

Æfing er lækning

Exercise Is Medicine

Hugmyndin um að brúa
bilið milli læknavísinda
og þjálfraeðvísinda

Arnar Hafsteinsson

- M.Sc. Heilbrigðisvísindi
- Diplóma, Lýðheilsuvísindi
- MBA
- B.Sc. Íþróttافرæði



Stutt kynning | Arnar Hafsteinsson

- Landakotspítali, K3 endurhæfingadeild | Þjálfari / Íþróttافرæðingur | 2023 -
 - Innohealth ehf (nýsköpun á forþjálfunarbúnaði) | Stofnandi og meðeigandi | 2023 -
 - Háskólinn í Reykjavík, Íþróttافرæðideild | Stundarkennari | 2022 -
 - Fort ehf (heilsuefling aldraðra) | Stofnandi og meðeigandi | 2022 -
-
- Íþróttakaanemía Keilis | Forstöðumaður | 2012 - 2021
 - ELIXIA (Stavanger) | Deildarstjóri einkaþjálfunar | 2011 - 2012
 - CrossFit Iceland | Meðstofnandi og þjálfari | 2008 - 2011
 - Valur, handboltadeild | Styrktarþjálfari | 2008
 - WorldClass | Einkaþjálfari | 2000 - 2011
 - Gym80 | Einkaþjálfari | 1996 - 2000



Námið

Hvernig vel ég háskólanám?

Að hefja nám

Námsyfirlit

Grunnnám

Byggingafræði

Hagfræði

Iðnfræði

Íþróttfræði

Íþróttfræði BSc

Styrk- og þrekþjálfun

Lögfræði

Sálfræði

Tæknifræði

Tölvunarfræði

Verkfræði

Viðskiptafræði

Þriggja vikna námskeið

Meistaránám

Doktorsnám

Háskólagrunnur HR

Háskólanám eftir

Diplómanám í styrk- og þrekþjálfun

UMSÓKNARVEFUR →

Námið

Að námi loknu

Skipulag náms

Aðstaðan

Kennarar

Inntökuskilyrði

Störfum og verkefnum tengdum styrk- og þrekþjálfun hefur fjölgað mikið að undanförmu samhliða aukinni vitundarvakningu hjá íþróttafélögum sem og almenningi um mikilvægi hennar. Námið er hagnýtt fyrir öll þau sem vilja læra að meta líkamlegt ástand fólks, gera viðeigandi áætlun og fylgja eftir með viðurkenndum þjálfunaraðferðum. Má þar nefna sjúkrapjálfa, íþróttfræðinga, íþróttakennara og þau sem hafa reynslu af þjálfun.



Námið veitir sérhæfingu á sviði styrk- og þrekþjálfunar og er bæði bóklegt og verklegt í bland. Meginviðfangsefni námsins er þjálfun styrks og þreks hjá íþróttafólki þvert á íþróttgreinar sem og almenningi.

Nemendur öðlast viðtæka þekkingu og fá tækifæri til að sniða verkefni að sínu áhugasviði. Þeir fá að vinna mörg verkefni út frá eigin bakgrunni og þannig auka sérhæfingu sína.

Styrk- og þrekbjálfun fyrir sértæka hópa

E-107-STES





HÁSKÓLI
ÍSLANDS

**Prevalence of sarcopenia in community-dwelling
habitués of open recreational and social services at
three nursing homes in the Greater Reykjavik area**

Arnar Hafsteinsson

Supervisor: Alfons Ramel

60 ECTS

February 2023

Thesis to master's degree in health science

FACULTY OF FOOD SCIENCE AND NUTRITION



**UNIVERSITY
OF ICELAND**

M.Sc. verkefnið mitt

Könnun á algengi sarcopenia á meðal íbúa og þjónustuþega í dagdvöl innan þriggja Hrafnistuheimila á stór-Reykjavíkursvæðinu

Niðurstöður:

- ✓ Hlutfall sarcopenia mjög hátt
- ✓ Tengsl milli jákvæðra útkomu og sjúkrahúslegu síðustu 12 mánuði
- ✓ Lítil þekking á líkamspjálfun og næringu (*vöðvavernd*)
- ✓ Mjög fáir að stunda styrkjandi þjálfun eða innbyrða nóg prótein

FRÉTTIR

Ótrúlegar tölur um vöðvarýrnun aldraðra Reykvíkinga



Heimsmet í vöðvarýrnun

Rannsakandi hefur aldrei séð herra hlutfall alvarlegrar vöðvarýrnunar en í rannsóknarhópi í Reykjavík. Margvísleg snjóhengjuáhrif.

bth@frettabladid.is

HEILBRIGÐISMÁL Arnar Hafsteinson, íþróttافرæðingur og stundakennari við Íþróttافرæðideild Háskólans í Reykjavík, kynnir á morgun sláandi niðurstöður um vöðvarýrnun eldra fólks í Reykjavík.

