Tackling OA and Chronic Disease Management

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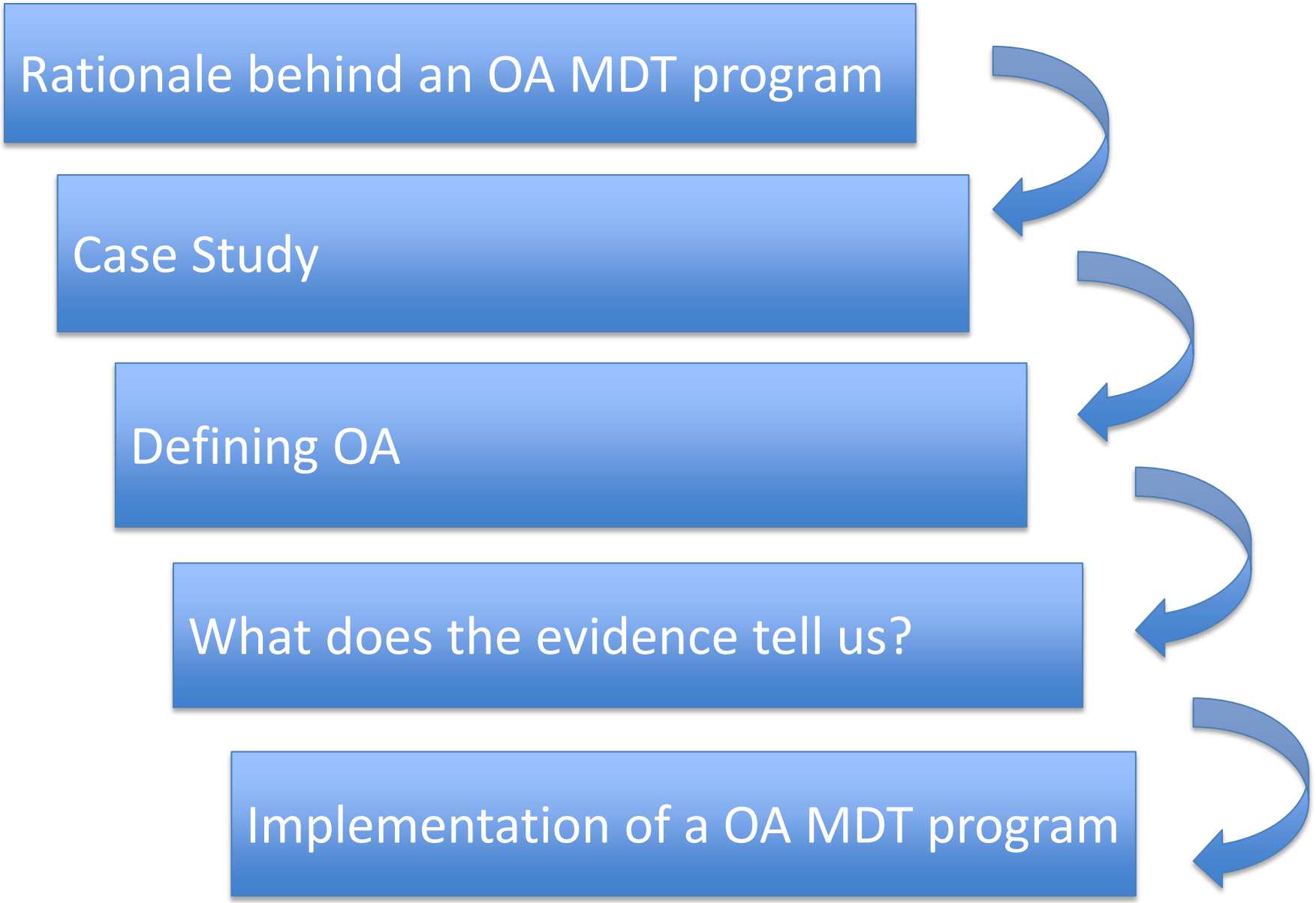
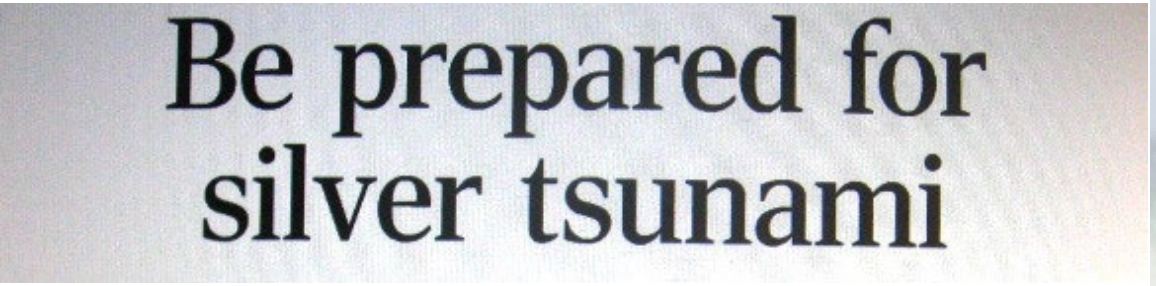
Outline

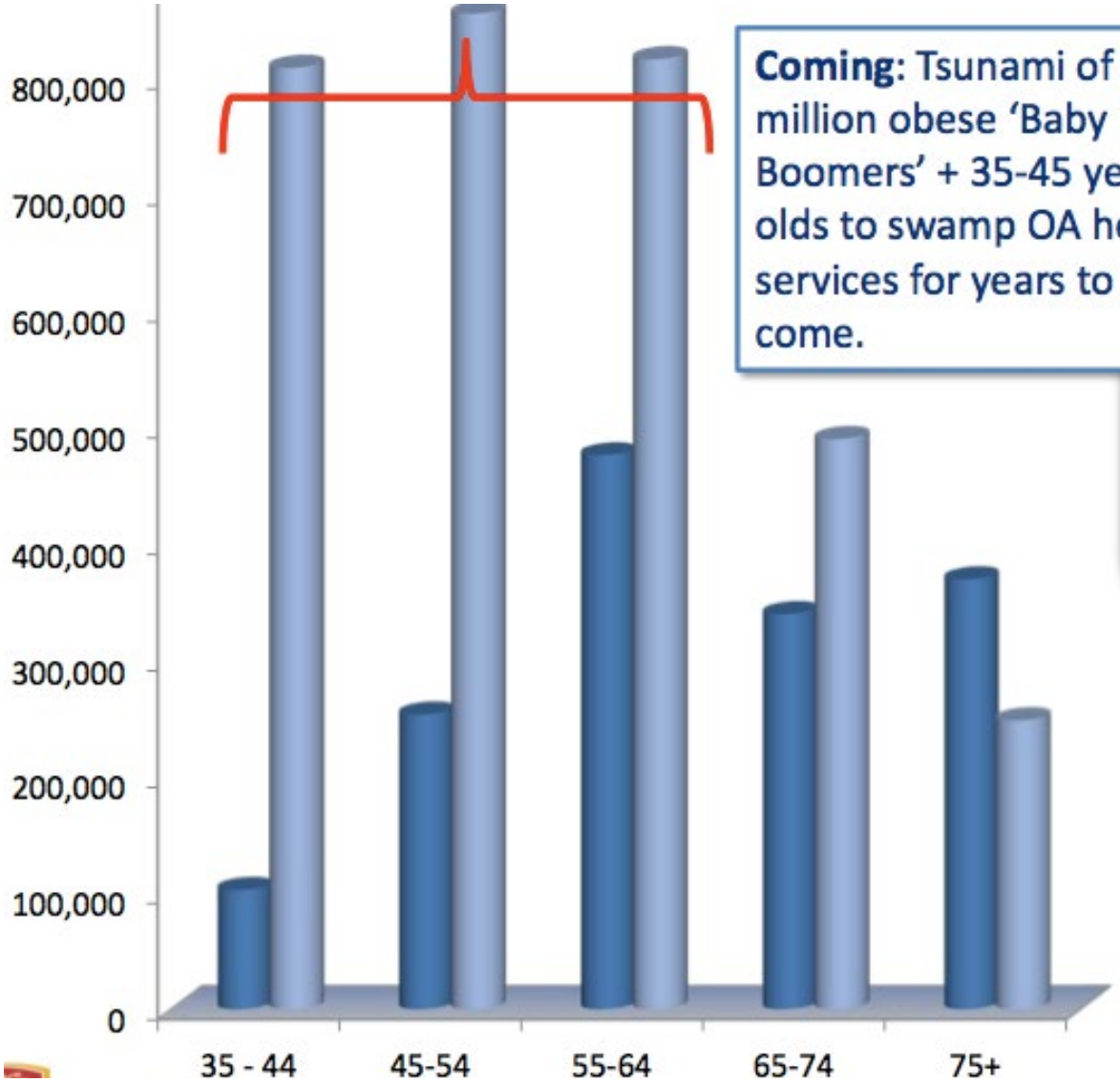

Rationale behind an OA MDT program
Case Study
Defining OA
What does the evidence tell us?
Implementation of a OA MDT program

OA – At a glance

- 1 in 5 people currently suffer from OA, this will increase to 1 in 4 by the year 2050.
- The risk of disability due to knee OA alone is greater than that due to any other medical condition over the age of 65.
- The incoming “silver tsunami” see’s an aging population with unprecedented obesity and sedentary characteristics.



OA and Obesity (number) by Age



Coming: Tsunami of 2.5 million obese 'Baby Boomers' + 35-45 year olds to swamp OA health services for years to come.

Number reporting Osteoarthritis

Number measured to be obese

Ref: National Health Survey 2007-8

Health Care Costs Related to OA

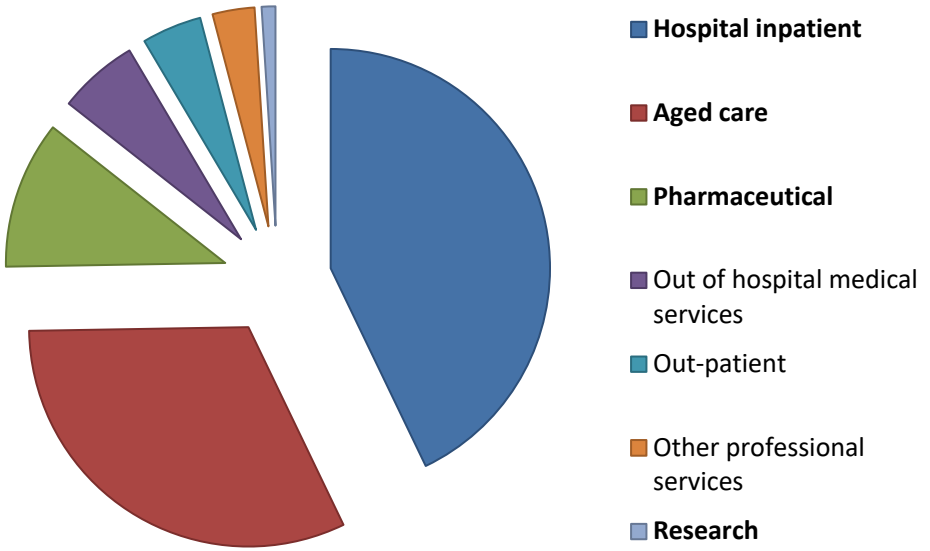
- $ 2.1 billion in 2015
- **4X increase since 2000**
- Most expensive type of arthritis in terms of direct costs
- $970 per patient per year (2015 data)

Source: Arthritis Australia 2016,
Arthritis and Osteoporosis Victoria, 2013

- OA represents 38% of the total health cost of musculoskeletal conditions

Source: Arthritis Australia 2016

Distribution of OA health care costs



Source: Arthritis and Osteoporosis Victoria, 2013

Indirect Costs Represent an Even Larger Amount with a Total of $4.2 Billion

	2015 Indirect Cost*
Productivity costs	
Lost income	$1753 million
Lost superannuation	$223 million
Presenteeism	$162 million
Absenteeism	$123 million
Premature death	$41 million
sub-total	$2.3 billion
Other indirect costs	
Deadweight loss	$1093 million
Carers	$496 million
Aids and home modifications	$226 million
Program	$82 million
Travel	$32 million
Funeral	$2 million
TOTAL indirect cost	**$4.2billion**

Total economic cost = Health cost + Indirect cost
= Health cost + (Productivity + Other Indirect Cost)

In 2015, there was a loss of $7.2 billion in GDP due to arthritis. There were $5.6 billion in costs to the health and welfare system.

