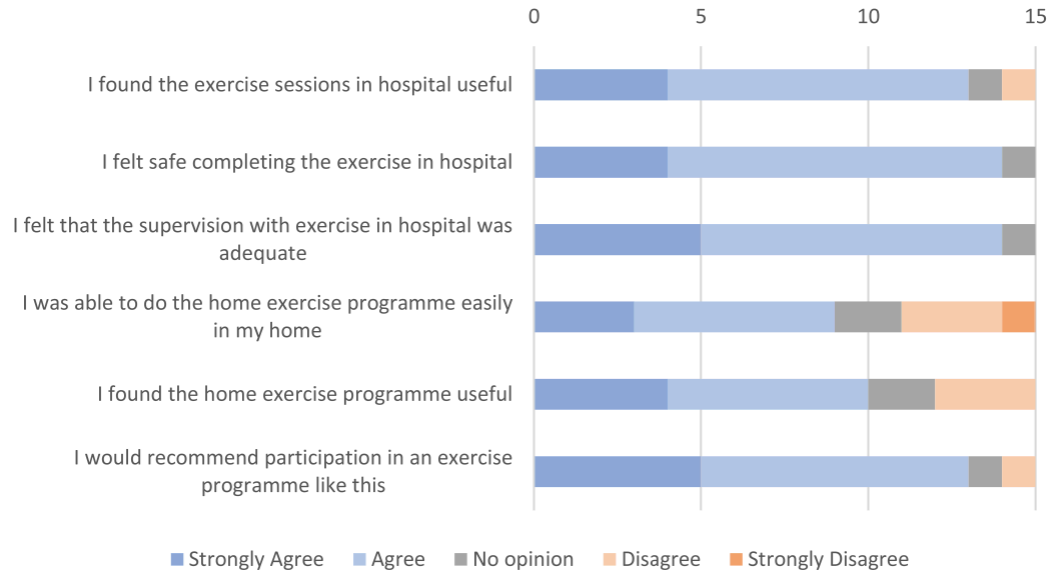
Emily Aitken¹, Jonathan Hiew^{2,3}, Emma J Hamilton^{3,4,5}, Laurens Manning^{3,5,6}, Jens Carsten Ritter^{3,7,8}, Edward Raby⁶ and Paul M Gittings^{1*} 

- n = 20
- Mixed weight bearing (with offloading) and NWB
- Podiatry support
- In-hospital and post-discharge exercise
- Individual tailoring based on ulcer location
- Targeted weight bearing
- Ergometers

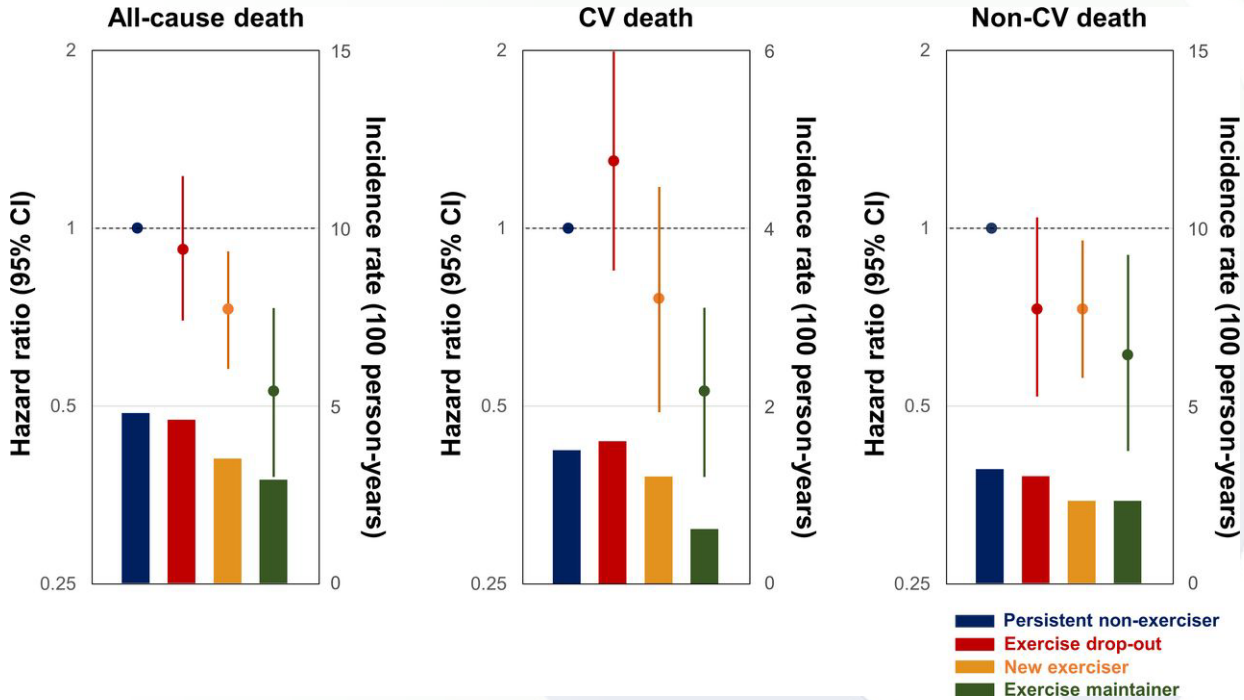
Table 4 Primary outcome feasibility and safety outcome data

Outcome	n	%
Recruitment	20 of 42	47.6
Retention	19 of 20	95.0
Adherence to study	15 of 20	75.0
Adherence to home exercise	10 of 20	50.0
Adverse Events	0	0.00

Acceptability

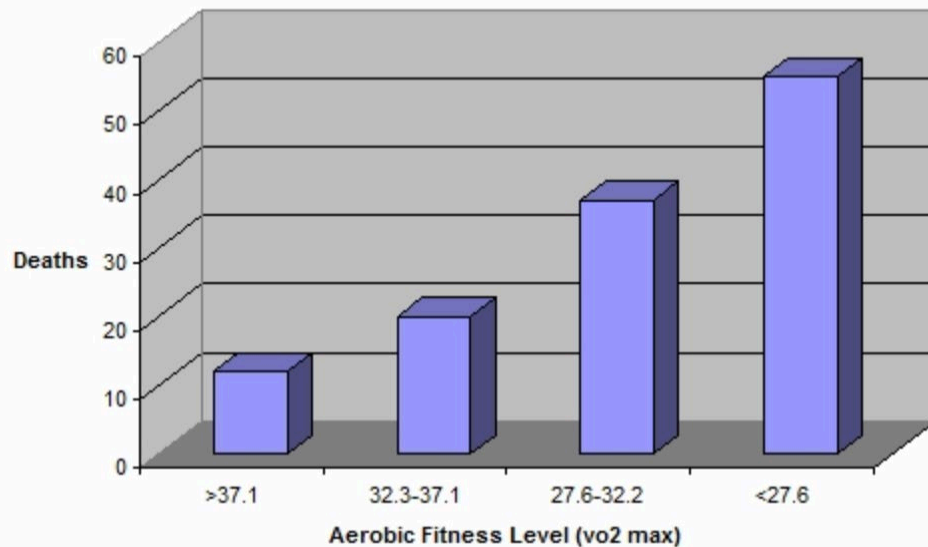


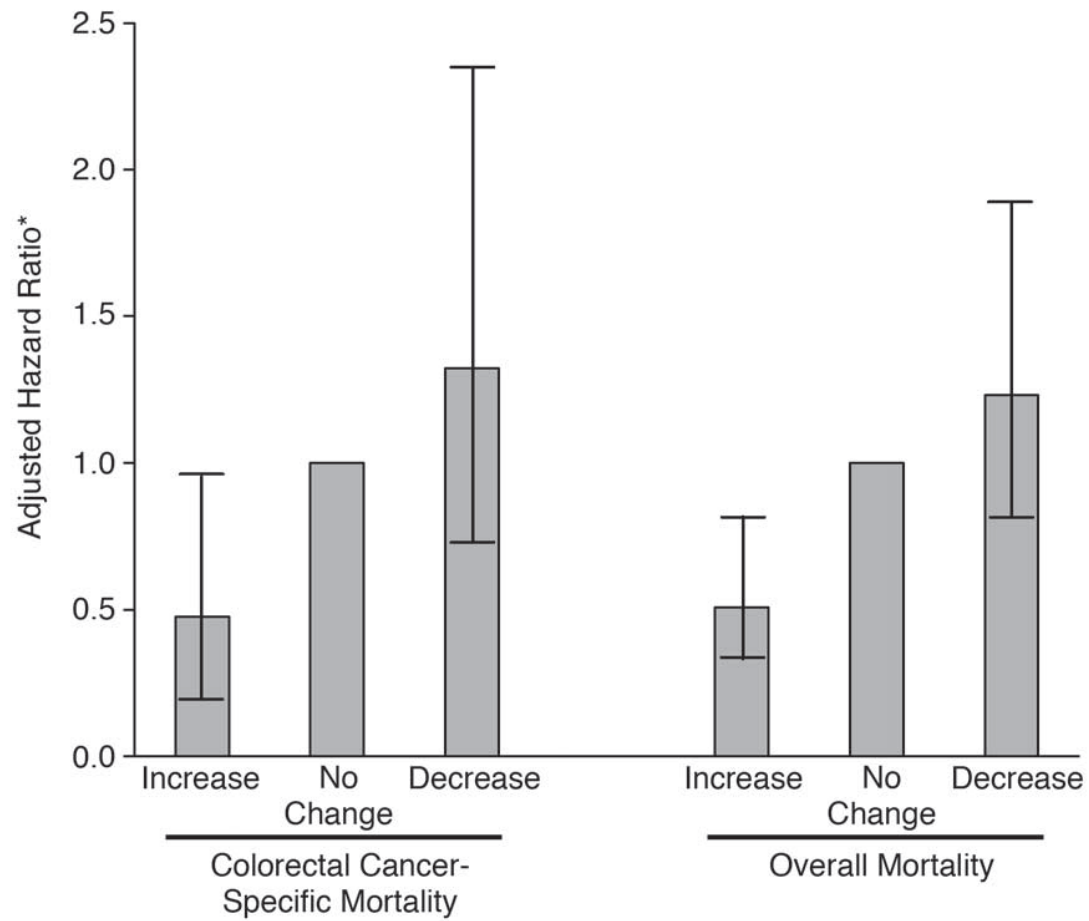
Dual-axis graph for all-cause, cardiovascular and non-cardiovascular deaths according to exercise habit change.