Arnar gerði rannsókn sem tók til 72 einstaklinga á aldrinum 65–95 ára. Algengar tölur í nágrannalöndum Íslands eru að 10–30 prósent aldraðra séu með vöðvarýrnunarsjúkdóm sem kallast sarcopenia. Niðurstaðan úr rannsókn Arnars er að 60 prósent Íslendinganna sem hann rannsakaði séu með vöðvarýrnunarsjúkdóm.

”

Þetta er hæsta niðurstaða sem ég hef séð.

Arnar Hafsteinson,
íþróttافرæðingur

„Þetta er hæsta niðurstaða sem ég hef séð í litteratúr,“ segir Arnar.

Þeir sem þjást af alvarlegri vöðvarýrnun eru mun líklegri til að detta og meiða sig, brjóta bein og enda á sjúkrahúsi. Þessi eini sjúkdómur kostar Bandaríkin 1,5 prósent af öllu fé sem fer til heilbrigðismála.

„Þetta vindur upp á sig eins og snjóbolti.“

Arnar segir að aldraðir fái ekki

nógu góðar upplýsingar er lúta að næringu og líkamsþjálfun.

„Það hefur komið fram í samtölum að þeir telja sig vera að innbyrða prótein þegar þeir eru í raun að innbyrða kolvetni.“

Arnar segir það hans tilfinningu að heilsulæsi hópsins sé mjög ábótavant.

„Niðurstaðan er sláandi af því að þetta fólk býr heima hjá sér.“

Arnar slær þó þann varnagla að ef þýði allra 65 ára og eldri væri rannsakað yrði talan lægri. Úrtakið hans var þjónustuþegar Hrafnistu.

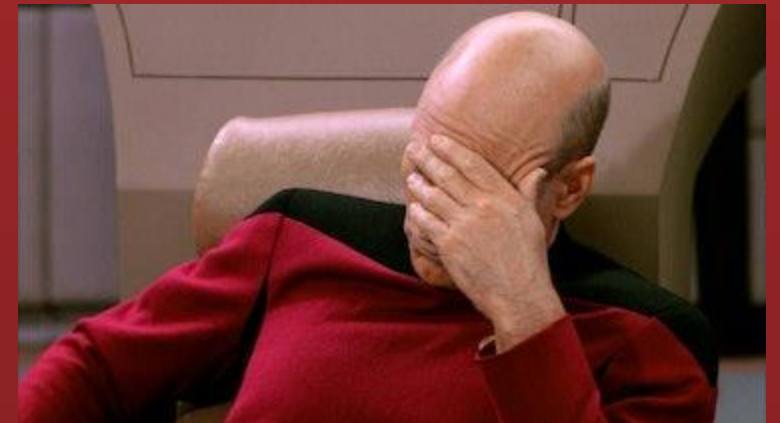
Í þessu samhengi bendir Arnar einnig á að öldrudum hafi snarfjölgað og ekkert lát á. Fyrir 120 árum hafi aldraðir verið sjö prósent Íslendinga. Innan tíðar verði aldraðir fjórðungur landsmanna.

„Við getum látið fólk anda mjög lengi, en það liggur kannski bara hreyfingarlaust síðustu árin.“ ■

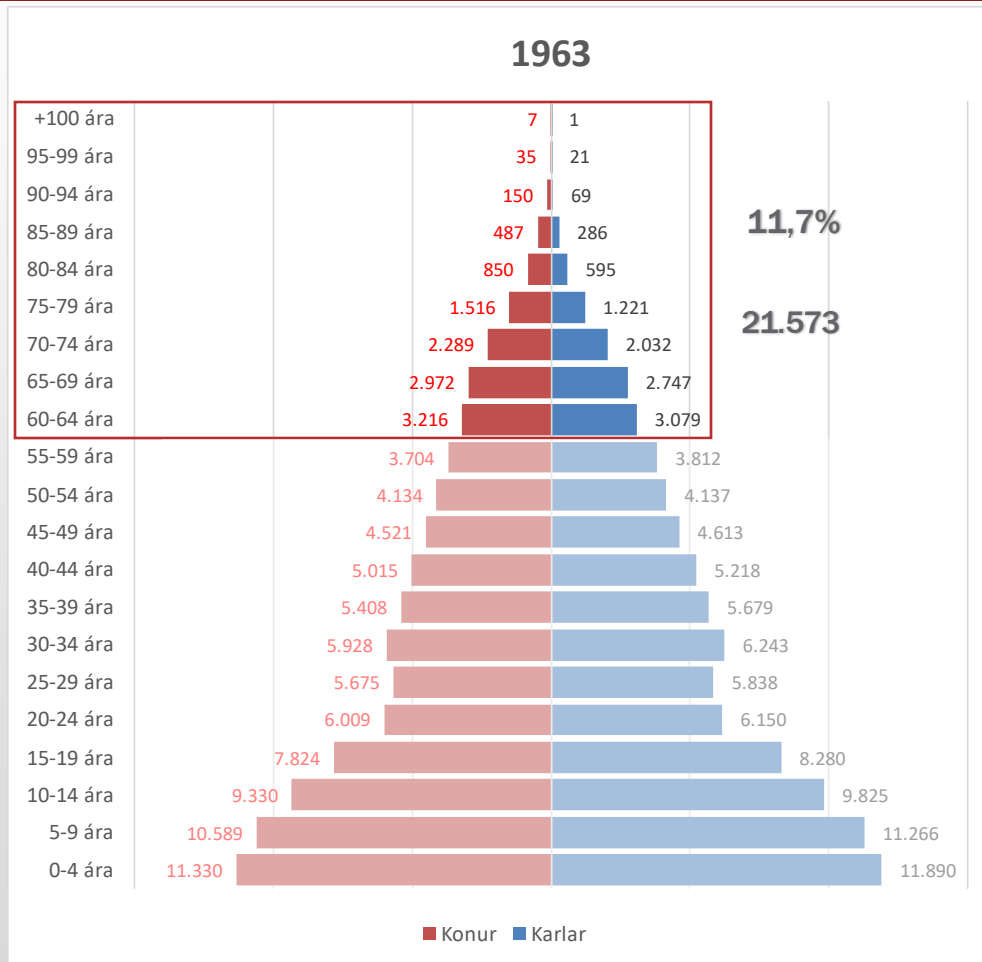
when the concrete stairs
are out-of-order