	Cost per patient in 2012
Health Cost	$ 1,684
Indirect Cost	$ 2,461
Total Economic Cost	**$ 4,385**

** Estimate based on 40.9% of all musculoskeletal indirect costs (Source: Arthritis and Osteoporosis Victoria, 2013, Arthritis Australia 2016, Treasury.gov.au [cited 9 May 2017])*

Reducing Obesity by 50% by 2050 Would Translate Into 212,500 Less Australians with OA, Possible Savings of $3.6 Billion Annually

Context

- Obesity is the most important modifiable factor for OA
- 24.5% of OA is caused by obesity

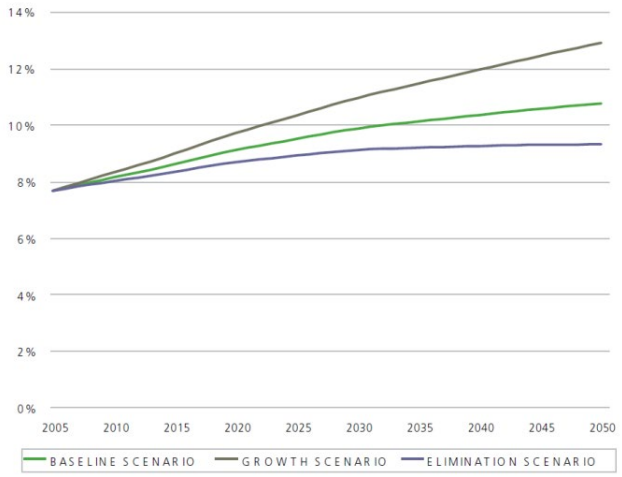
Source: Access Economics, 2008

Scenario 2

• Based on Access Economics (2007) data
• **Baseline scenario**: obesity prevalence is steady. The projected prevalence of OA under the base case is 10.7% of the population in 2050
• **Elimination scenario**: if all obesity were eliminated by 2050, there would be over 1 million fewer Australians with OA (relative to the growth scenario) and $7.4 billion per year could be saved.

* Based on an estimated total economic cost per OA patient in 2050 of $16,740 per year
** Costs of the obesity reduction program were not taken into account in these estimations

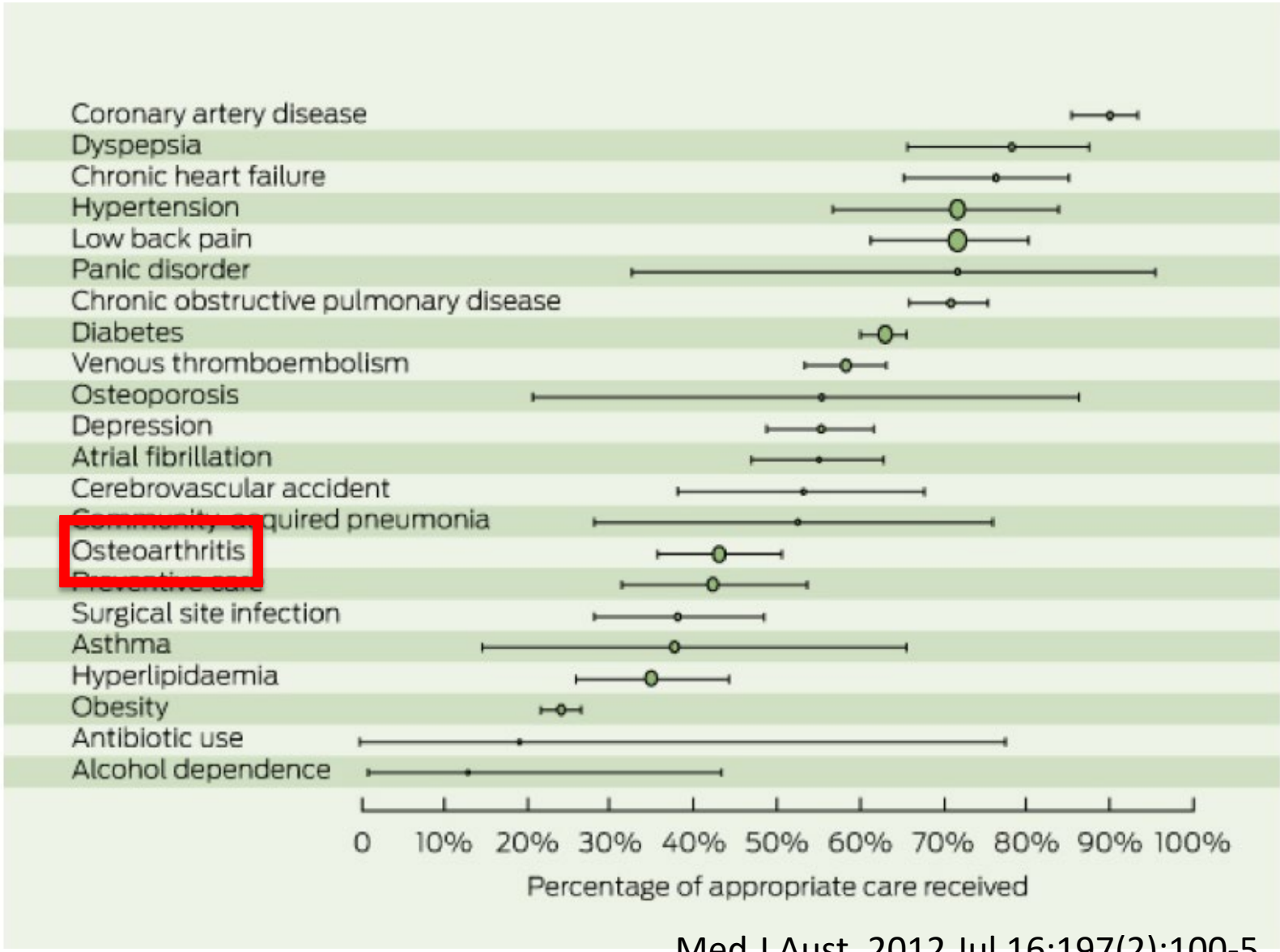
OA prevalence under different obesity scenarios 2005-2050



Source: Access Economics, 2007

For 2050	Prevalence of OA	Number of patients	Total economic cost (in billion)	Net savings compared to the base case (in billion)**
Base case	10.7%	3,142,000	$ 52,6	
Reducing obesity by 50%	10%	2,929,500	$ 49,0	**$ 3,6**
Eliminating obesity	9.3%	2,717,000	$ 45,5	**$ 7,4**

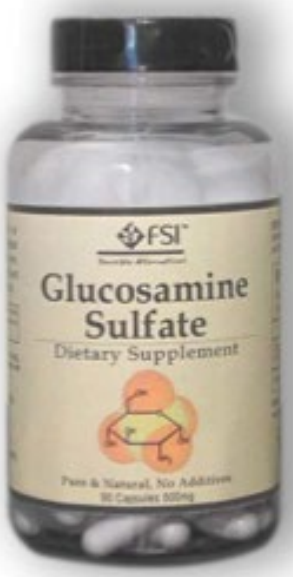
Appropriate Care



Med J Aust. 2012 Jul 16;197(2):100-5

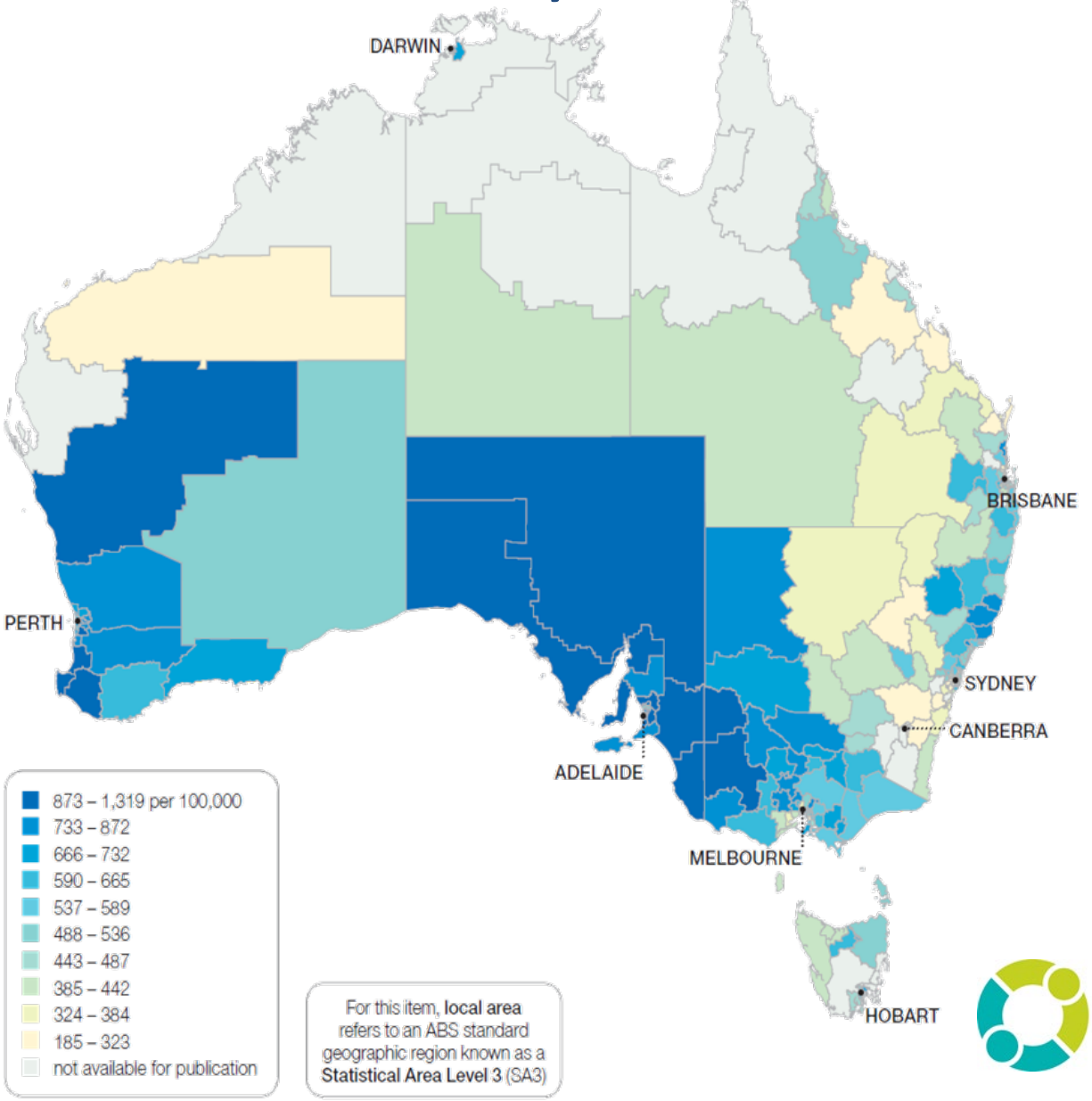
- Drug-free OA knee pain relief that can last for months
- Improvement in mobility nearly twice that of diclofenac[1]
- Just 3 injections