Dong-Seon Kang et al. Heart 2022;108:1945-1951

Number of Deaths During a 10 year follow up





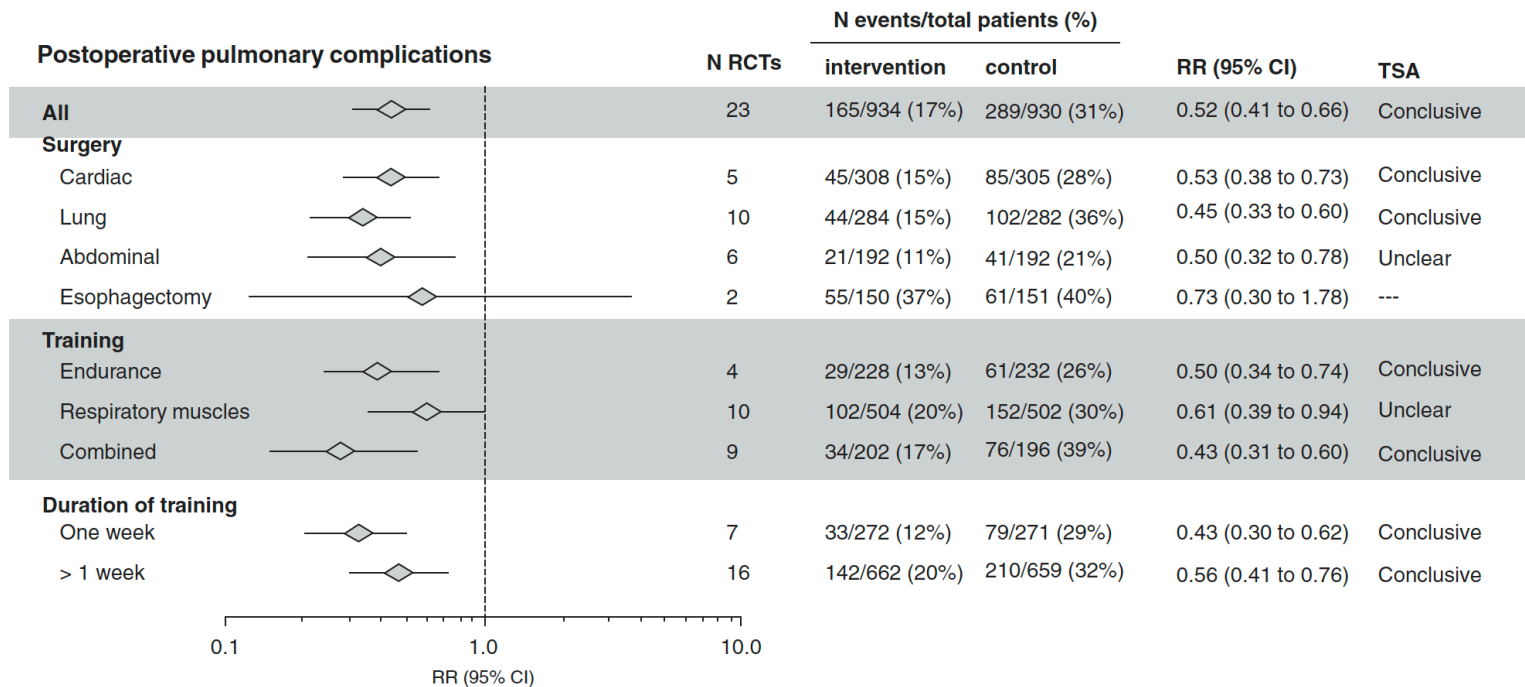


Figure 3. Analysis of postoperative pulmonary complications according to type of surgery, type of exercise training, and duration of training. CI = confidence interval; RCT = randomized controlled trial; RR = relative risk; TSA = trial sequential analysis.

The exercise in pulmonary arterial hypertension (ExPAH) study

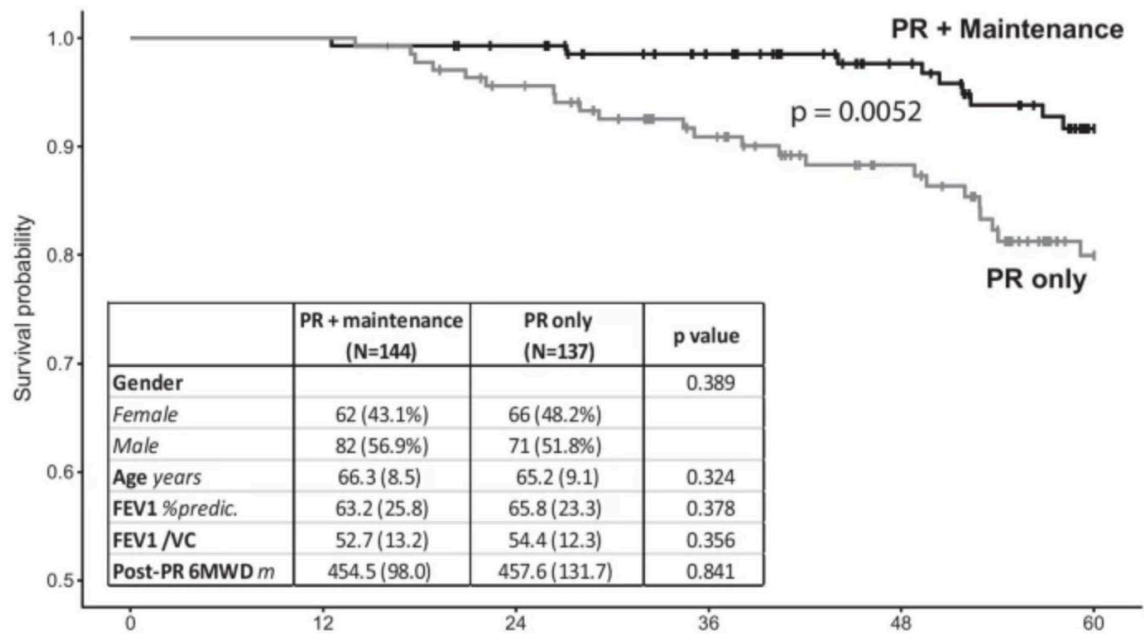
Chia et al, 2018

- outpatient supervised exercise + behaviour change
- 2 sessions / wk
- Aerobic ex (20 mins), strength (20 mins), resp exercises (10 mins)

- feasible, acceptable, enjoyable
- improved symptoms (dyspnoea, mental wellness)
- improved haemodynamics

Efficacy of a long-term pulmonary rehabilitation maintenance program for COPD patients in a real-life setting: a 5-year cohort study

[Léo Blervaque](#), [Christian Préfaut](#), [Hélène Forthin](#), [Francis Maffre](#), [Marion Bourrelier](#), [Nelly Héraud](#), [Matthias Catteau](#), [Pascal Pomiès](#), [Dany Jaffuel](#), [Nicolas Molinari](#), [Maurice Hayot](#) & [Fares Gouzi](#) ✉



5-year survival probability for the “PR + maintenance” and “PR only” groups. Curves: Kaplan–Meier analysis; gray line: “PR only” group; black line: “PR + maintenance” group. Table: Comparison of main clinical characteristics of the “PR + maintenance” and “PR only” groups

Percutaneous Coronary Angioplasty Compared With Exercise Training in Patients With Stable Coronary Artery Disease

A Randomized Trial

2004

Rainer Hambrecht, MD; Claudia Walther, MD; Sven Möbius-Winkler, MD; Stephan Gielen, MD;

- n =101 males
- Stable angina and one stenosed vessel
- 20 mins / day cycle erg @70% max HR during stress test
- + 1 x group session x 60 mins weekly

Exercise Group

- Increased exercise tolerance
- Increased VO2 max
- Increased survival

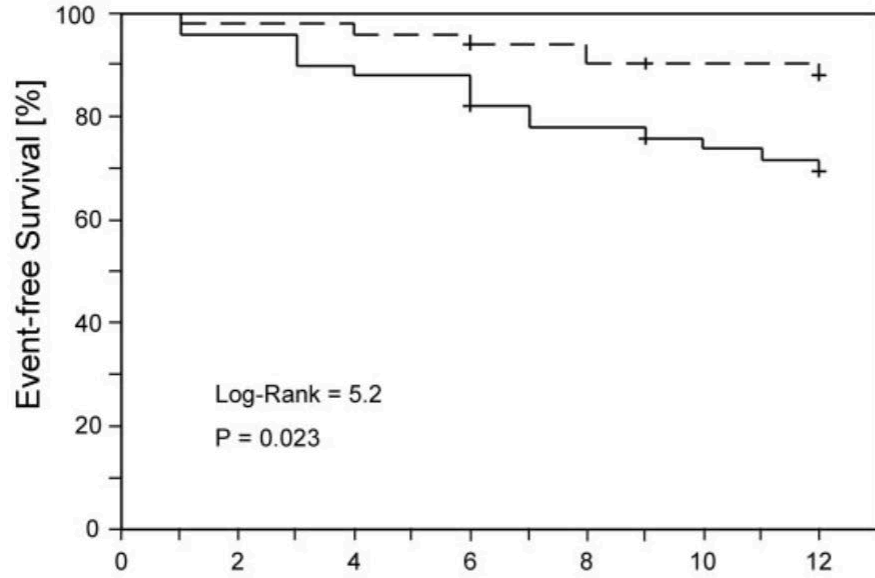


Figure 2. Event-free survival after 12 months was significantly superior in exercise training group versus PCI group ($P=0.023$ by log-rank test).

<i>Patients at Risk</i>							
	0	2	4	6	8	10	12
PTCA/Stent Group	50			41			35
Exercise Training Group	51			48			45

Follow up [Months]

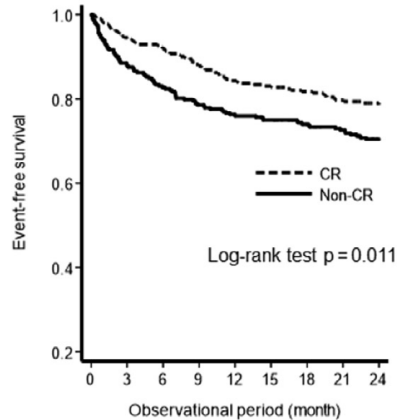
Prognostic Effects of Cardiac Rehabilitation in Patients With Heart Failure (from a Multicenter Prospective Cohort Study)

Takuji Adachi, PhD, PT^a, Naoki Iritani, MSc, PT^b, Kuniyasu Kamiya, PhD, PT^c,

2022

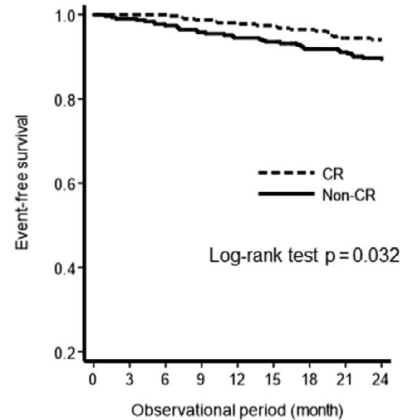
Heart Failure/CR in Patients with HF

A. Composite outcome



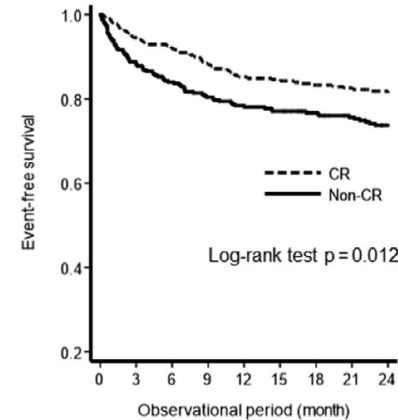
Number at risk		0	3	6	9	12	15	18	21	24
Non CR	313	259	238	215	182					
CR	313	288	264	248	217					

B. All-cause mortality



Number at risk		0	3	6	9	12	15	18	21	24
Non CR	313	302	292	268	234					
CR	313	313	307	294	261					

C. HF rehospitalization



Number at risk		0	3	6	9	12	15	18	21	24
Non CR	313	259	238	215	182					
CR	313	288	264	248	217					

- n = 626
- CR weekly (x2) x 6 mo vs control
- Acute HF or worsening CHF

Figure 2. Kaplan–Meier curves for the composite outcome, HF rehospitalization, and all-cause mortality according to cardiac rehabilitation.