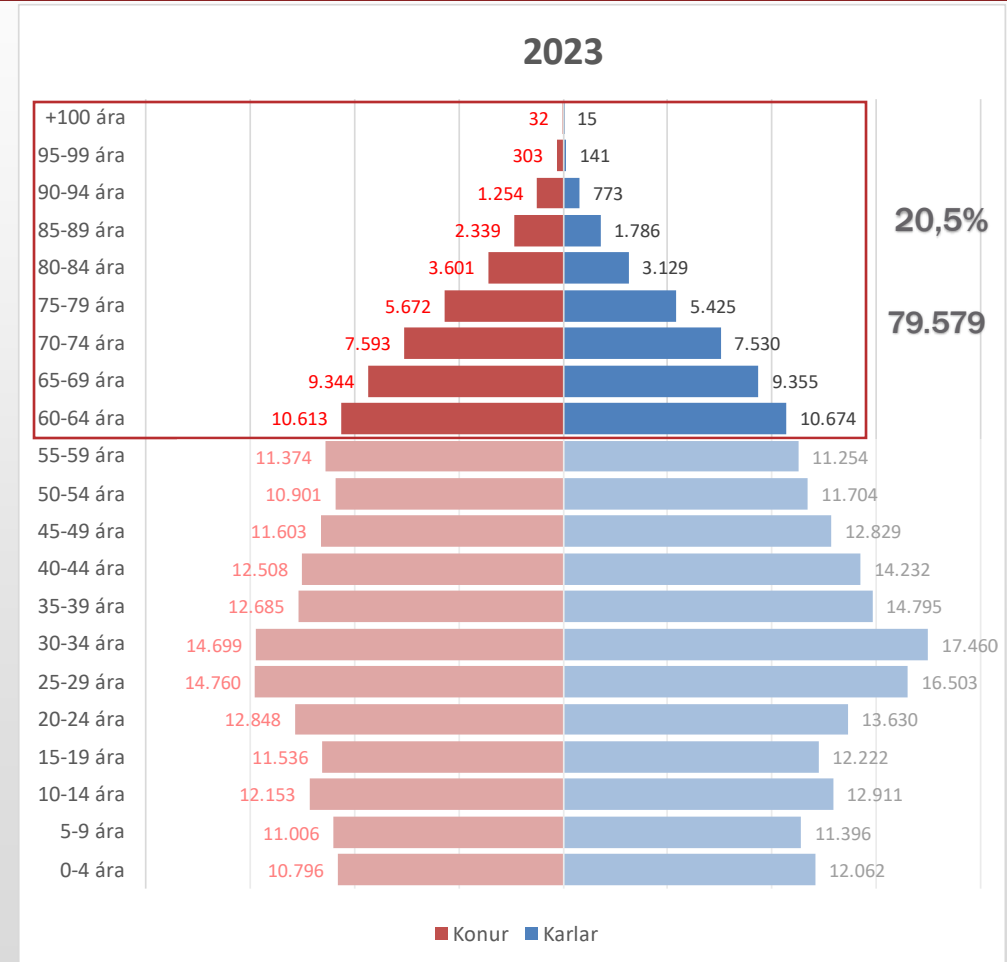
Hugsanleg skýring
á niðurstöðum
rannsóknar??