SYNVISC®
HYLAN G-F 20
MOVE CLOSER TO HEALTHY SYNOVIAL FLUID



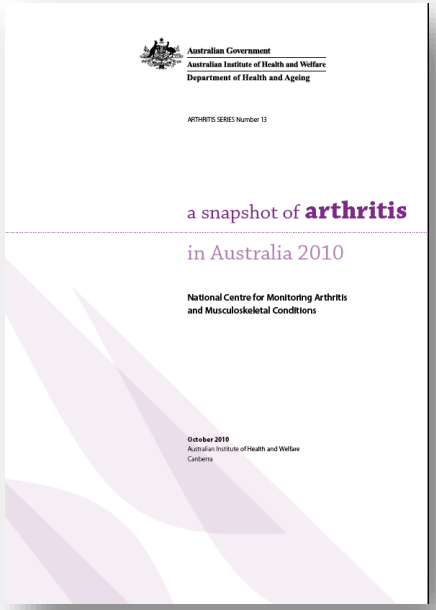
Osteoarthritis Cartilage. 2009 Oct;17(10):1255-62

Atlas data 2017: Knee arthroscopy admissions 55 years and over

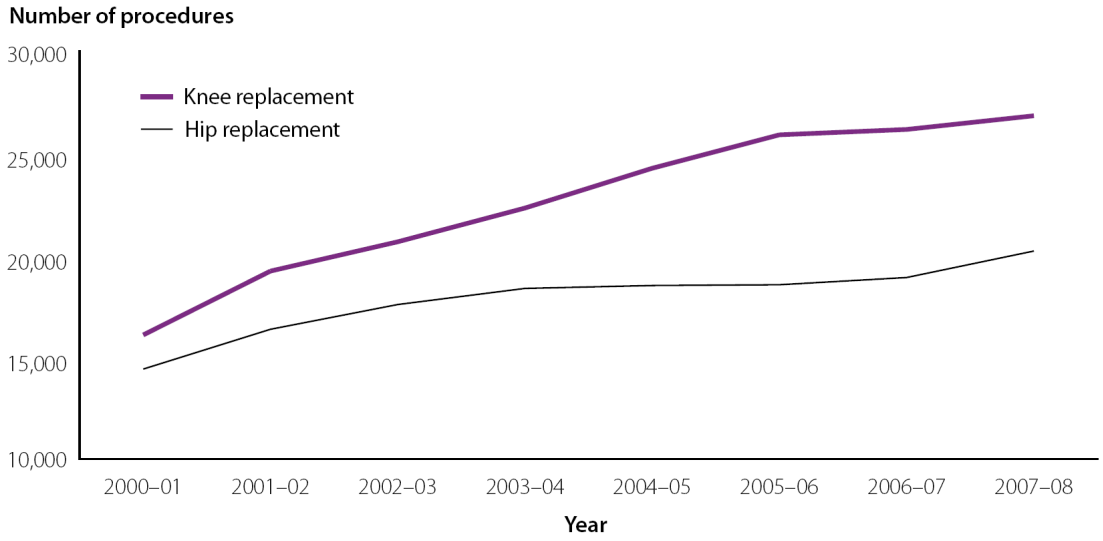


Clinical Care Standards

Increasing elective replacement



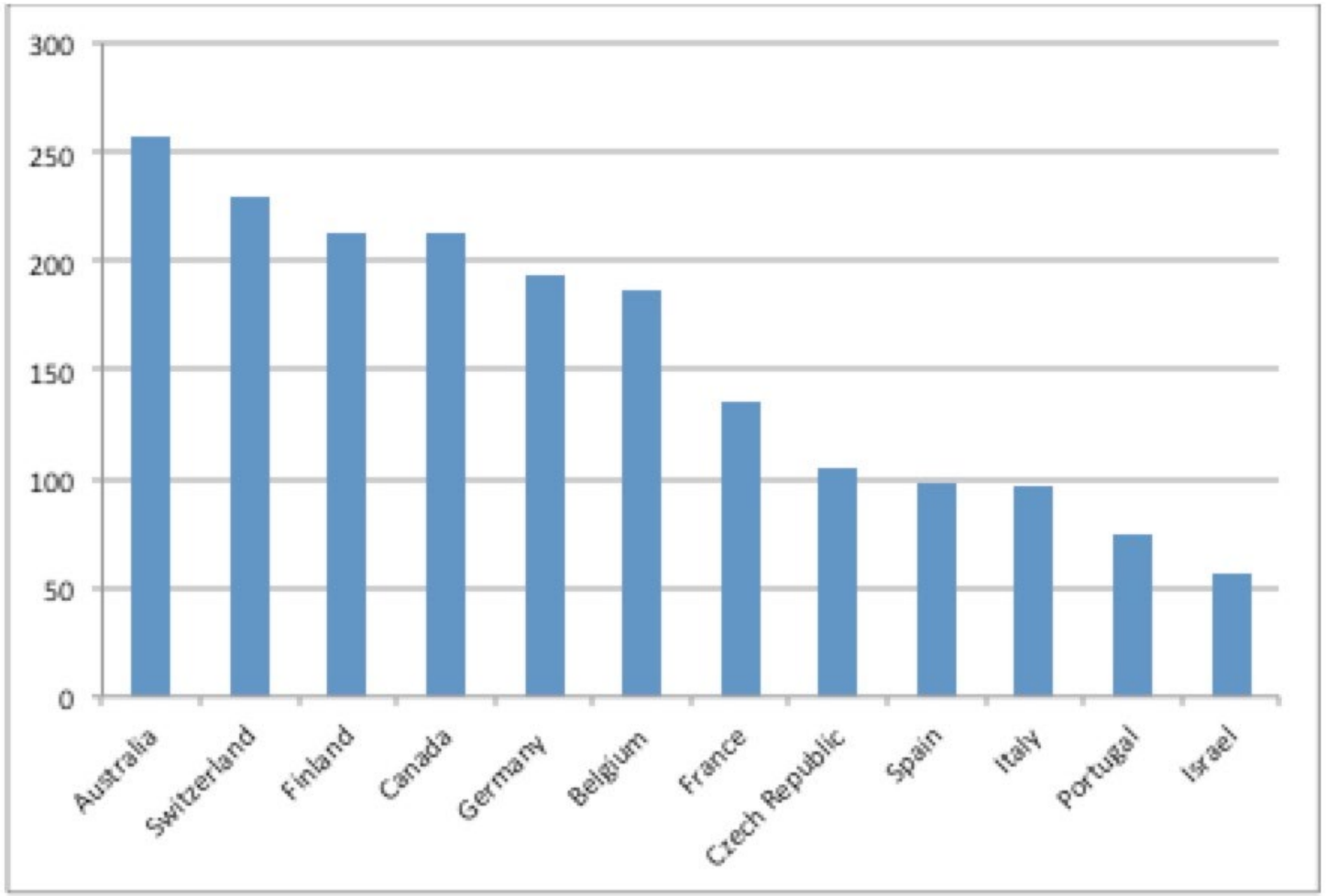
Arthroplasties to reduce the impact of arthritis are on the increase in Australia. Over the period 2000–01 to 2007–08, the number of knee arthroplasties for arthritis increased by 67% from 14,866 to 26,712 (Figure 5). The number of hip arthroplasties during the same period increased from 13,524 to 19,279, an overall increase of 40%.



Source: AIHW National Hospital Morbidity Database.

Figure 5: Trends in total knee and hip replacements for arthritis, 2000–01 to 2007–08

Knee replacement rate (per 100,000) across and within selected OECD countries, 2011



5–fold variation

Srivastava et al., 2012

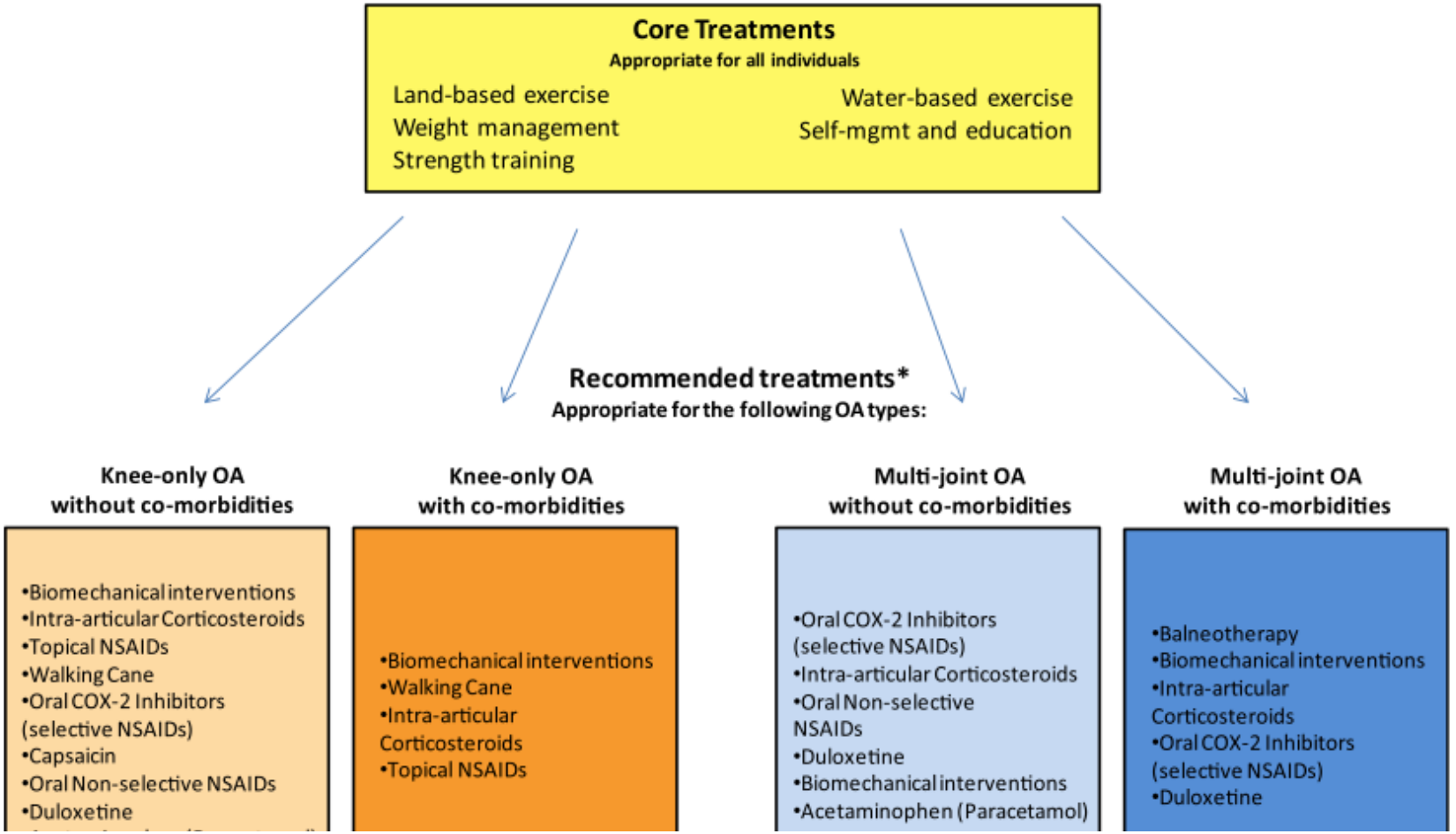
GeographicVariations in Health Care: What do we know and what can be done to improve health system performance? OECD Health Policy Studies, OECD Publishing.