Optimal Exercise Programs for Patients With Peripheral Artery Disease

A Scientific Statement From the American Heart Association

2019

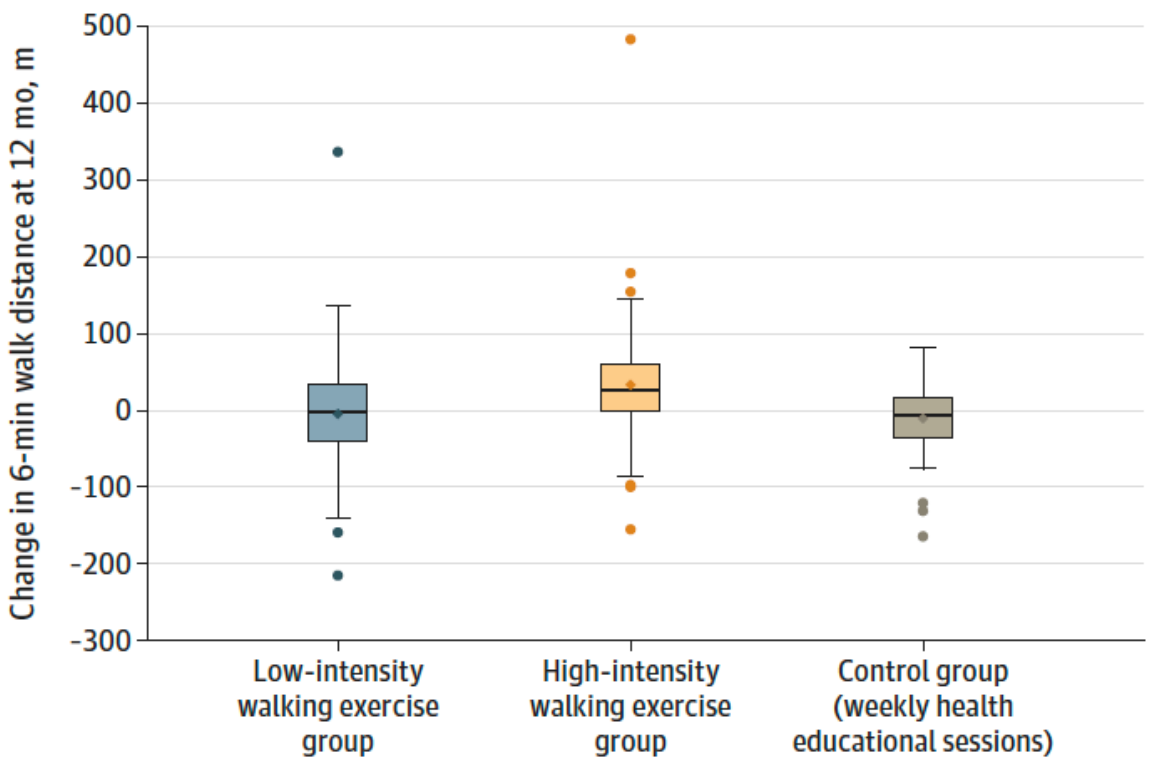
- a structured H-BEx intervention improves the 6-MWT distance more than it improves treadmill-based PWT/PWD
- a supervised treadmill exercise intervention improves treadmill walking more than it improves the 6-MWT.

Effect of Low-Intensity vs High-Intensity Home-Based Walking Exercise on Walk Distance in Patients With Peripheral Artery Disease

The LITE Randomized Clinical Trial 2021

Mary M. McDermott, MD; Bonnie Spring, PhD; Lu Tian, ScD; Diane Treat-Jacobson, PhD, RN; Luigi Ferrucci, MD, PhD; Donald Lloyd-Jones, MD;

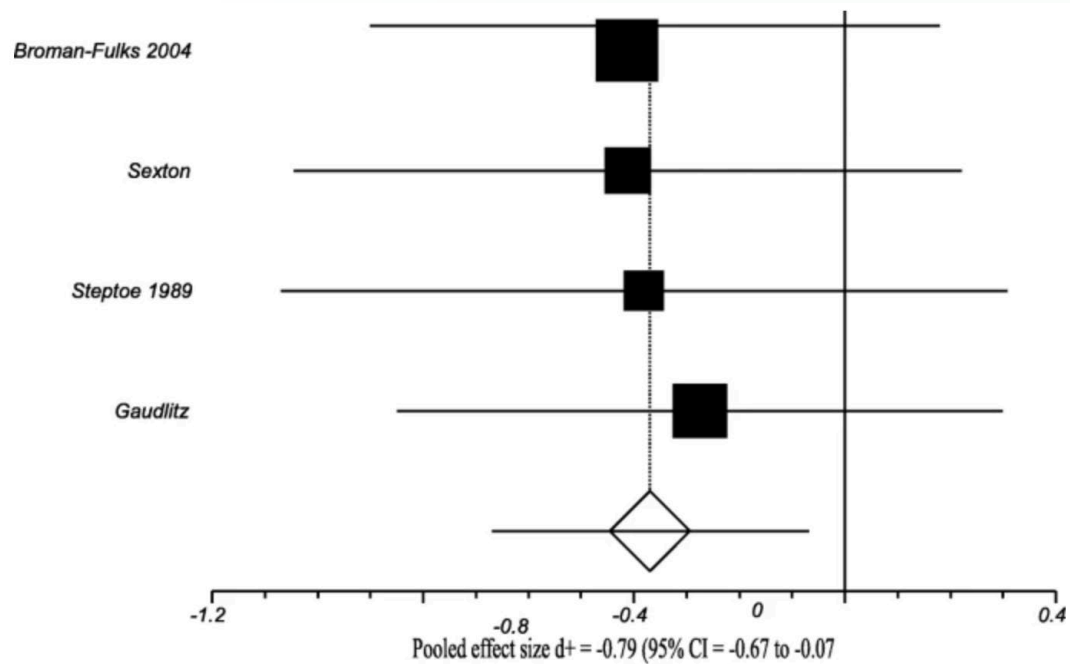
- n = 305
- unsupervised exercise (high intensity / low intensity) and control groups
- 5 x 50 min. walk sessions / week x 12 months
- high = with pain / low = without pain
- accelerometry +
- 82% completed 12 month assessment
- primary outcome = 6MWT



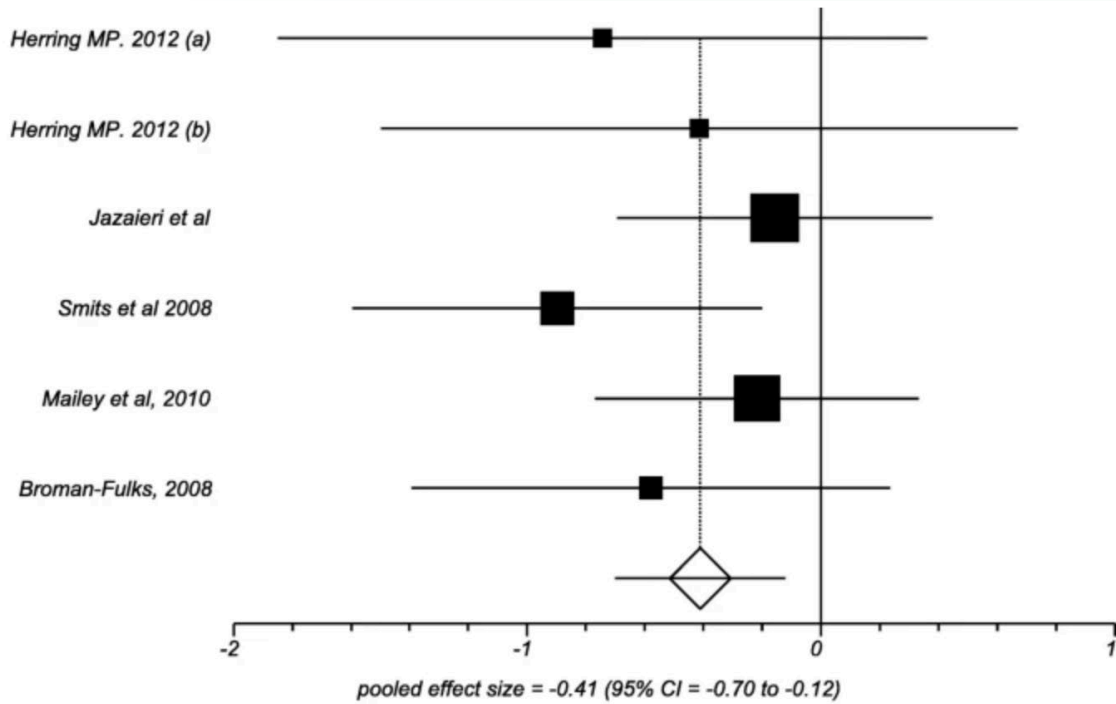
Research article | [Open Access](#) | [Published: 16 July 2018](#)

Exercise in the treatment of clinical anxiety in general practice – a systematic review and meta-analysis

[Elizabeth Aylett](#) , [Nicola Small](#) & [Peter Bower](#)



High (min 60% HR max or VO2 max) vs low intensity exercise for treating anxiety
Exercise programme duration min 2 weeks



Exercise vs waiting list controls in treating anxiety

Aerobic exercise in RA (Ye et al, 2022)

Meta-analysis of 13 RCTs

Outcomes:

- functional ability: Health Assessment Questionnaire-Disability index (HAQ-DI);
- disease activity: Disease Activity Score in 28 joints (DAS28);
- joint count, including
 - tender joint count (TJC)
 - swollen joint count(SJC)
 - Ritchie Articular Index (RAI),
- Inflammatory markers (CRP and ESR);
- pain (VAS or the Short Form McGill Pain Questionnaire)
- aerobic capacity VO2max
- Sit to Stand (STS) test.