Mannfjöldi eftir kyni og aldri – Ísland 1963 vs. 2023



Mannfjöldi 183.991



Mannfjöldi 387.446

Professor Simon Melov

Buck Institute for Research on Aging

He is excited about rapid advances in technologies, like microscopy and single-cell sequencing, that are enabling scientists to get new insights into aging at a cellular level. There will likely be major breakthroughs in animal models over the next two to five years, he says. But he still questions whether we'll ever have an anti-aging therapeutic as effective as diet and exercise. "Even if we did have a therapeutic which, let's say, was 50% as beneficial as a good diet and exercise—and that would be a very successful drug—it's still going to have side effects," Melov says. "So would you rather exercise three times a week and eat well or take that pill?"

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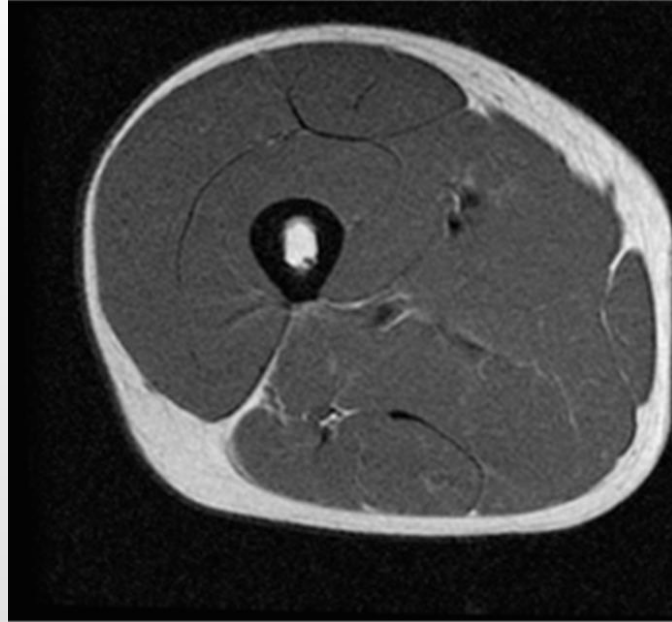
Buck Institute for Research on Aging

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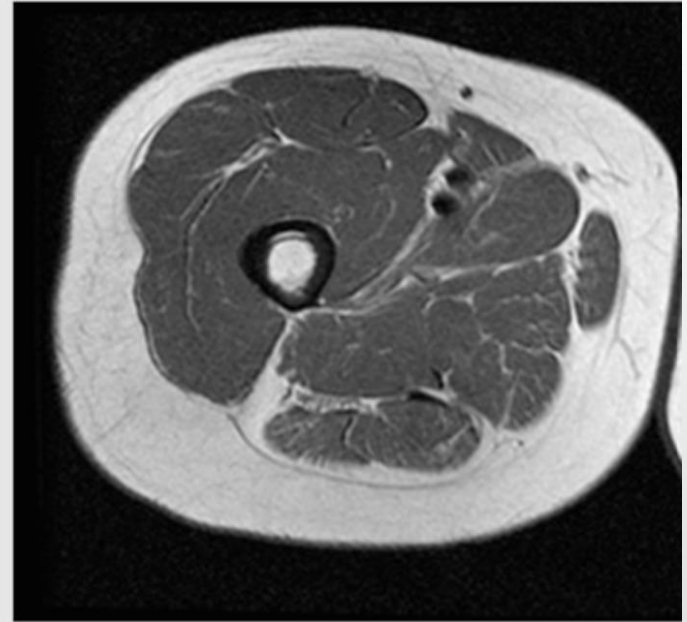
SARCOPENIA

Sarcopenia: ICD-10-CM (M62.84)

- Skilgreindur sem beinagrinda-vöðvasjúkdómur, með minnkandi vöðvamassa, -styrk og virkni
- Dregur úr lífsgæðum og getu til daglegra athafna (ADL)
- Orsakir:
 - Lífsstíll
 - Næring
 - Hreyfingaleysi
 - Undirliggjandi sjúkdómar
 - Sjúkrahúslega
 - Hár aldur