Clinical Care Standards

Numerous guidelines

- OARSI
  - *Osteoarthritis & Cartilage* 2008, 16:137-162
- EULAR
  - *Ann Rhum Dis* 2000;59:936-944
- NICE
  - *BMJ* 2008;336:502-503
- AAOS
  - *J Am Acad Orthop Surg* 2009: 17; 591=600

OARSI Guidelines



(McAlindon et al., 2014)

A need for change

Case Study

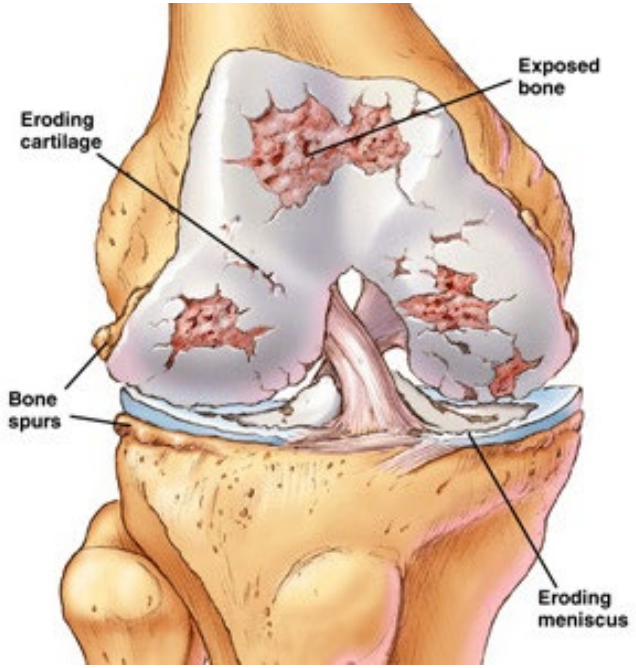
- **Ms JS**
- **Category B** – Right TKR
- 55yo female with 10 year history of right knee pain – rapid deterioration last 18/12.
- **PHx:** Right knee arthroscopy 10 years ago
- **PMhx:** Giant cell myocarditis ‘06, heart replacement ’08, Graves disease, Steroid induced diabetes since ‘08, cataracts ‘11, thyroidectomy, HT, Chol
- **X-ray:** Moderate medial T/F joint OA and AVN right knee
- **Referrals:** Rheumatologist, Dietician, Orthotist, Hydrotherapy, Physiotherapy.

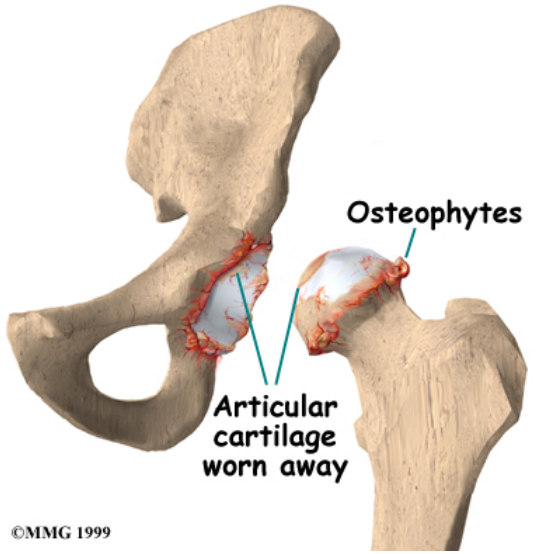
Outcome measures

	Initial Ax.	3 month Ax.	12 month Ax.
VAS	3	1	0
TUG	9.3sec	6.3sec	4.8sec
6MWT	459m	550m	608m
BMI	31.27	28.41	23.90 Approx.20kg loss
Waist	105cm	98cm	86cm
KOOS	58	59	75
HBA1c	11	7	6

OA defined

- OA is a disease which effects all components of the joint, not just the cartilage.
- OA occurs when damaging forces within the joint outweigh the joint's repair mechanisms.





Imbalance

Normal breakdown vs Bone/cartilage repair

Misconceptions/Myths

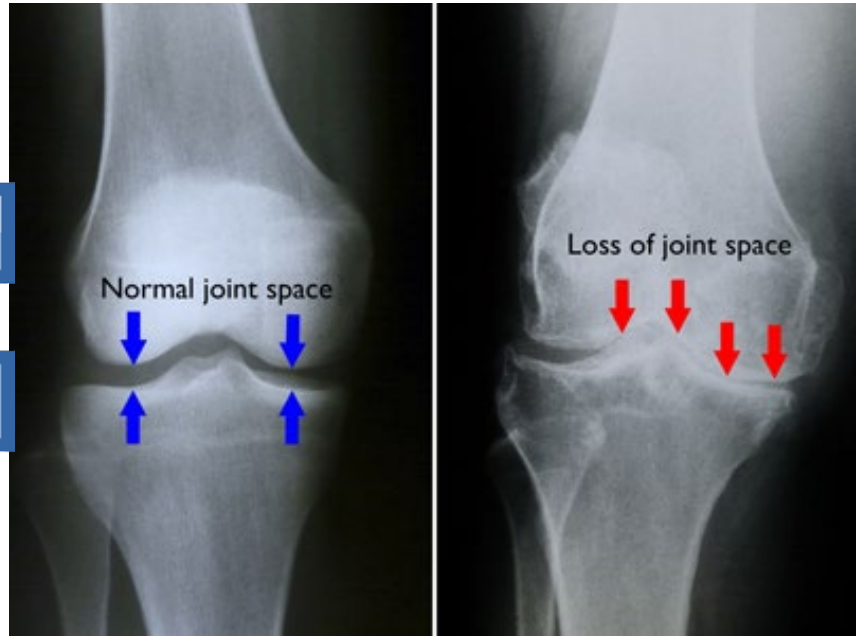
- "Exercise will worsen my arthritis" [FALSE]
- "Walking hurts my joint therefore I should avoid walking" [FALSE]
- "I have bone on bone arthritis – I must have an operation" [FALSE]
- "My hip/knee will inevitably deteriorate" [FALSE]

Mild vs Moderate vs Severe Arthritis

Healthy Knee

Arthritic Knee

Pain does not mean damage
Damage does not mean pain

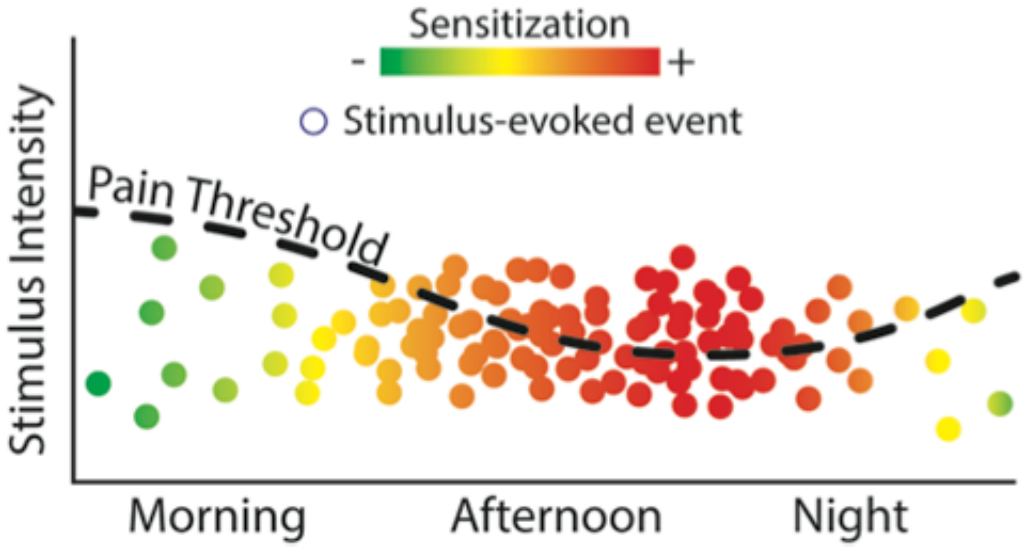


Other considerations determining severity

- Level of pain at rest and/or exercise
- Range of motion
- Joint malalignment
- Muscle weakness
- Swelling
- Ability to sleep
- Reliance on pain relief
- Reliance on walking aids
- Ability to perform ADL's

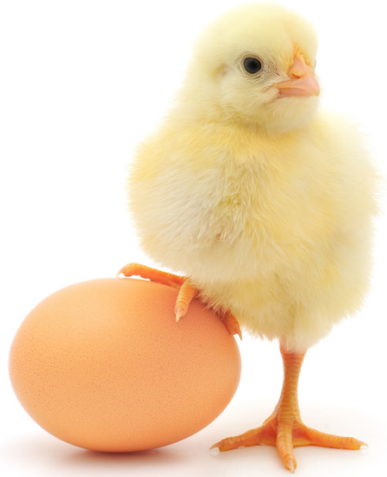
Pain threshold

- Chronic pain lowers pain thresholds over time.
- Exercise has been proven to raise pain thresholds

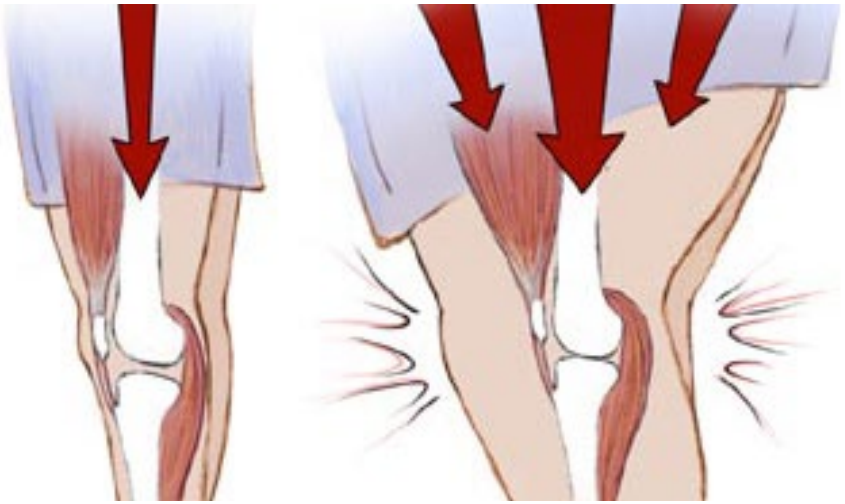


OA: Chicken or the egg

- The pathogenesis of OA and reasons for its progression are not entirely understood.
- Muscle wasting is often detected prior to other signs of OA.
- Possibility that muscle weakness plays a larger part in early OA progression than previously believed.