Improvements in

- Aerobic capacity
- Functional ability
- Pain relief
- Strength (Sit to Stand)

6-week group exercise / education progr in FM

Loftus, N et al (2022)

- moderate, short-term (6 weeks) benefits in
 - physical fitness
 - key symptoms.
- benefits were
 - sustained at 6 months
 - small-to-moderate in scale and lower than the MCID.

Exercise Therapy for Fibromyalgia

Busch, J et al, 2011

- reduction of pain
- Reduction of fatigue
- reduction of depression
- improvement in global health
- improved physical function.

Non Specific Chronic Low Back Pain

- General ex prog (strength, flexibility, aerobic fitness) beneficial
- Not recommended in acute LBP, which gets better anyway in 4-6 weeks in most cases

Where does community-based clinical exercise fit ?

ICPOP

Integrated Care Programme for Older Persons

- Team of 12
- Mixed hospital and community
- Physio x 1
- Consultants and other specialties

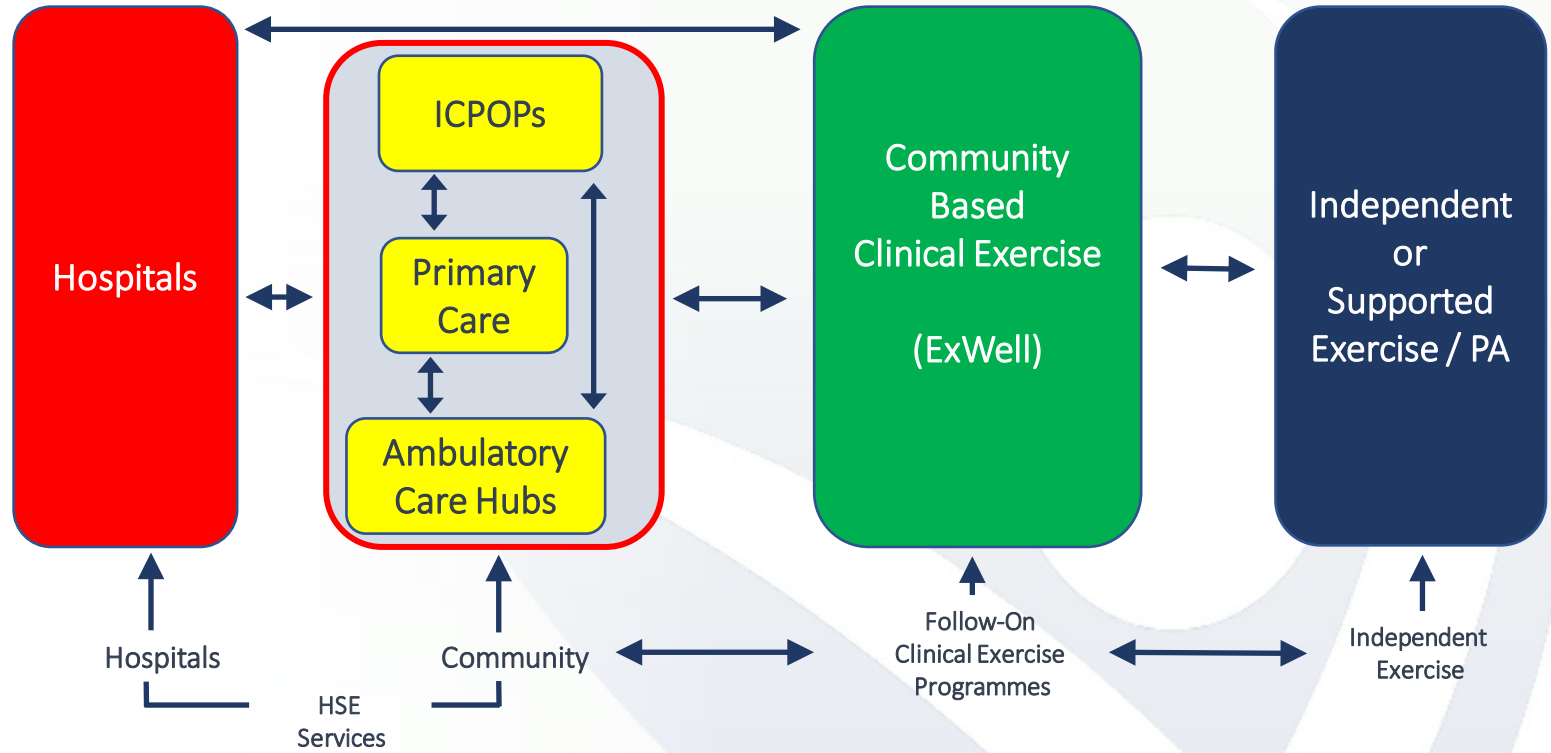
CDH

Chronic Disease Hub

- Team of 36
- Mixed hospital and community
- Larger rehab capacity

National Structure

- 1 ICPPOP and 1 CDH will co-locate
- Combined unit will serve population of 150,000
- = Community Health Networks x 3 @ 50,000 each
- 31 units total (1 unit = ICPPOP + CDH)
- 93 CHNs



ExWell Medical

- social enterprise
- 22 centres
- over 2000 weekly visits
- on-line offering
- medical oversight
- staff = 21
- Sports science / physio background
- 19 funded or subsidized projects
- HSE agreements growing



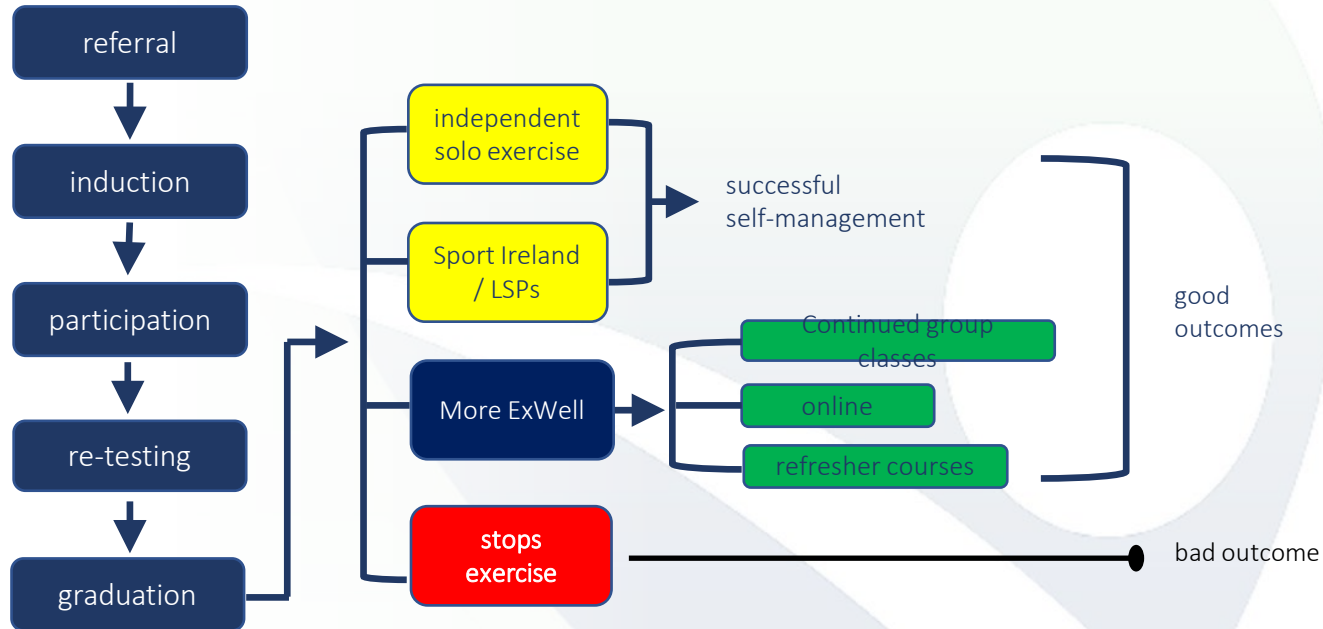
core pillars

- exercise
- social interaction
- impact measurement

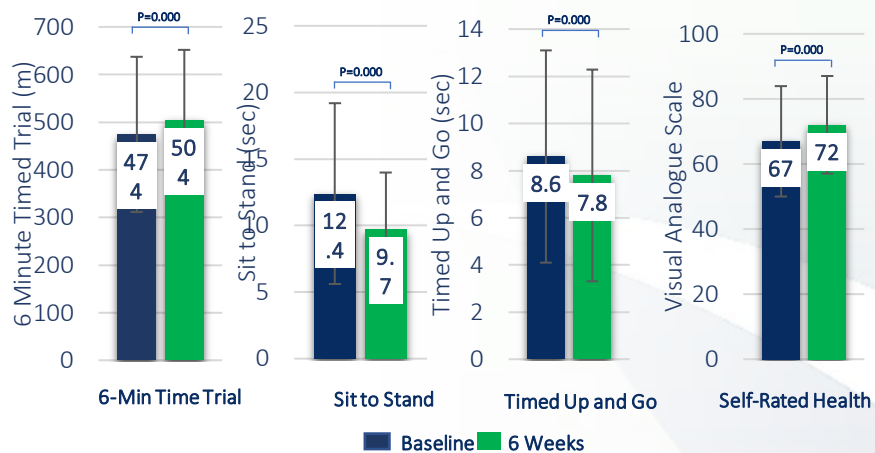
- adherence surveillance / monitoring
- research



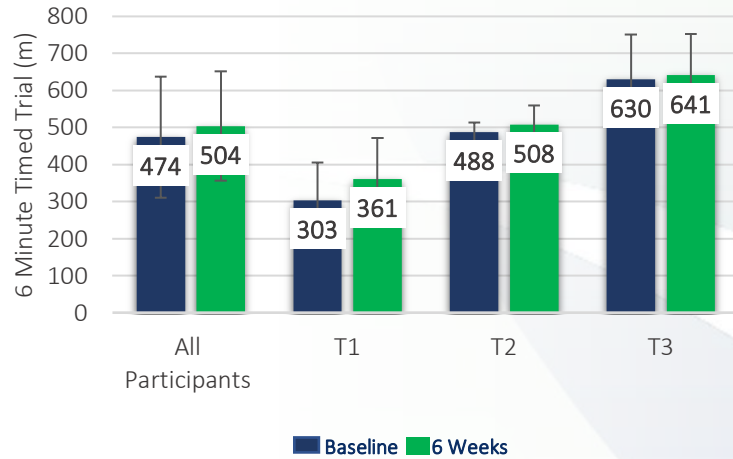
the pathway



impact



6 Minute Time Trial Data (Citywest)



Key impact messages

- All outcomes improve
- They improve quickly (6 weeks)
- The scale of change exceeds MCID for 6MTT and SS
- The greatest relative improvements occur in those who start off the weakest

Practical Challenges



- functional ability
- progression
- class format
- age
- disease specificity
- frailty
- communication difficulty
- workers
- pain
- Covid
- class format
- programme duration
- engagement / dropout
- delivery model

different functional abilities

- level options for aerobic exercises
- stations by ability
- include chair station
- classes by ability
- heavy / light weights



progression

- happens naturally
- education about what progression means
- criteria
 - tolerance of class with appropriate 'distress'
 - no adverse events
 - adequate time at one level
 - objective tests improving
 - willingness to move
 - tolerance of new level



age

- younger participants may panic
- address it at induction
- offer 'young' class
- young station
- individual attention



disease specific programmes

- ? not necessary
- exceptions
 - PAD
 - Cancer
- mixed classes
 - beneficial
 - inspiration from seeing others
 - facilitate scaling



frailty / high need

- individual assistance (relative or ExWell intern)
- careful progression, starting with strength only



communication difficulty

- deafness /cataracts / cognitive decline
- awareness
- staff training
 - stand in front
 - stand close
 - repeat introductions
 - don't rush
 - vigilance for poor understanding
 - avoid technical language
 - age-friendly brochures (font size etc.)