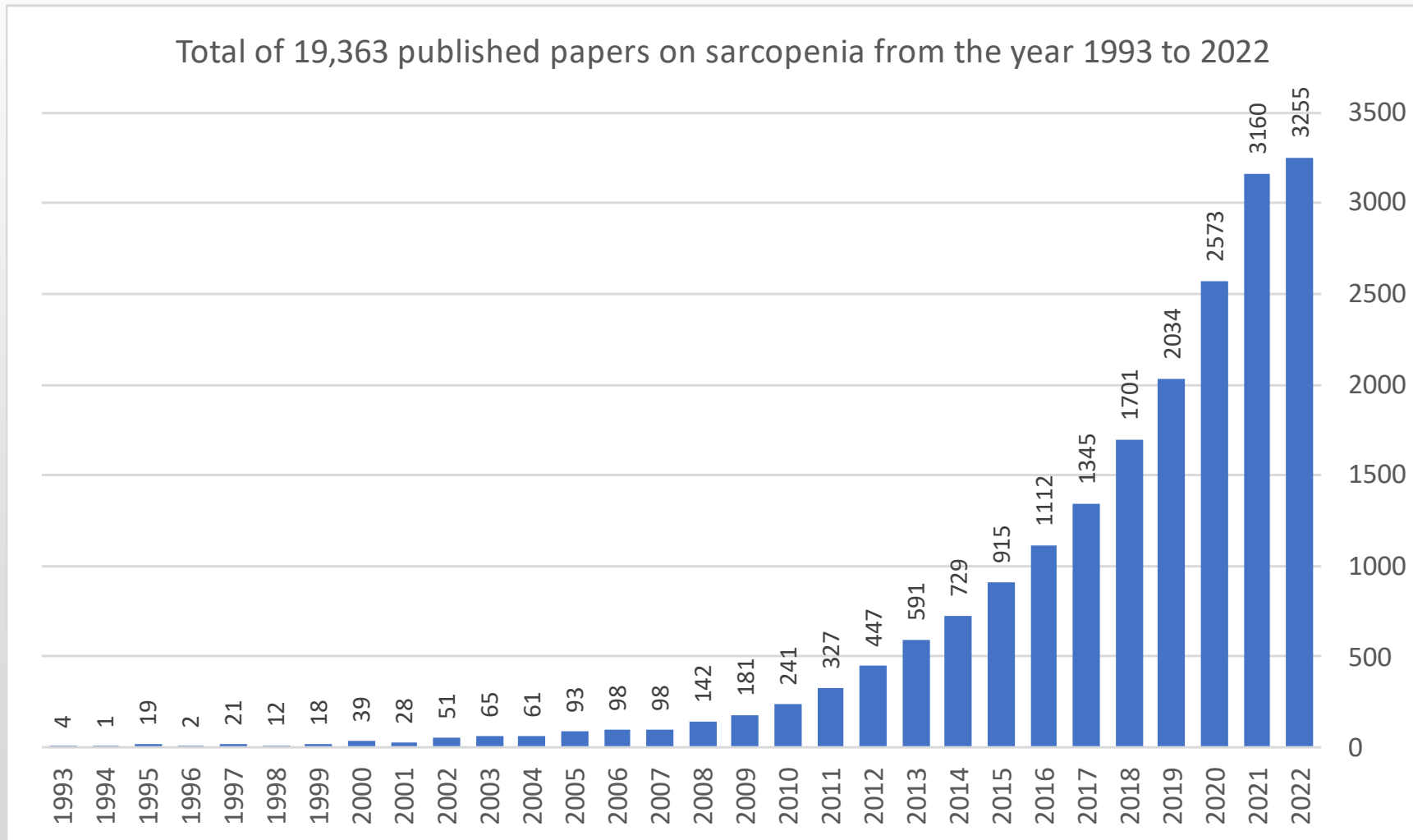


Age 25



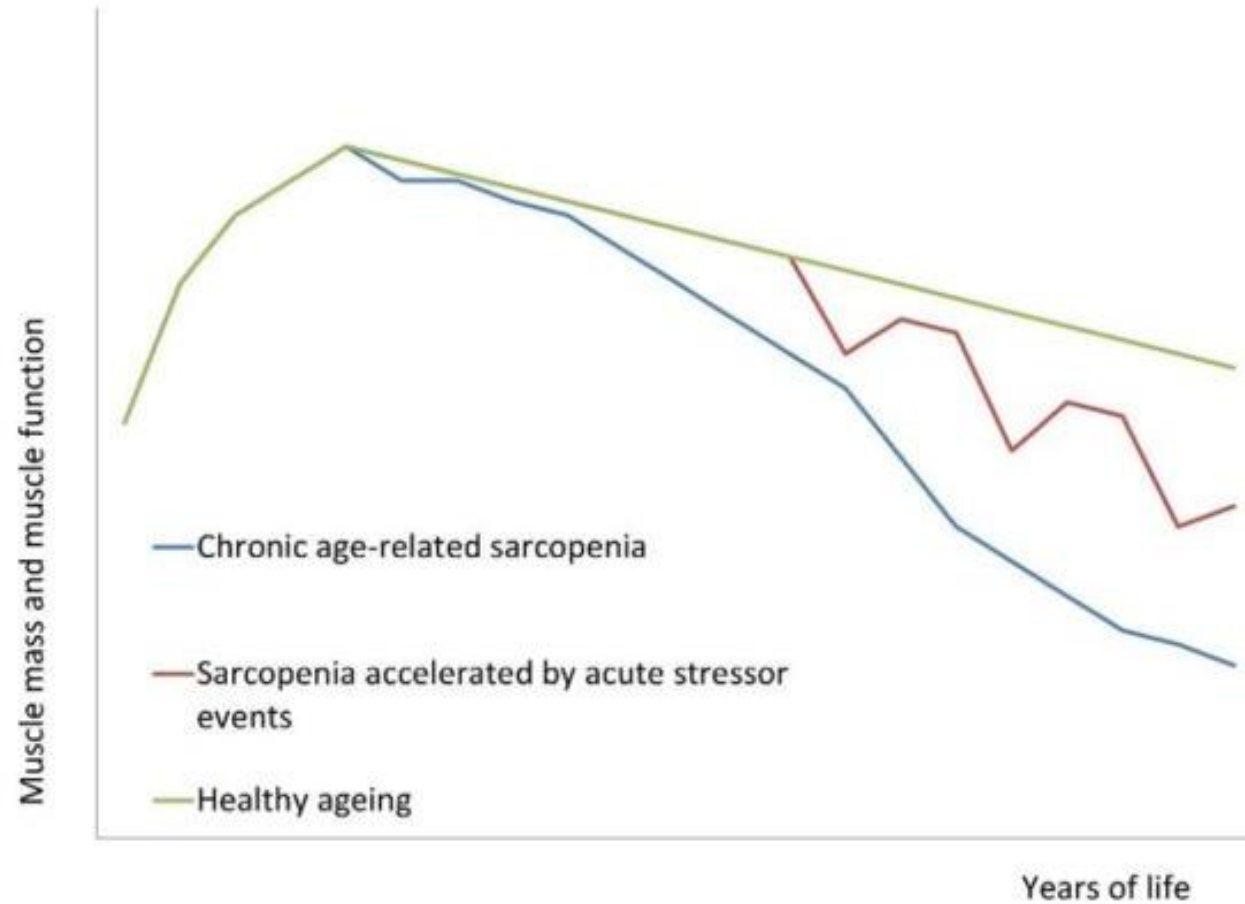
Age 63

Fjöldi birtra greina á PubMed með leitarorðið „sarcopenia“

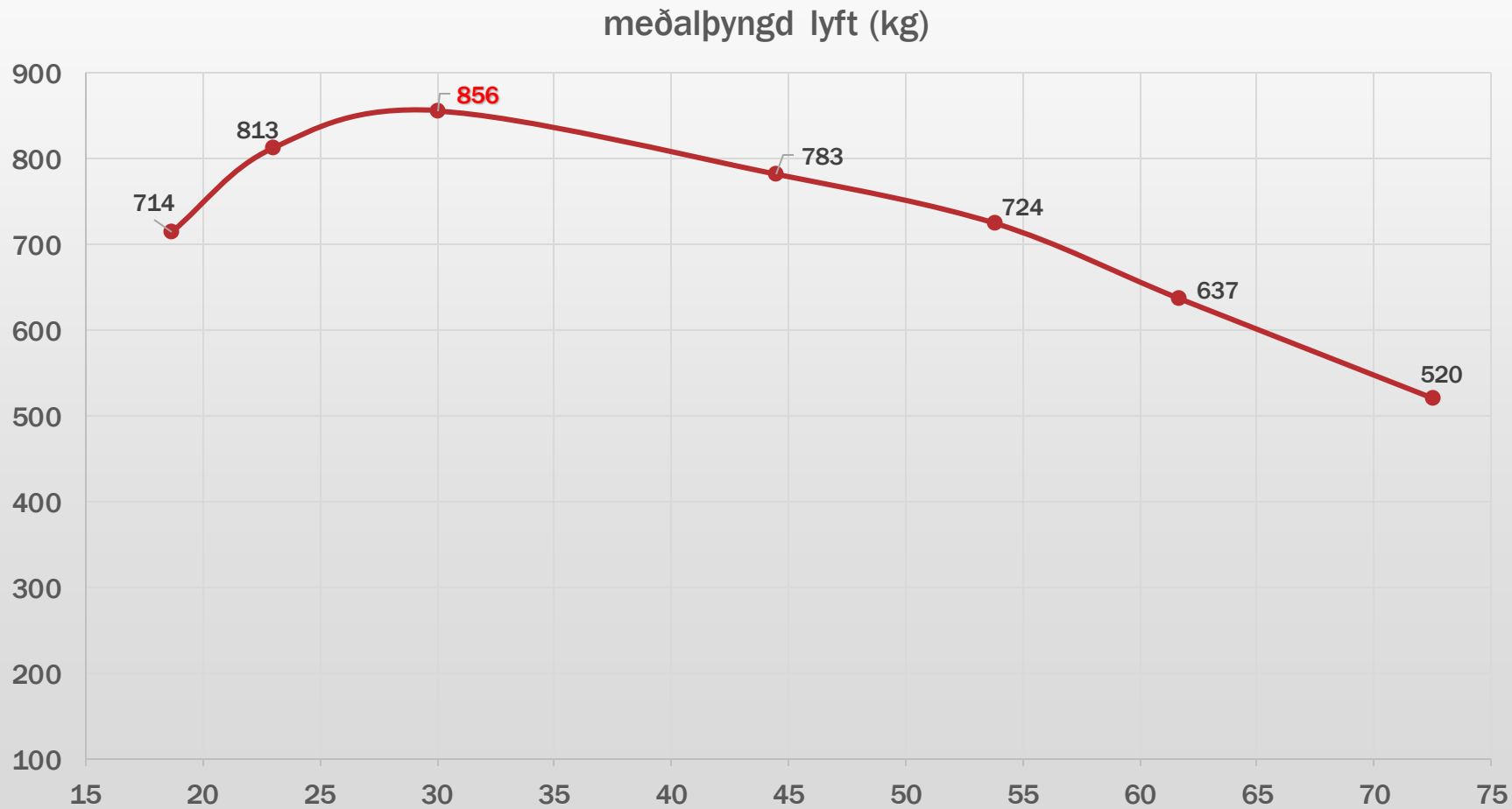


Acute Sarcopenia Secondary to Hospitalisation – An Emerging Condition Affecting Older Adults

Carly Welch^{1,2, *}, Zaki K. Hassan-Smith^{2,3,4}, Carolyn A. Greig^{5,6}, Janet M. Lord^{1,6}, Thomas A. Jackson^{1,2}