Modifiable factors accelerating joint deterioration



- High impact activity
- **Obesity**
- Muscle inhibition/**weakness**

Leads to:

- Unwanted joint movement
- Increased joint forces
- Joint breakdown

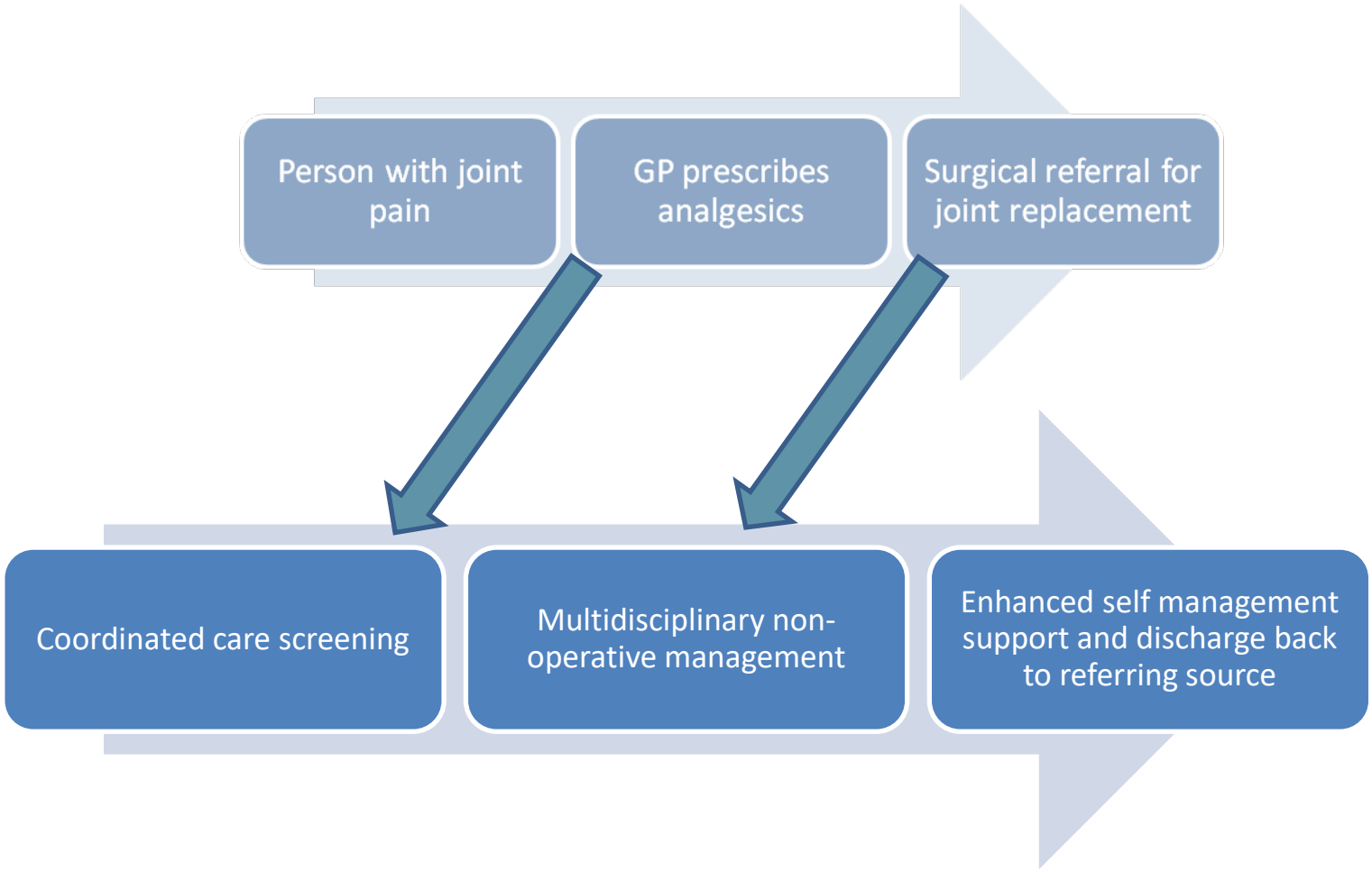
Pain

Osteoarthritis Chronic Care Program (OACCP)

- The OACCP offers a comprehensive, evidence based and integrated model of care that improves the interdisciplinary coordination of treatment for individuals with OA.

- Objectives:
  - Reduce pain
  - Enhance function
  - Improve quality of life
  - Slow disease progression
  - Encourage self management

Traditional vs Current approach



OACCP Multidisciplinary Team

- Person with OA
- Physiotherapist
- Dietician
- Occupational Therapist
- Social Worker
- Rheumatologist
- Orthotist
- Community Groups

- Exercise - strengthening, aerobic conditioning, hydrotherapy
- Weight management, optimal nutrition
- Joint protection, need for assistive devices, lifestyle/ functional adaptations
- Assist with coping, self efficacy, catastrophising
- Monitor and advise pharmacologic interventions with GP or pain clinic
- Need for insoles, motion control shoes, braces

Outcome Measures

AQoL – 6D

AQoL-6D (Data Collection Copy)
(Standard)

aqol1 How much help do you need with jobs around the house (e.g., cooking, cleaning the house or washing clothes):
- ☐ I can do all these tasks very quickly and efficiently without any help
- ☐ I can do these tasks relatively easily without help
- ☐ I can do these tasks only very slowly without help
- ☐ I cannot do most of these tasks unless I have help
- ☐ I can do none of these tasks by myself

aqol2 Thinking about how easy or difficult it is for you to get around by yourself outside your house (e.g., shopping, visiting):
- ☐ getting around is enjoyable and easy
- ☐ I have no difficulty getting around outside my house
- ☐ a little difficulty
- ☐ moderate difficulty
- ☐ a lot of difficulty
- ☐ I cannot get around unless somebody is there to help me

aqol3 Thinking about your mobility, including using any aids or equipment such as wheelchairs, frames, sticks:
- ☐ I am very mobile
- ☐ I have no difficulty with mobility
- ☐ I have some difficulty with mobility (for example, going uphill)
- ☐ I have difficulty with mobility. I can go short distances only.
- ☐ I have a lot of difficulty with mobility. I need someone to help me.
- ☐ I am bedridden

aqol4 Thinking about dressing, washing yourself, eating or looking after your appearance:
- ☐ these tasks are very easy for me
- ☐ I have no real difficulty in carrying out these tasks
- ☐ I find some of these tasks difficult, but I manage to do them on my own
- ☐ many of these tasks are difficult, and I need help to do them
- ☐ I cannot do these tasks by myself at all

aqol5 Your close and intimate relationships (including any sexual relationships) make you:
- ☐ very happy
- ☐ generally happy
- ☐ neither happy nor unhappy
- ☐ generally unhappy
- ☐ very unhappy

aqol6 Thinking about your health and your relationship with your family:
- ☐ my role in the family is unaffected by my health
- ☐ there are some parts of my family role I cannot carry out
- ☐ there are many parts of my family role I cannot carry out
- ☐ I cannot carry out any part of my family role

aqol7 Thinking about your health and your role in your community (that is to say neighbourhood, sporting, work, church or cultural groups):
- ☐ my role in the community is unaffected by my health
- ☐ there are some parts of my community role I cannot carry out
- ☐ there are many parts of my community role I cannot carry out
- ☐ I cannot carry out any part of my community role

aqol8 How often did you feel in despair over the last seven days?
- ☐ never
- ☐ occasionally
- ☐ sometimes
- ☐ often
- ☐ all the time

aqol9 And still thinking about the last seven days, how often did you feel worried?
- ☐ never
- ☐ occasionally
- ☐ sometimes
- ☐ often
- ☐ all the time

aqol10 How often do you feel sad?
- ☐ never
- ☐ rarely
- ☐ some of the time
- ☐ usually
- ☐ nearly all the time

Centre for Health Economics, Monash University 1

DASS21

DASS21 Name: Date:

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you *over the past week*. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

0 Did not apply to me at all
1 Applied to me to some degree, or some of the time
2 Applied to me to a considerable degree, or a good part of time
3 Applied to me very much, or most of the time

1	I found it hard to wind down	0	1	2	3
2	I was aware of dryness of my mouth	0	1	2	3
3	I couldn't seem to experience any positive feeling at all	0	1	2	3
4	I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5	I found it difficult to work up the initiative to do things	0	1	2	3
6	I tended to over-react to situations	0	1	2	3
7	I experienced trembling (eg, in the hands)	0	1	2	3
8	I felt that I was using a lot of nervous energy	0	1	2	3
9	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10	I felt that I had nothing to look forward to	0	1	2	3
11	I found myself getting agitated	0	1	2	3
12	I found it difficult to relax	0	1	2	3
13	I felt down-hearted and blue	0	1	2	3
14	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15	I felt I was close to panic	0	1	2	3
16	I was unable to become enthusiastic about anything	0	1	2	3
17	I felt I wasn't worth much as a person	0	1	2	3
18	I felt that I was rather touchy	0	1	2	3
19	I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)	0	1	2	3
20	I felt scared without any good reason	0	1	2	3
21	I felt that life was meaningless	0	1	2	3

KOOS

Knee injury and Osteoarthritis Outcome Score (KOOS), English version LK1.0

KOOS KNEE SURVEY

Today's date: ____/____/____ Date of birth: ____/____/____

Name: _____

INSTRUCTIONS: This survey asks for your view about your knee. This information will help us keep track of how you feel about your knee and how well you are able to perform your usual activities.
Answer every question by ticking the appropriate box, only one box for each question. If you are unsure about how to answer a question, please give the best answer you can.

Symptoms
These questions should be answered thinking of your knee symptoms during the **last week**.

S1. Do you have swelling in your knee?
Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always ☐

S2. Do you feel grinding, hear clicking or any other type of noise when your knee moves?
Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always ☐

S3. Does your knee catch or hang up when moving?
Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always ☐

S4. Can you straighten your knee fully?
Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐

S5. Can you bend your knee fully?
Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐

Stiffness
The following questions concern the amount of joint stiffness you have experienced during the **last week** in your knee. Stiffness is a sensation of restriction or slowness in the ease with which you move your knee joint.

S6. How severe is your knee joint stiffness after first wakening in the morning?
None ☐ Mild ☐ Moderate ☐ Severe ☐ Extreme ☐

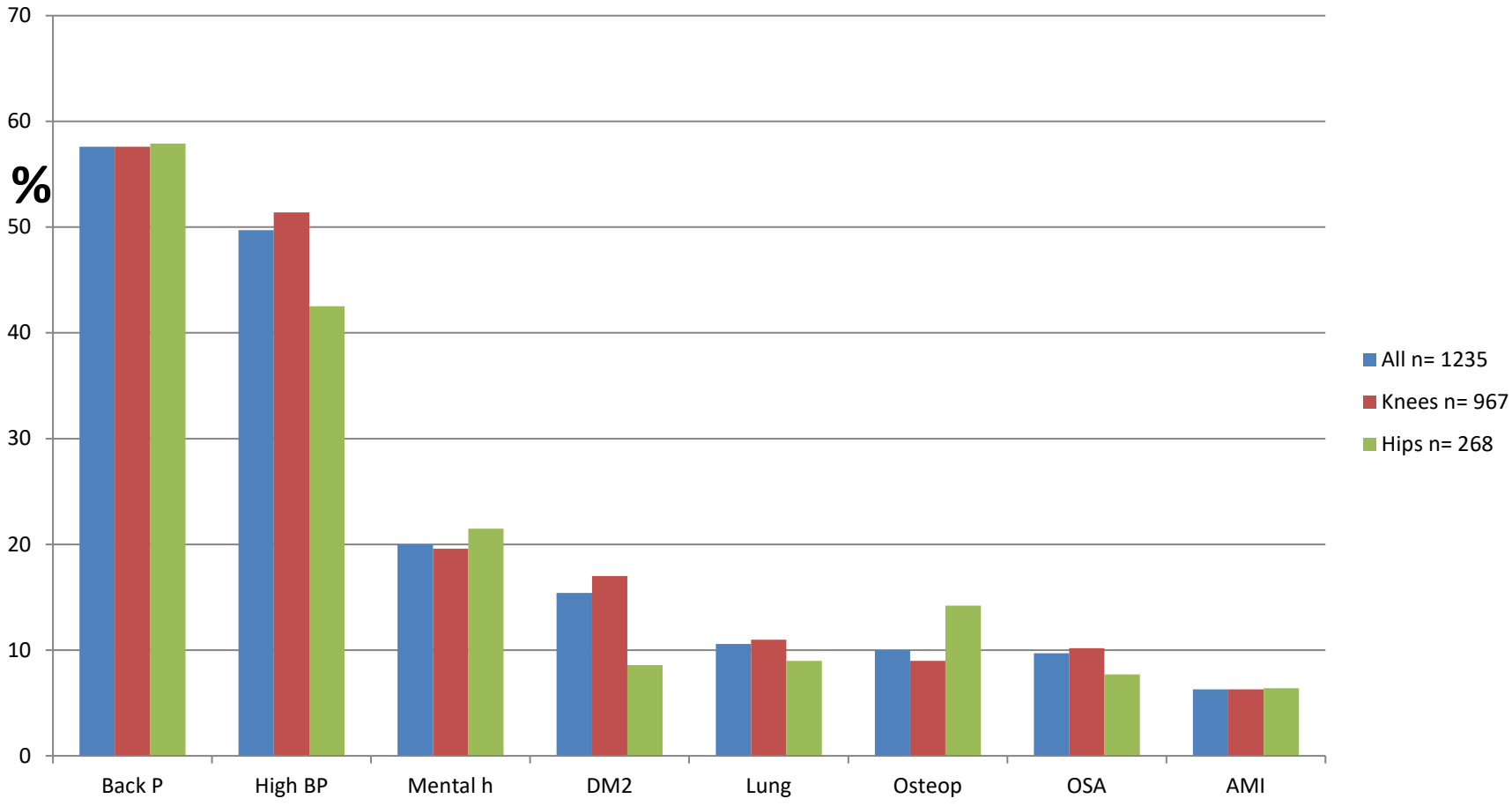
S7. How severe is your knee stiffness after sitting, lying or resting **later in the day**?
None ☐ Mild ☐ Moderate ☐ Severe ☐ Extreme ☐