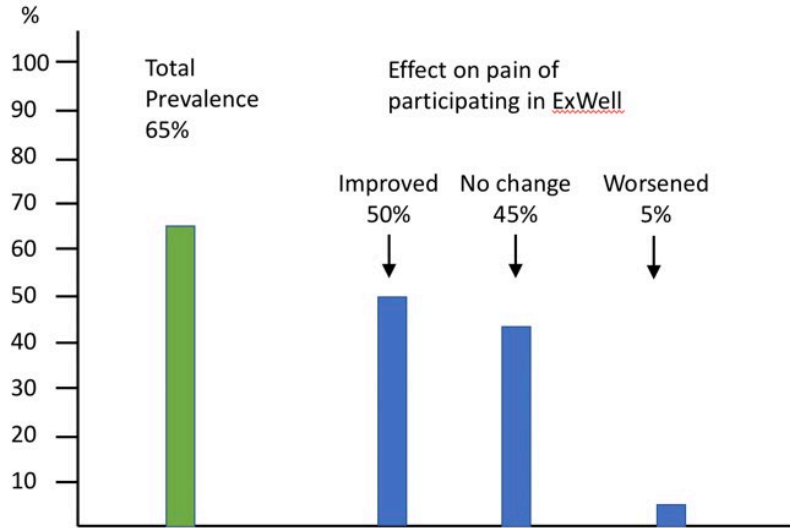


participants who are still working

- programmes work because of down time facility use
- evening access difficult
- solution may be early morning classes



Pain



Covid

- at any time , follow DoH guidelines
- keep the participants informed
- clinical exercise sessions are medical appointments
- pods / spacing / masks
- hygiene re equipment
- open the doors
- outdoor classes



class format

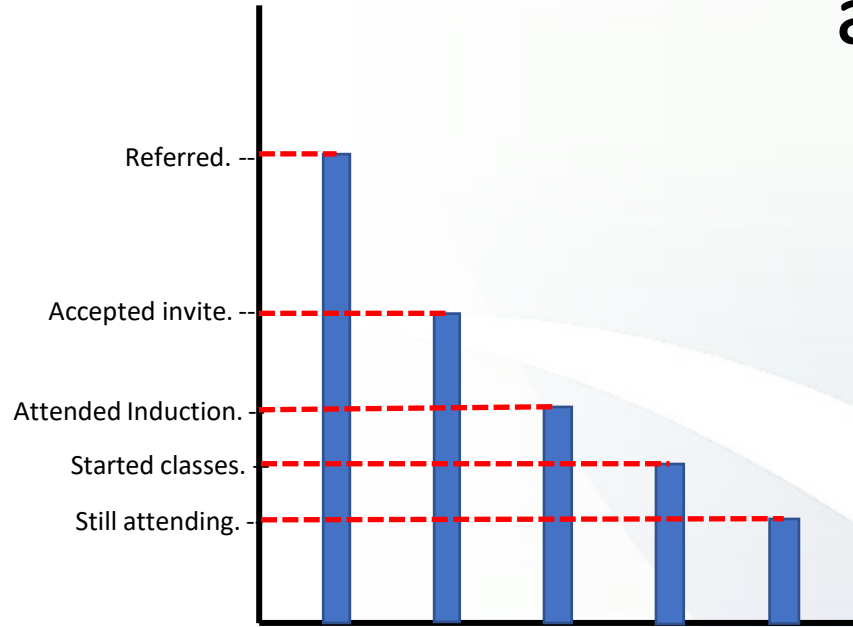
- all options work
 - stations
 - circuits
 - one large group
- some like variety, some want no change

offer the options

Programme Duration

- benefits occur quickly
- minimum 12 weeks preferred
- long-term maintenance preferred
- ? occasional 'refresher' courses
- ? transition to online
- aim to also increase non-class PA levels

engagement and adherence

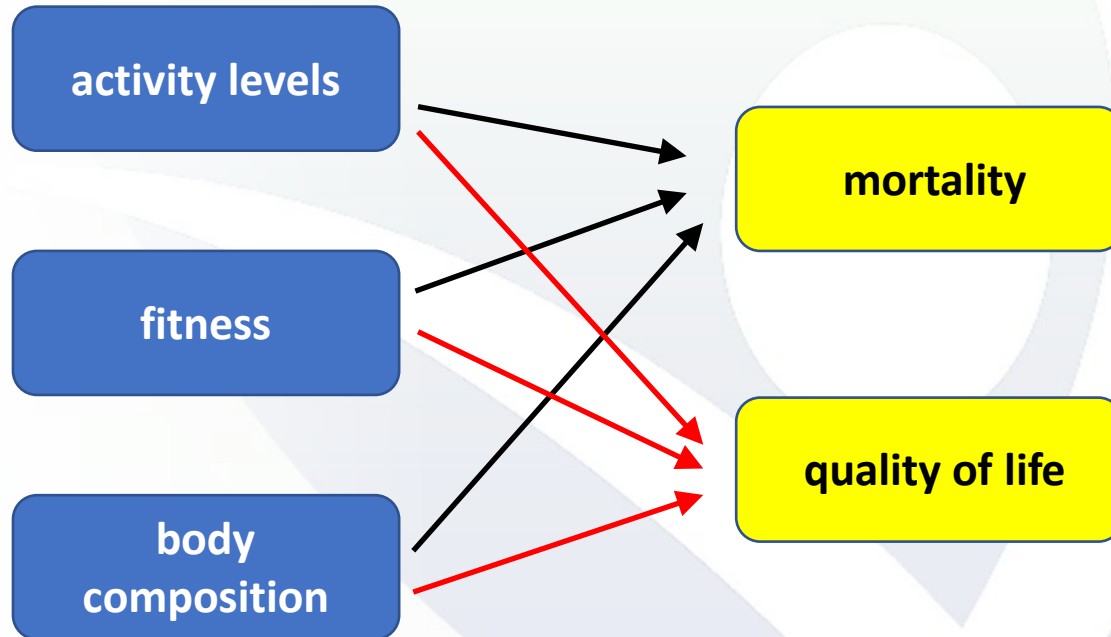


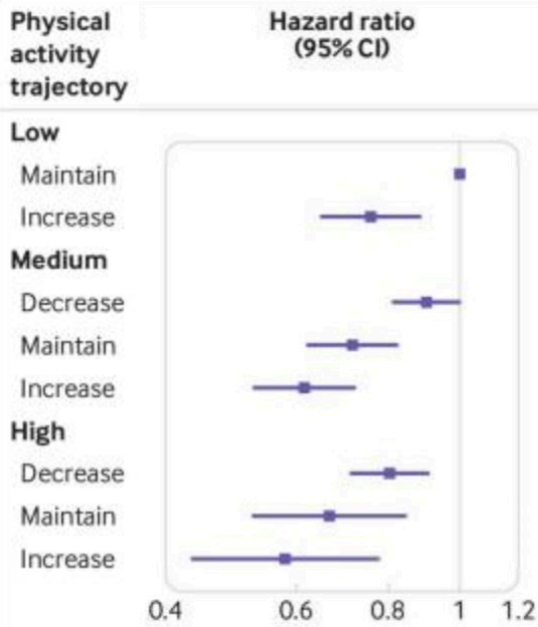


overview

exercise-related factors

outcomes





- Your current (today) level of physical activity level predicts your risk of mortality from
 - all causes
 - cardiovascular disease
 - Cancer

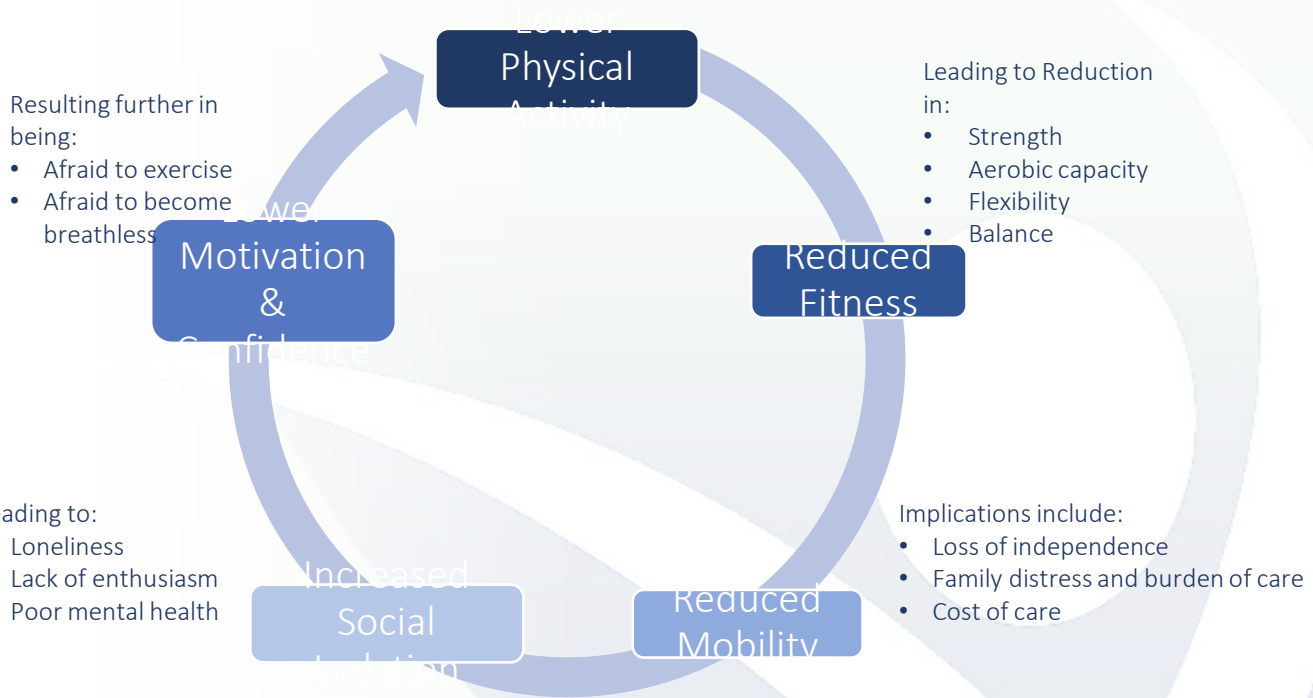
- Meeting and maintaining at least the minimum public health recommendations (150 minutes per week of moderate-intensity physical activity) would potentially prevent almost half of all the deaths associated with physical inactivity