Heimsmet í kraftlyftingum (IPF) milli aldursflokka

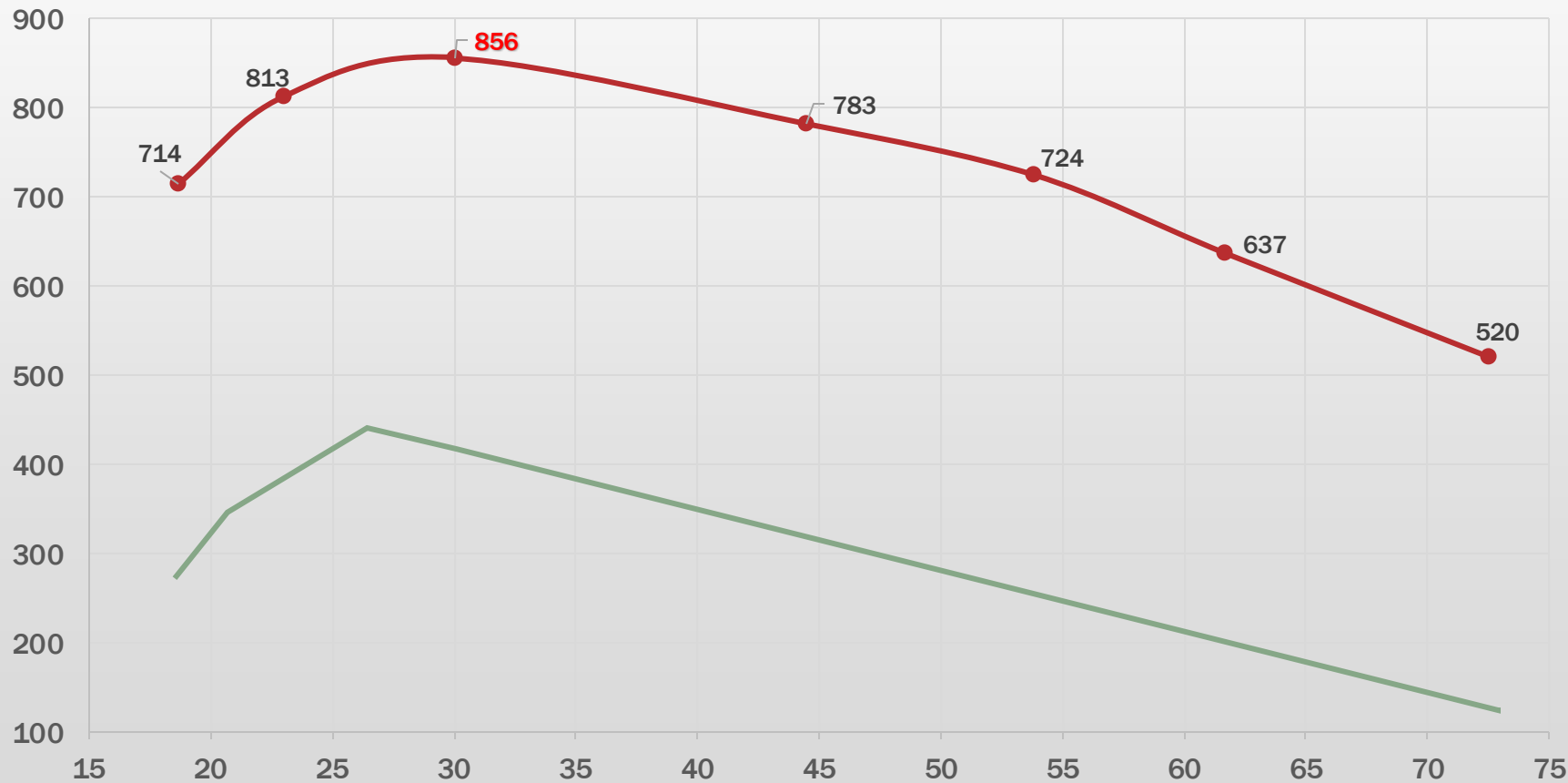


Sex þyngdarflokkar
-66 kg til -120 kg
Sjö aldursflokkar

Hlutfalls lækkun	Meðal aldur	Flokkur
-16,5%	19 ár	Sub-junior
-5,0%	23 ár	Junior
0,0%	30 ár	Open
-8,6%	45 ár	Masters 1
-15,5%	54 ár	Masters 2
-25,5%	62 ár	Masters 3
-39,3%	73 ár	Masters 4

Heimsmethafar í kraftlyftingum (IPF) og heilbrigð öldrun

meðalþyngd lyft (kg)



Sex þyngdarflokkar
-66 kg til -120 kg
Sjö aldersflokkar

Hlutfalls lækkun	Meðal aldur	Flokkur
-16,5%	19 ár	Sub-junior
-5,0%	23 ár	Junior
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-8,6%	45 ár	Masters 1
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-39,3%	73 ár	Masters 4

ÆFING = MEDAL

EXERCISE IS MEDICINE

Exercise Is Medicine

ACSM 2008

Ímyndið ykkur pillu sem sannað væri að veitti sambærilegan heilsufarslegan ávinning og fæst með þjálfun og/eða reglulegri hreyfingu, með litlum líkum á aukaverkunum en fjölda jákvæðra áhrifa sem myndi valda að sjúklingum „liði betur, virkar betur og sofa betur“.

Læknar myndu örugglega ávísa þeirri pillu til hvers sjúklings, lyfjafyrirtæki myndu framleiða og markaðssetja lyfið, sjúkrasamlög myndu örugglega borga fyrir það og hver einasti sjúklingur myndi biðja um það.

Bandarískar ráðleggingar um hreyfingu

2018 Physical Activity Guidelines for Americans		
Age (yrs old)	Aerobic Activity Recommendations	Muscle Strengthening Recommendations
6-17	60 minutes of moderate or vigorous physical activity (PA)/day including at least 3 days of vigorous PA/wk	3 days/week and included as part of the 60 minutes of daily PA. Also include bone-loading activity
18-64	150-300 minutes of moderate PA/wk, 75 minutes of vigorous PA/wk or equivalent combination spread throughout the week	Muscle strengthening activities at moderate or greater intensity (all major muscle groups) on 2 or more days/wk
65+	Same as adults, or be as active as abilities and health conditions allow	Same as adults, but include balance training and combination activities (strength and aerobic training together)
All Ages	Sit less. Move more. All physical activity counts.	

Bandarískar ráðleggingar um hreyfingu