RNS/Ryde hospital 2012-2016 Outcomes

OACCP participant characteristics n= 1235

	All patients n= 1235
Female (%)	65.2
Age in years mean (SD)	65.6 (10.26)
Body Mass Index mean (SD)	30.8 (6.52)
Waist: increased risk of chronic disease* (%)males	80.9
Waist: increased risk of chronic disease* (%) females	90
No previous non-pharmacological Rx (%)	56.7

Comorbidities



Where's the evidence?

ARTHRITIS & RHEUMATOLOGY
Vol. 66, No. 3, March 2014, pp 622–636
DOI 10.1002/art.38290

Impact of Exercise Type and Dose on Pain and Disability in Knee Osteoarthritis

A Systematic Review and Meta-Regression Analysis of Randomized Controlled Trials

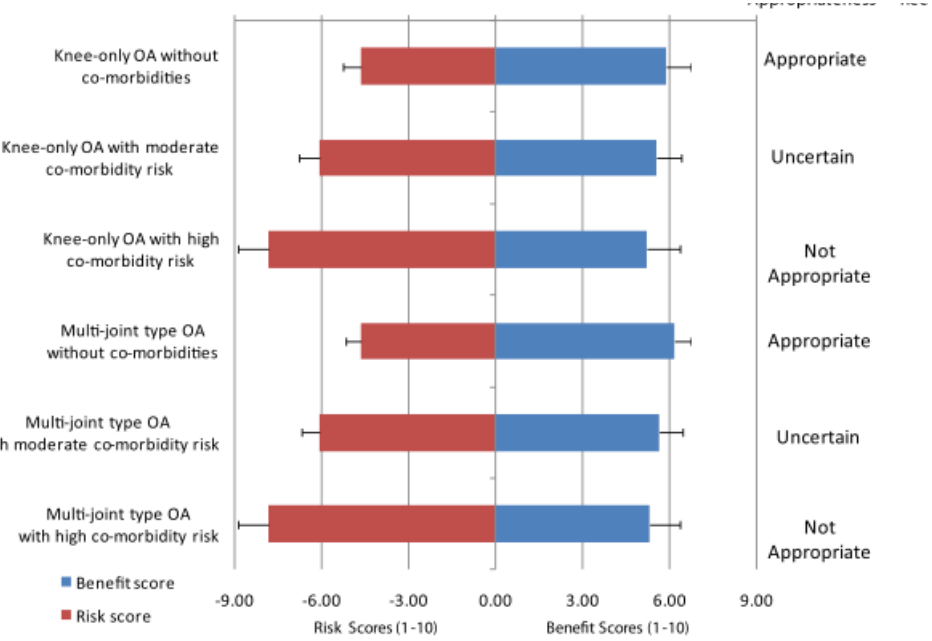
C. Juhl,[1] R. Christensen,[2] E. M. Roos,[3] W. Zhang,[4] and H. Lund[3]

Optimal programs to manage knee OA should focus on:

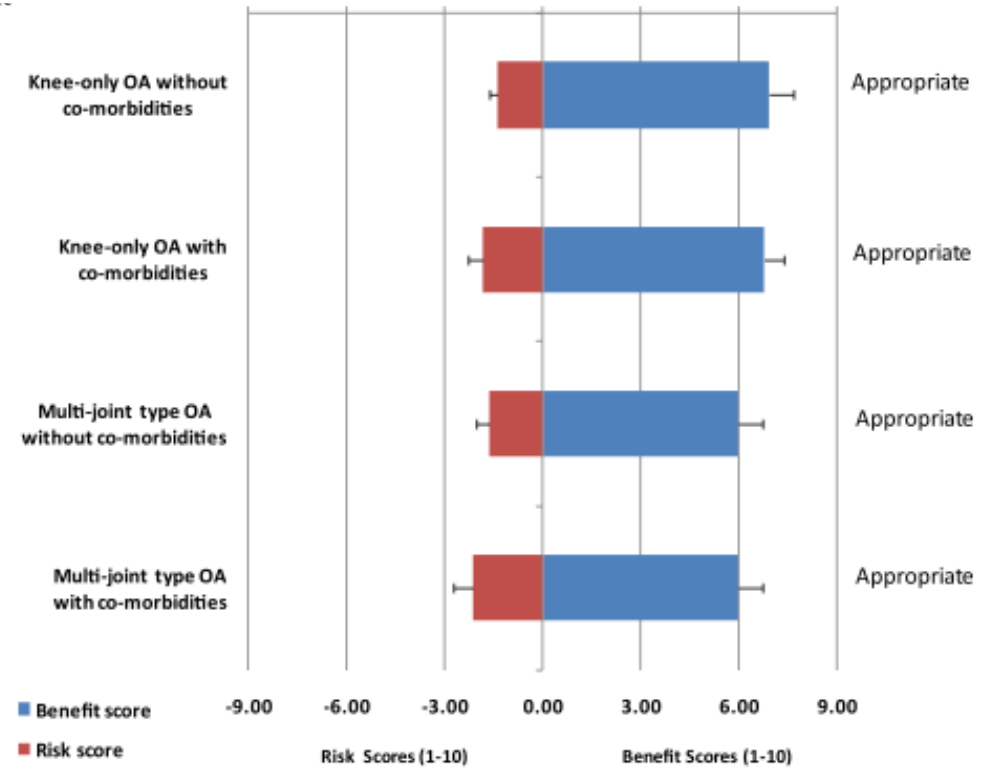
- Strength training – primarily quads 3 times/week (min 12 sessions)
- Aerobic training – ideally not on the same day as strength training
- Supervised programs perform better
- Group and individual programs derive similar results

OARSI Guidelines

Anti-inflammatories



Strength Training



Addressing OA sub-groups

ARTHRITIS & RHEUMATOLOGY
Vol. 66, No. 4, April 2014, pp 950–959
DOI 10.1002/art.38317

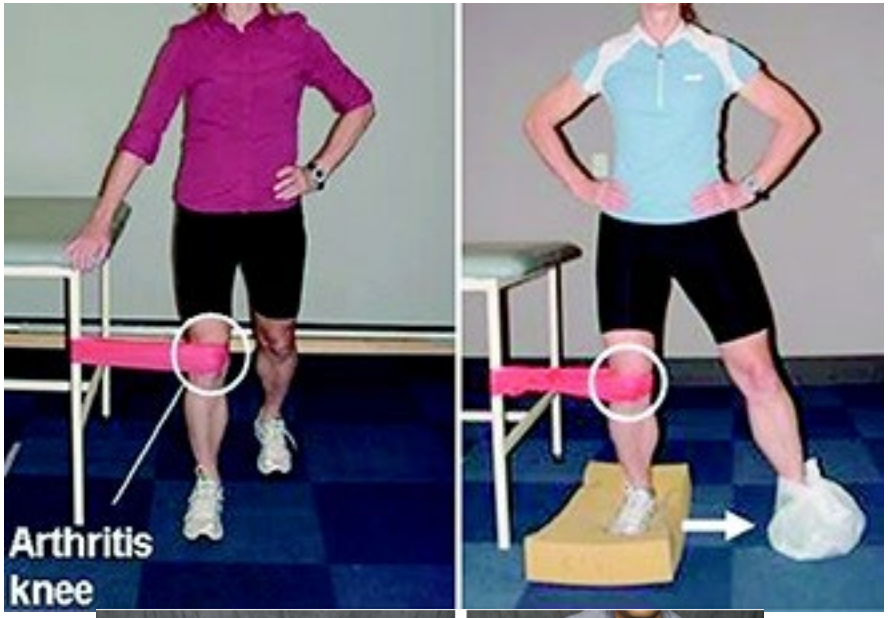
Neuromuscular Versus Quadriceps Strengthening Exercise in Patients With Medial Knee Osteoarthritis and Varus Malalignment

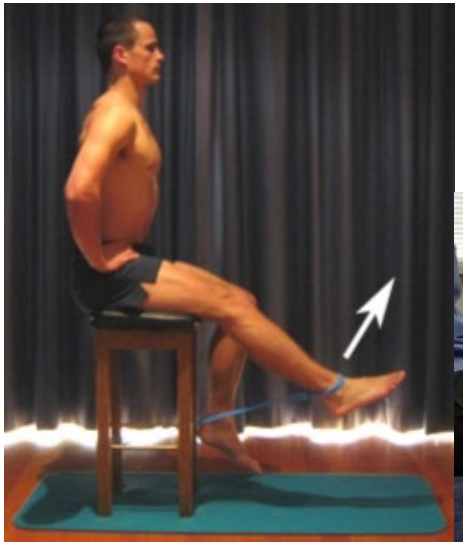
A Randomized Controlled Trial

Kim L. Bennell,[1] Mary Kyriakides,[1] Ben Metcalf,[1] Thorlene Egerton,[1] Tim V. Wrigley,[1] Paul W. Hodges,[2] Michael A. Hunt,[3] Ewa M. Roos,[4] Andrew Forbes,[5] Eva Ageberg,[6] and Rana S. Hinman[1]

- No impact on knee adduction moment
- Both groups had significant improvements in pain and function
- No significant difference between NEXA and QS.