- Middle aged and older adults, including those with cardiovascular disease and cancer, will live longer by becoming more physically active,
- This benefit happens regardless of
 - past activity levels
 - changes in established risk factors, including overall diet quality, bodyweight, blood pressure, triglycerides, and cholesterol

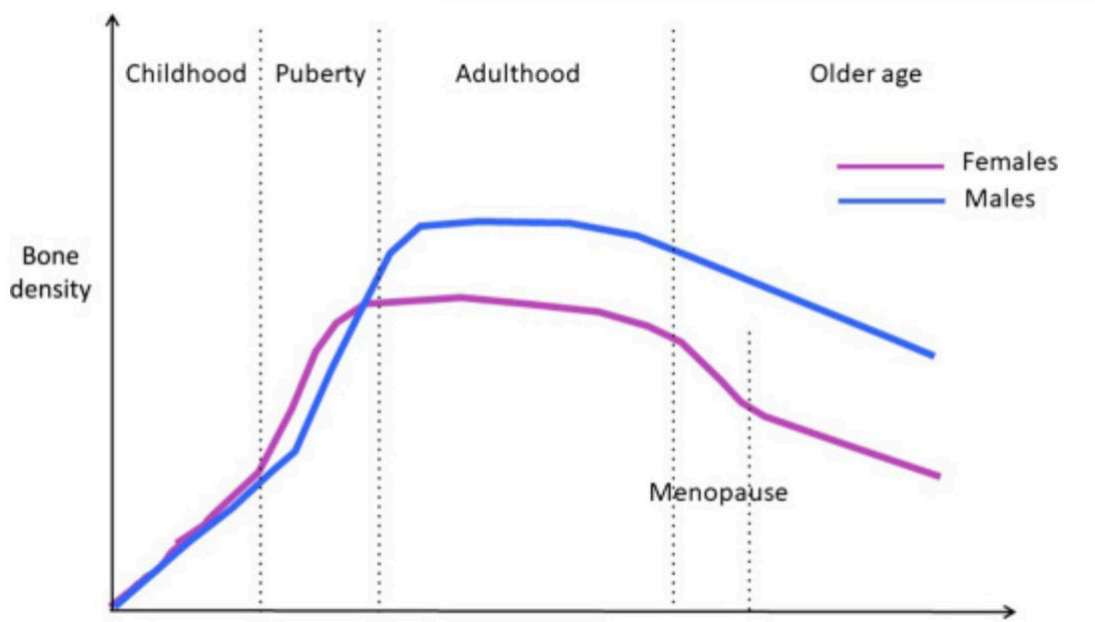
Public health strategies should shift the population towards

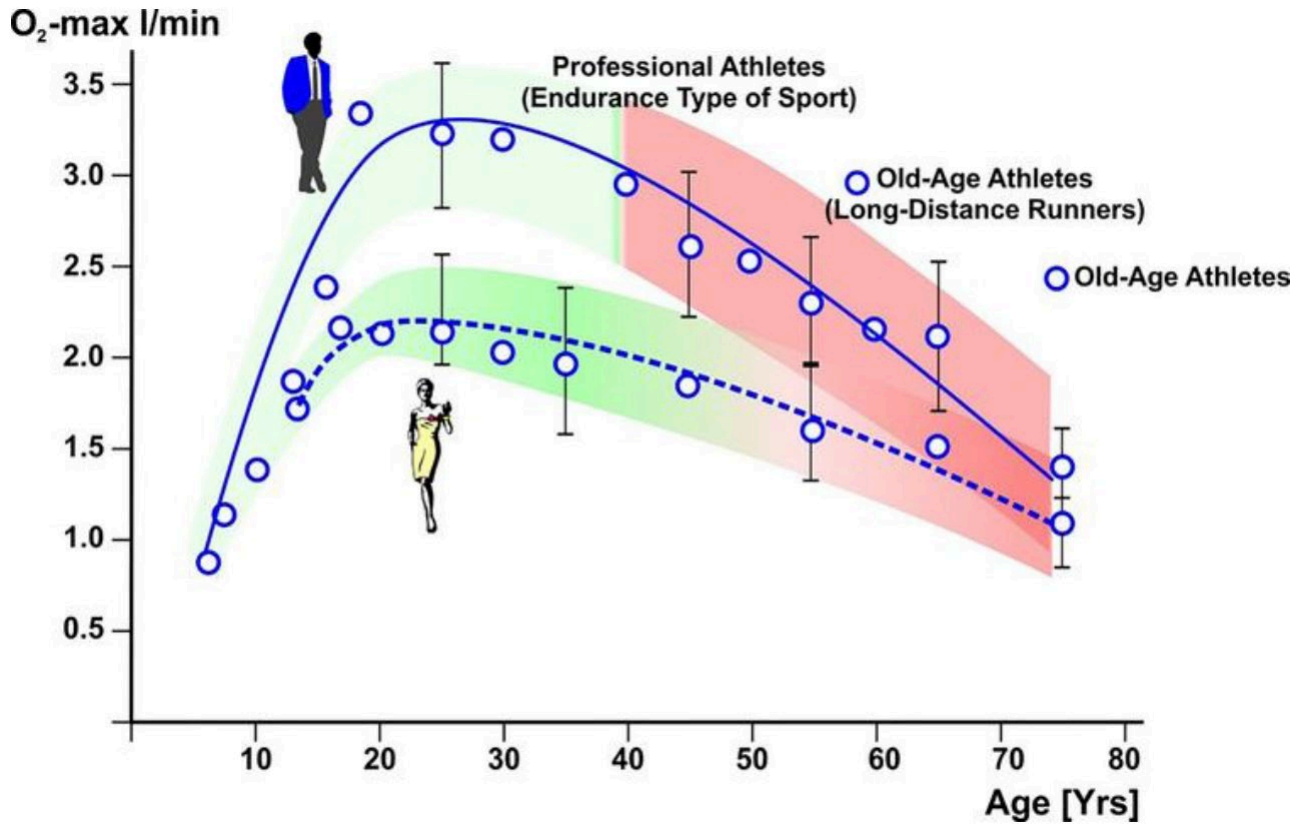
- meeting the minimum recommendations
- preventing declines in physical activity during middle and late life

- Physical activity trajectories and mortality: population based cohort study, 2019, Mok. A et.al

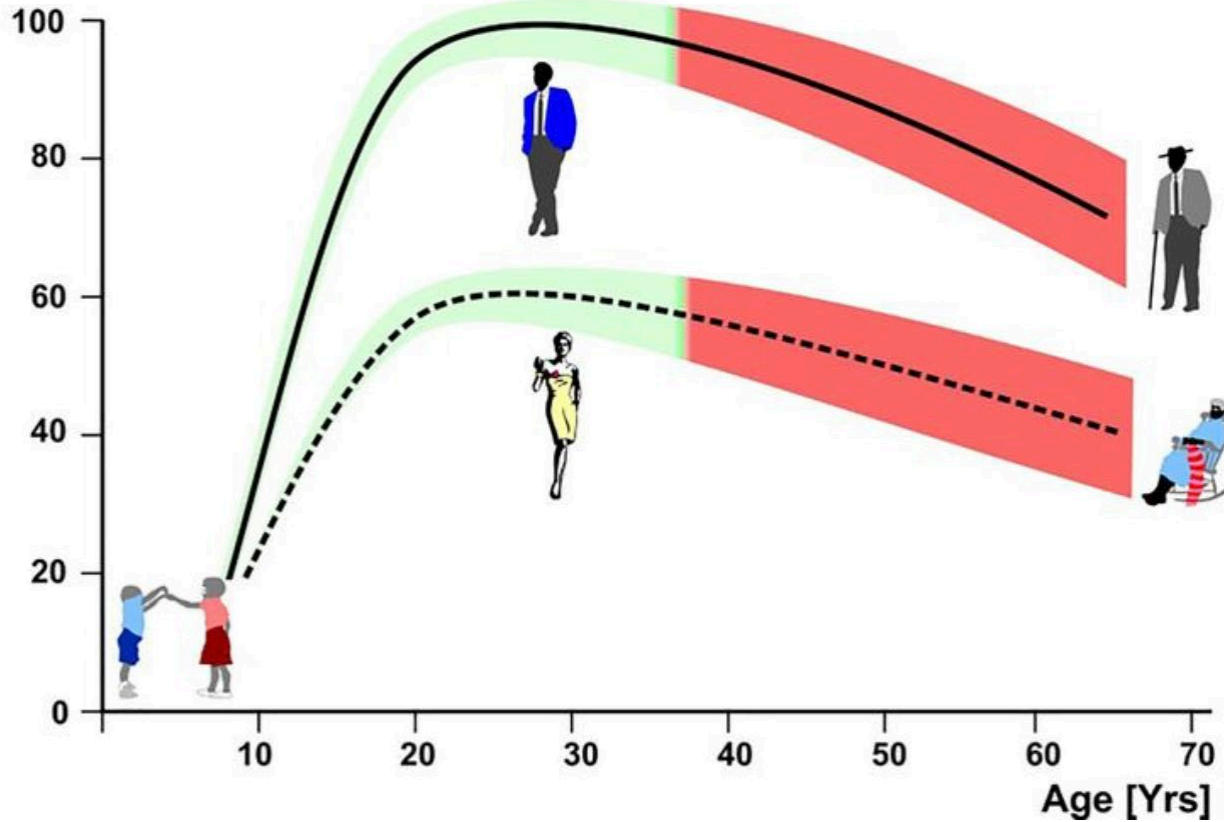


The Downward Spiral

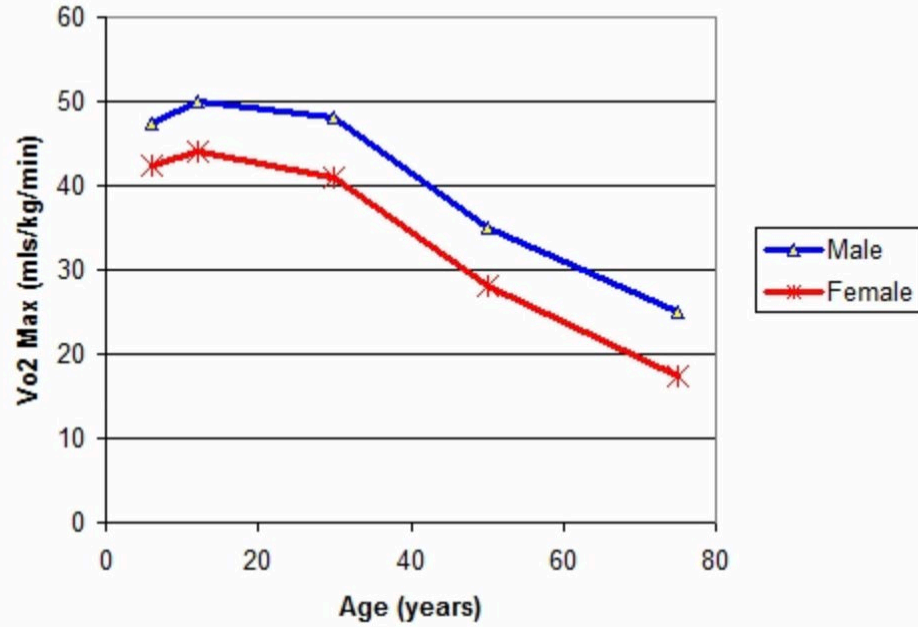




Muscle Strength [%]



Vo2 Max Norms for Men and Women



- What is the issue ?
- What is the challenge in dealing with the issue ?
- What is our solution ?

The Issue

CI affects 84% people over 65. Many have multiple CIs. CI management consumes 75% of the entire health budget of €20 billion. Huge impact on patients, families and society. Knock-on loneliness . Worsening with aging population. Not tenable long-term

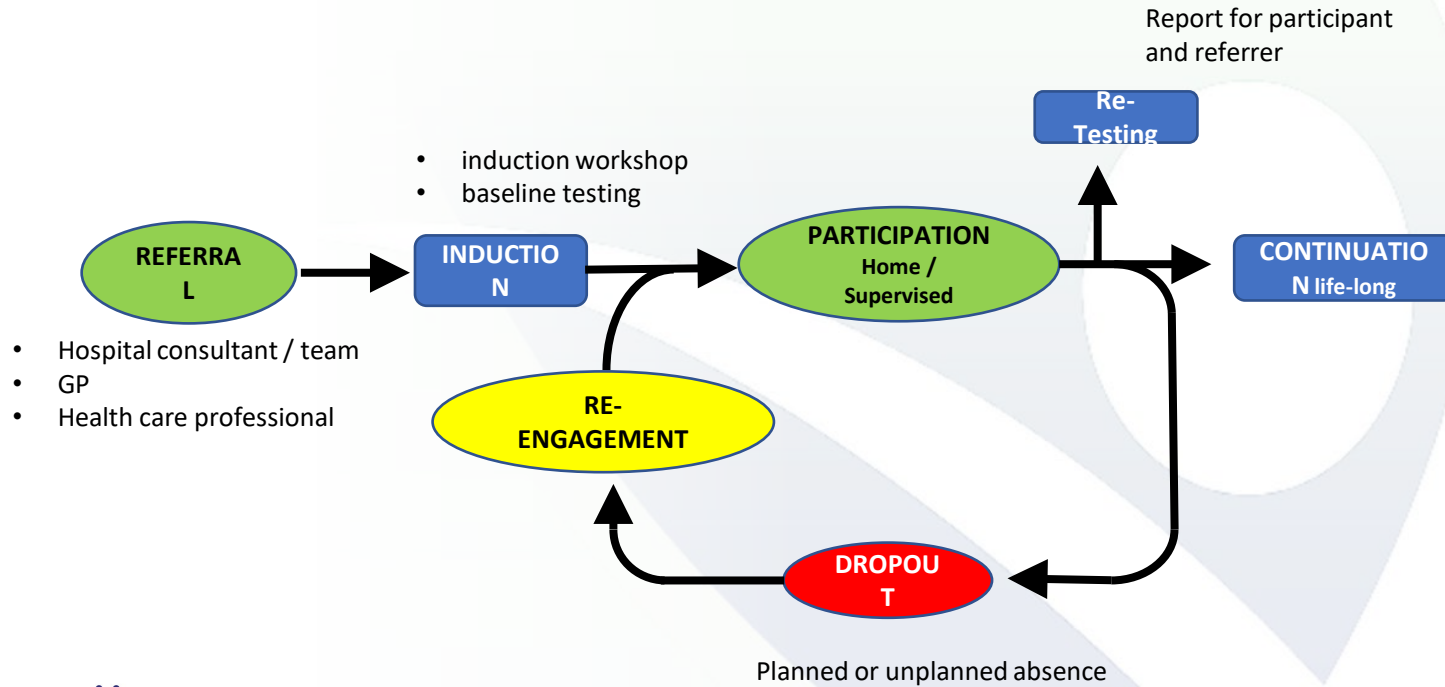
The Challenge

Impossible to deliver CI management (at the scale required) in hospitals. Emerging Community structures have 2 main challenges : 1. capacity 2. exit pathway

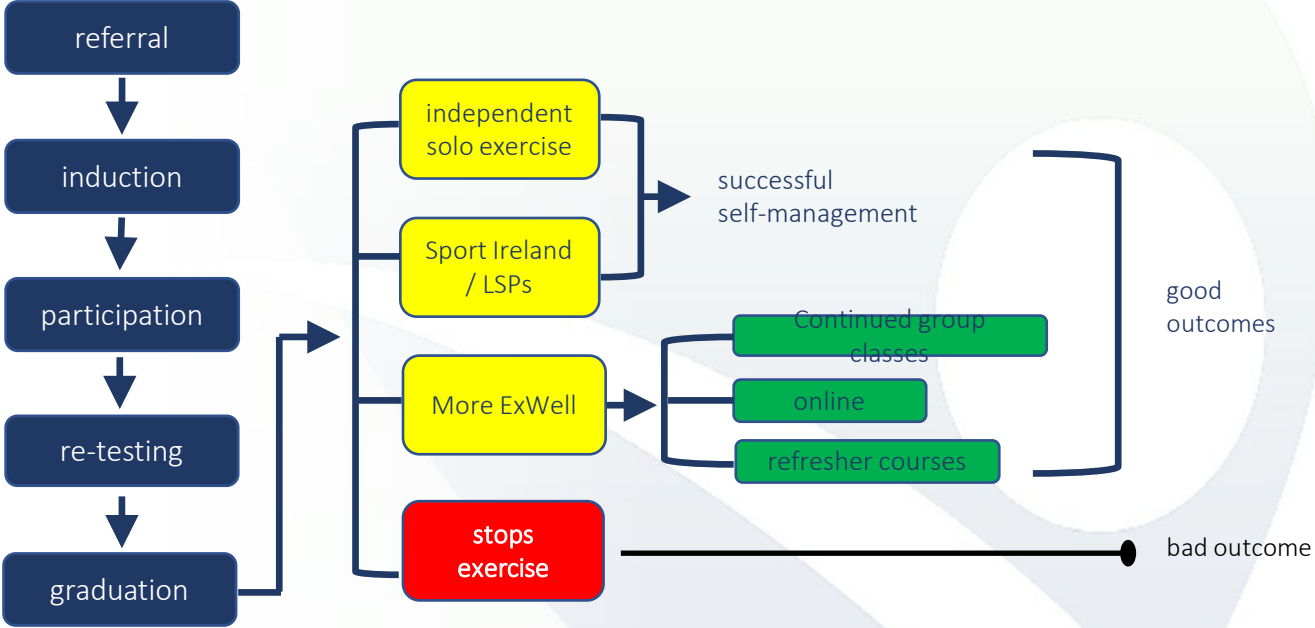
The Solution

ExWell offers a follow on resource to both hospital and HSE community services which solves both the capacity and the graduation challenges

The ExWell Pathway



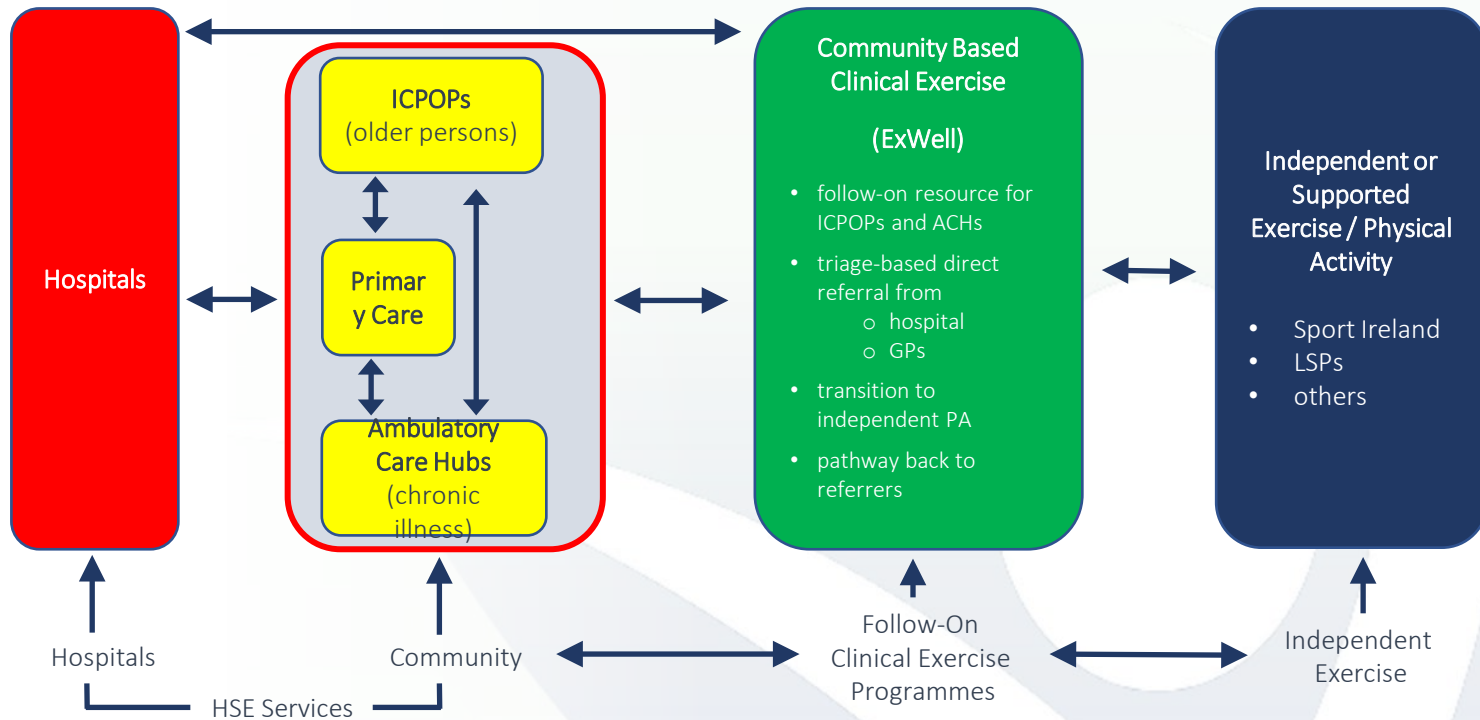
The Participant Pathway



Core Principles

- Exercise
- Social interaction
- Impact measurement

- Adherence surveillance / monitoring
- Research



The ExWell Healthcare Model

ExWell Engagement Strategy

- HSE
- Health Insurers
- Sport Ireland
- Pharma
- Local Authorities
- Advocacy Groups
 - ICS
 - IHF
 - CanTeen
- Home Care