NEXA VS QS





Arthritis Care & Research
Vol. 67, No. 9, September 2015, pp 1281–1288
DOI 10.1002/acr.22558

ORIGINAL ARTICLE

Influence of Biomechanical Characteristics on Pain and Function Outcomes From Exercise in Medial Knee Osteoarthritis and Varus Malalignment: Exploratory Analyses From a Randomized Controlled Trial

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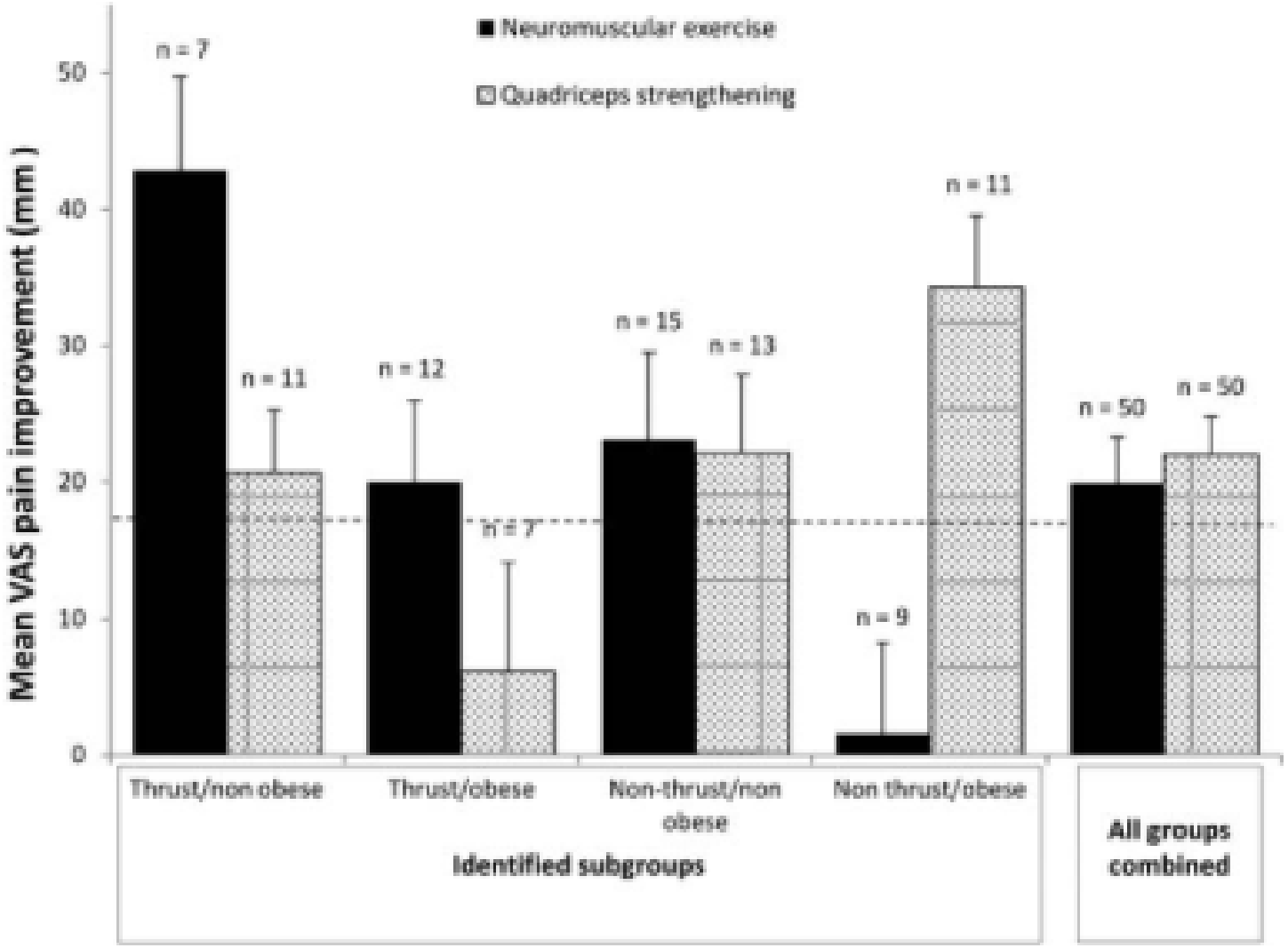

- Varus thrust and non-obese = NEXA
- Non varus thrust and obese = QS

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Patellofemoral joint osteoarthritis: An individualised pathomechanical approach to management

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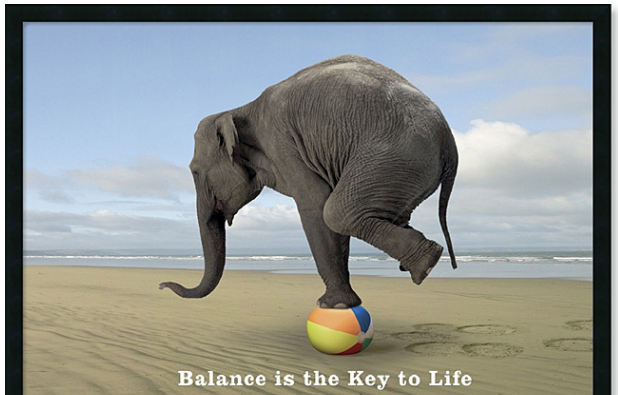
- No set system of patient care is recommended
- Good evidence for individualized multimodal program incorporating quads and hip abductor strengthening with potential use of medial arch support orthotics, bracing/taping, contralateral cane use, gait retraining.

What's the consensus?

- Loaded vs unloaded
- Supervised vs home based
- Individual vs group
- Tailored vs generic
- Structured vs incidental
- Manual therapy?

Balancing key factors for exercise prescription

- Patient education
- Patient-centered goals
- Pacing
- Increase program in graded fashion
- Pain – type, quality, intensity, duration
- Consideration of comorbidities



- Mild discomfort during and after exercise
- Moderate to severe pain during exercise
- Pain last longer than 30min post exercise
- Analgesia pre-exercise

Managing flares

High impact vs low impact exercise

Incidental v's Structured Program

Assistive devices

Strength training (example)

- Repetitions: 2x15
- Frequency:3+ days/week
- Progress each exercise and be guided by fatigue.
- Don’t push through pain

ie sharp lancinating pain or pain that last 30min post exercise.

Load

Joint/tissue capacity

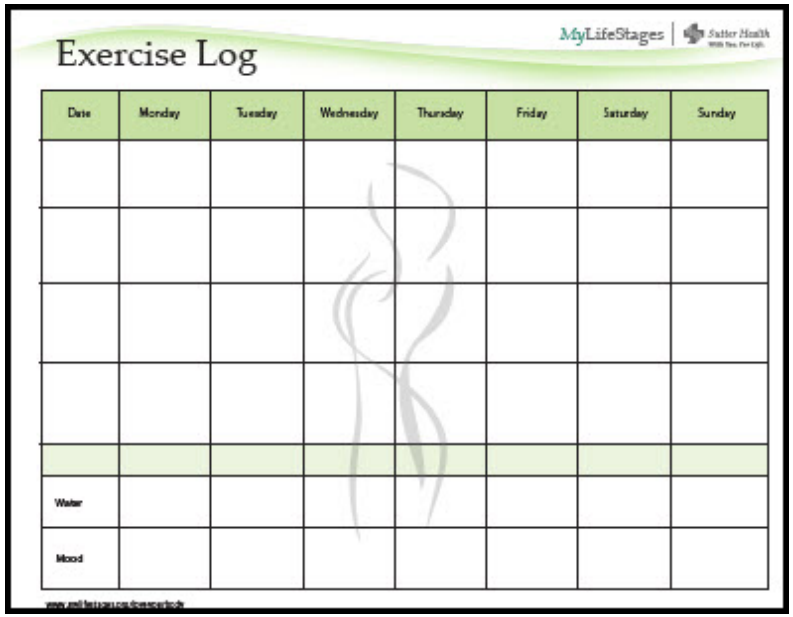
Where's your starting

Interventions to increase adherence to therapeutic exercise in older adults with low back pain and/or hip/knee osteoarthritis: a systematic review and meta-analysis

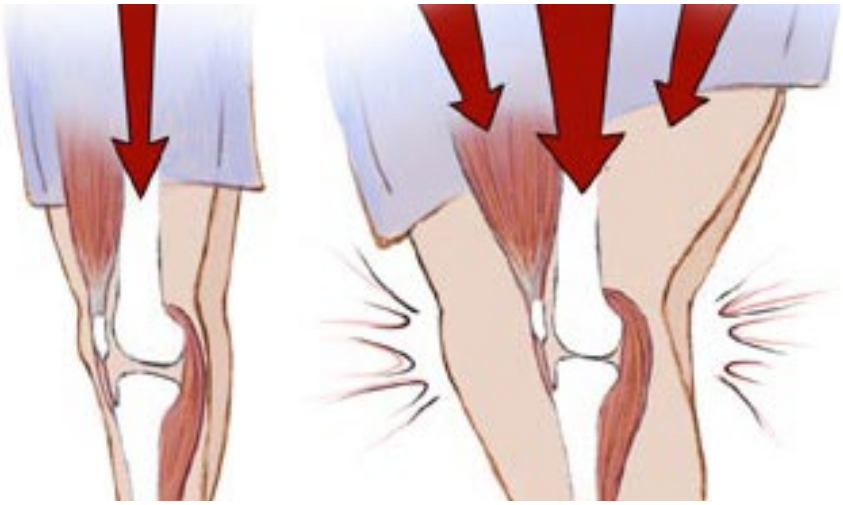
Philippa J A Nicolson,[1] Kim L Bennell,[1] Fiona L Dobson,[1] Ans Van Ginckel,[1] Melanie A Holden,[2] Rana S Hinman[1]

- Booster sessions with a physiotherapist improve adherence to exercise in OA patients
- Use of motivational techniques such as positive feedback and reinforcement, use of exercise diaries and treatment contracts all increase exercise adherence
- Behavioral graded exercise – gradually increasing exercise and integrating into daily routine

What gets measured gets done!!!



Weight loss and OA



- **10%** reduction in body weight + Strength focused exercise

50% < Pain

↑ Function

Messier et al
Jama. 2013 Sep
25;310(12):1263-73

Every kilogram

of extra weight you carry

results in 4-5kg

of extra force

through your knee joint

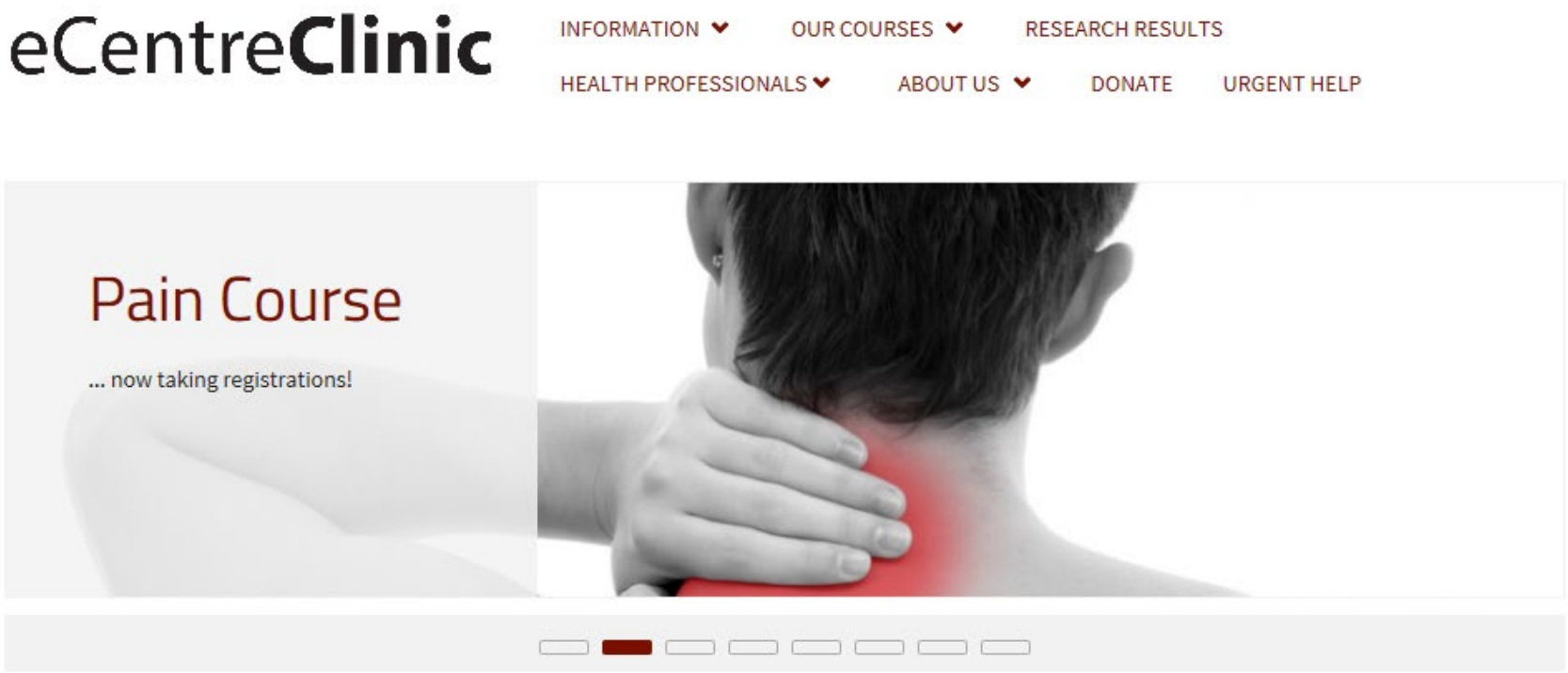
Supplements

- Moderate effects in short term

Liu, X et al *BJSM* 2018 *52*(3), 167-175.