**Funders,
Policymakers,
Supporters**

ExWell

Referrers

- GPs
- Hospital Teams
- ICPOPs
- CDHs
- Social Prescribers
- AHPs
- Pharmacists
- Advocacy Groups

Delivery Partners

- GAA
- Comm Centres
- Sports Centres
- 3rd Level Institutions
- Advocacy Groups
- Local Authorities
- Private Gyms

engagement framework

- HSE
- Health Insurers
- Sport Ireland
- Pharma
- Local Authorities
- Advocacy Groups
 - ICS
 - IHF
 - CanTeen
- Home Care

**Funders,
Policymakers,
Supporters**

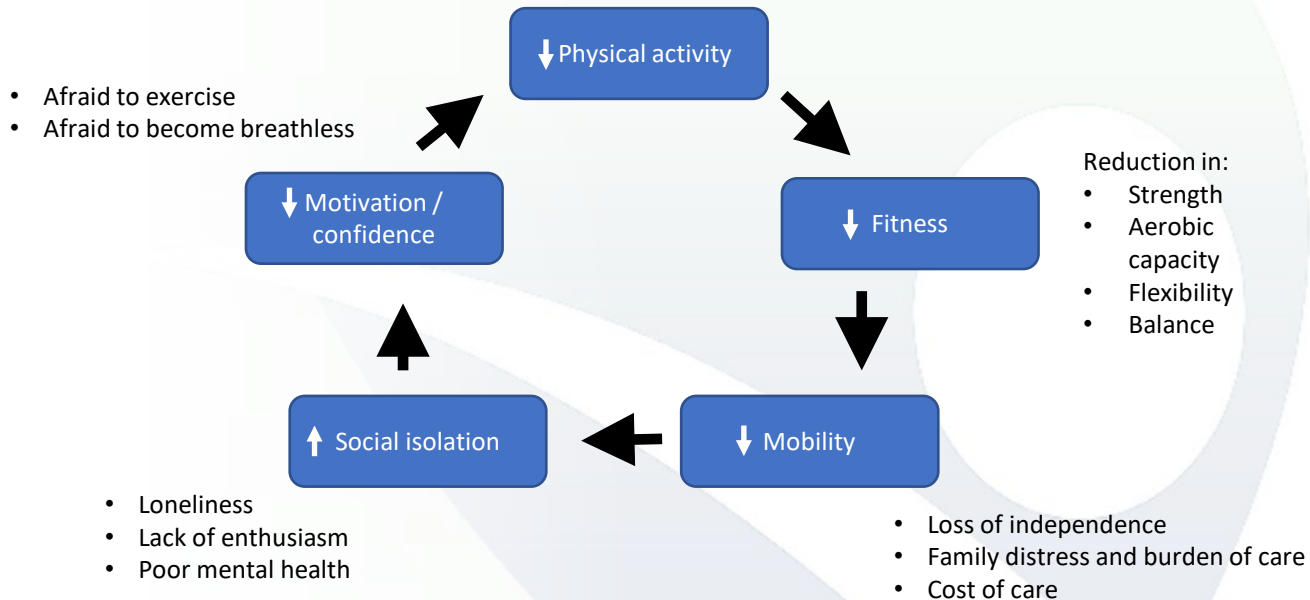
ExWell

Referrers

- GPs
- Hospital Teams
- ICPOPs
- CDHs
- Social Prescribers
- AHPs
- Pharmacists
- Advocacy Groups

Delivery Partners

- GAA
- Community Centres
- Sport Centres
- 3rd Level Institutions
- Advocacy Groups
- Local Authorities
- Private Gyms



The Downward Spiral

ExWell Medical CLG

Advisory Group / Board

Board

- Lar Bradshaw (Chair) (N, Rm)
- Dr Noel McCaffrey (F, N, Rs)
- Prof Sean Kennelly (Rs)
- Prof Susan Smith (Rs)
- Chris Kelly (F, N)
- Anne Dermody
- Clive Kilmurray (F, Rm)
- Grainne McMorrow

Advisory Group

- David Beirne (F)
- Diarmuid McNamee (F, N)
- Dr Emmett Byrne (Rs)
- Danny Fagan (F)

Committees

- F - Finance
- N - Nominations
- Rs - Research
- Rm - Remuneration

Senior Management

CEO

Dr. Noel McCaffrey

Head of Operations

Danny Fagan

Medical Director

Prof. Sean Kennelly

Chief Financial Officer

Brendan Gillen

Medical Officer

Dr. Emmett Byrne

Delivery Leads

Fiona Skelly PhD

Conor Ryan BSc

Cein McMonagle
MSc

Aodhaghan
Ó'Deasmhúnaigh MISC

Colm O'Meara MSc

Communications

Conor Ryan

Danny Fagan

Admin Support

Lorraine Corcoran

Cathy Dowdall

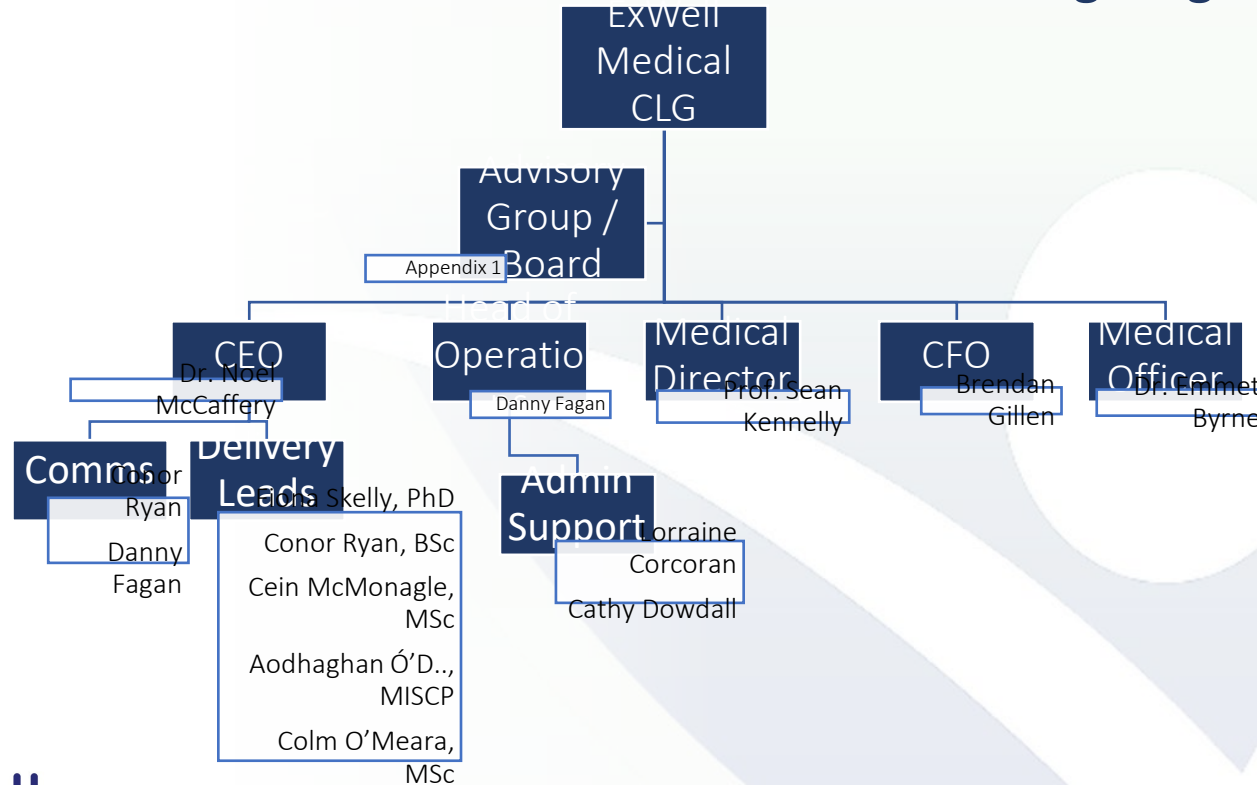
Research

Dr. Fiona Skelly

Dr. Lisa Kelly

Organisational Chart

Organogram



funded projects

- HSE**
- CHO 7 (4)
 - Midlands (DMHG) (3)
 - CHO 9 (2)

- Active Cities**
- Ballymun
 - Swords
 - Sandyford

- Local Support**
- Balbriggan
 - Mulhuddart
 - Ballybough (NEIC)

- Nursing Home**
- Orpea
- Sport Ireland PACC**
- SETU (Carlow)

CanTeen

TCC

non-funded projects

- IWA
- Kilkenny
- Waterford
- Sligo
- DLR

new proposals

- Mullingar CHO 8
- Sligo CHO 1
- Cork CHO 4
- S-East CHO 5
- VHI
- Centric
- TCC F-Up
- VHI

cancer

- Service**
- ICS
 - Mater
 - SVUH
 - SJH

- Research**
- PANO

research

- Current projects
- Research committee

Staff: 21 total / 16.5 WTE
Visits: 1600 / week

other activity

- Sponsorship
- Novartis
- Levels
- Festival
- Staff Retention
- Awareness
 - Annual Report
 - Ten Stories
 - Newsletter
 - Website
- Volunteerism
- Choir
- TUD partnership
- Weekly Zoom
- Recruitment
- Nutrition

ExWell Core Values

Lar Bradshaw

Board Chair, ExWell Medical

1. Patient Centred

- Transforming the lives of the chronically ill.
- Holistic approach
- Inclusive and welcoming
- Respect for participants

2. Can Do Attitude

- We will always find a way..
- Resilience
- Creativity / innovation

3. Passion and Commitment

- The passion that comes from our noble purpose..
- Commitment to excellence and the desire to serve.
- Pride
- Life is too short. Our passion comes with a sense of energy and enjoyment / fun

4. Collaboration Based on Trust, Integrity

- Our instinct is to trust
- The only way to deliver our mission is through collaboration
- Building trust:
 - integrity (we tell the truth)
 - reliability (we do what we say we will do)
 - win / win approach (we strive for mutual benefit)
 - do what is right (we behave ethically at all times).
- We will seek out those who share those characteristics

5. Pursuit Of Truth, Not Ego

- ExWell has a big heart, and a big head.
- We have no place for “politics”, we have no room for pursuit of ego.
- We believe in the hierarchy of ideas and the obligation to dissent and to be dissented against, because out of disagreement comes insight.

6. We Are A Team

We are a team. This means we commit to the following:

- Honesty of effort
- Be the best we can be
- Courage
- Look after each other

Changes in Key Outcomes after 6 Weeks in Citywest