Heat vs Ice

Self management programs



- https://www.ecentrecli /

A not-for-profit initiative of
MACQUARIE University
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Manual therapy

Other considerations for joint protection

Transfers and movement

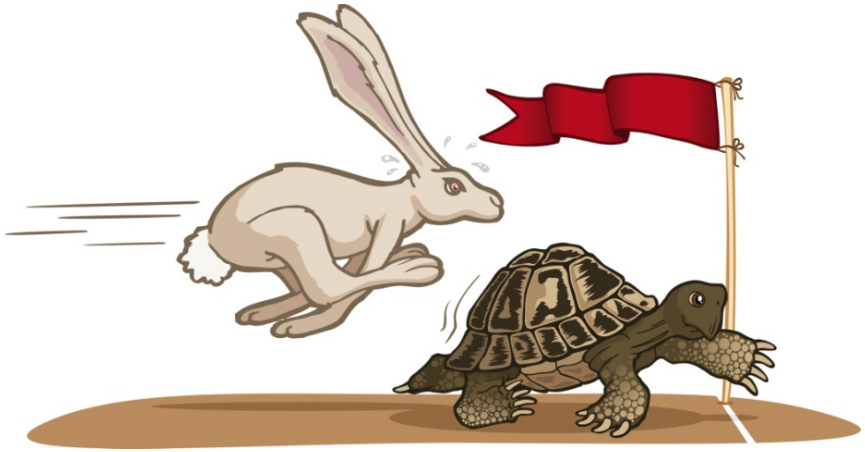
- Chairs
- Toilets
- Cars/buses
- Stairs
- Turning/chair position

Managing at home

- Managing housework
- Managing home mainte[redacted]
- Managing the gardening

- Planning
- Pacing
- Priority setting
- Delegation

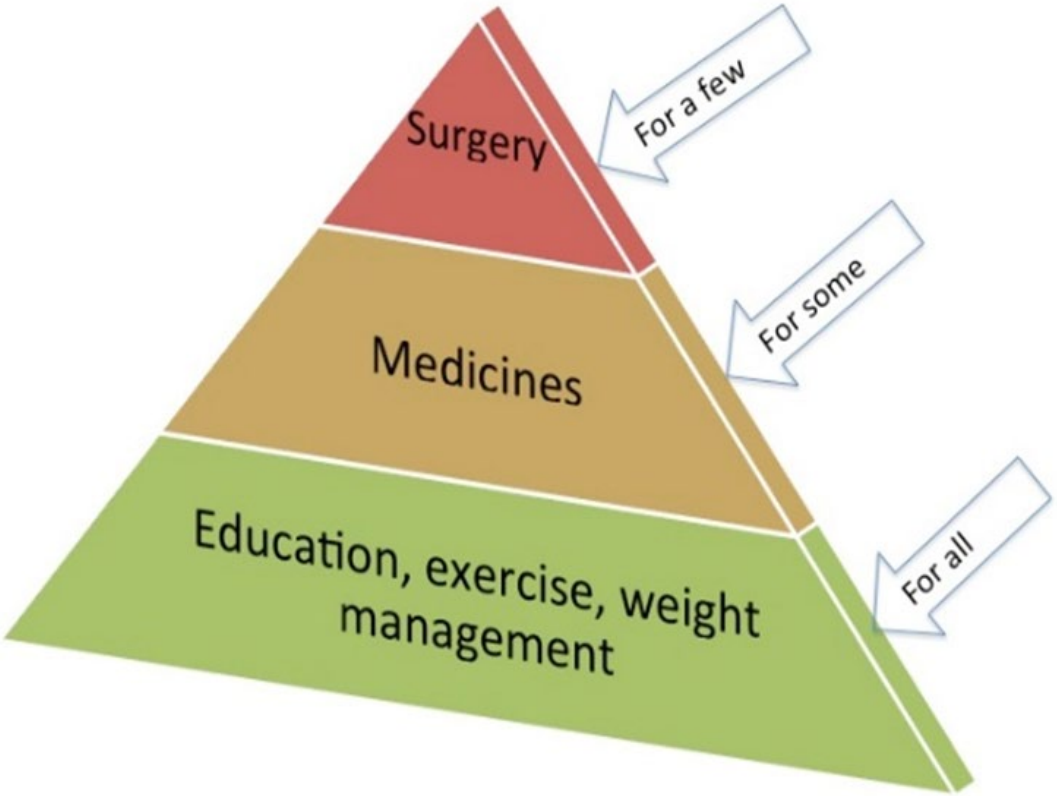
https://www.myagedcare.gov.au/
Ph: 1800 200 422

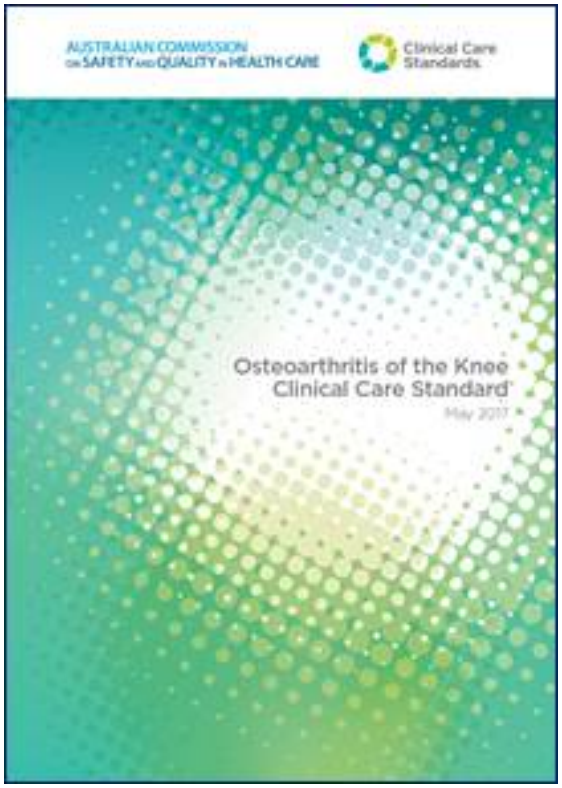


Sleeping

- Get to bed at a consistent time
- Avoid eating and caffeine 1 hour prior to bed
- Avoid television, computers, ipads prior to bed
- Develop a routine, shower, lights low, red a book
- Utilise a body pillow of waking up with joint or back pain

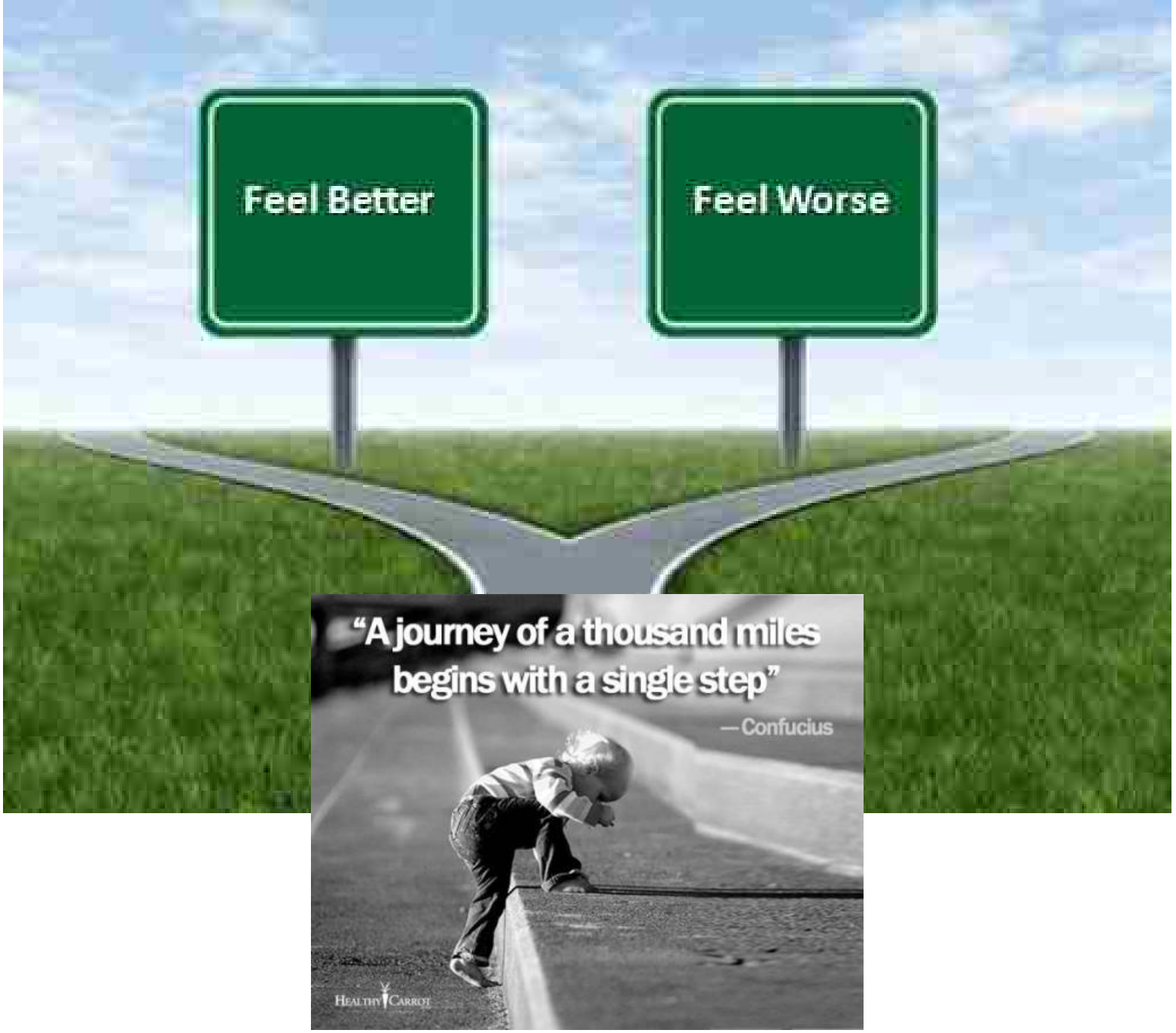
Components of care for knee OA





Adapted from Roos & Juhl
Osteoarthritis Cartilage. 2012;20(12):1477-83

Clinical Care Standards


Feel Better
Feel Worse
"A journey of a thousand miles begins with a single step"
— Confucius
Healthy Carrot

Acknowledgments

ACI NSW Agency for Clinical Innovation

Institute of Bone & Joint Research

Royal North Shore Hospital