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All Ages			

Ráðleggingar WHO um hreyfingu

Practice Guideline > Br J Sports Med. 2020 Dec;54(24):1451-1462.

doi: 10.1136/bjsports-2020-102955.

World Health Organization 2020 guidelines on physical activity and sedentary behaviour

Abstract

Objectives: To describe new WHO 2020 guidelines on physical activity and sedentary behaviour.

Methods: The guidelines were developed in accordance with WHO protocols. An expert Guideline Development Group reviewed evidence to assess associations between physical activity and sedentary behaviour for an agreed set of health outcomes and population groups. The assessment used and systematically updated recent relevant systematic reviews; new primary reviews addressed additional health outcomes or subpopulations.

Results: The new guidelines address children, adolescents, adults, older adults and include new specific recommendations for pregnant and postpartum women and people living with chronic conditions or disability. All adults should undertake 150-300 min of moderate-intensity, or 75-150 min of vigorous-intensity physical activity, or some equivalent combination of moderate-intensity and vigorous-intensity aerobic physical activity, per week. Among children and adolescents, an average of 60 min/day of moderate-to-vigorous intensity aerobic physical activity across the week provides health benefits. The guidelines recommend regular muscle-strengthening activity for all age groups.

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Acute sarcopenia: Er ganga næg þjálfun – eða ofmetin?

2000 Steps/Day Does Not Fully Protect Skeletal Muscle Health in Older Adults during Bed Rest

[Emily Arentson-Lantz](#),¹ [Elfego Galvan](#),¹ [Adam Wachter](#),² [Christopher S. Fry](#),¹ and [Douglas Paddon-Jones](#)¹

Healthy older adults (68 ± 2 y) were randomized to 7-days bed rest with (STEP; $n=7$) or without (CON; $n=10$) a 2000 step/day intervention. Performing 2018 ± 4 steps/day did not prevent the loss of lean leg mass and had no beneficial effect on aerobic capacity, strength or muscle fiber volume.

Arentson-Lantz, E., Galvan, E., Wachter, A., Fry, C. S., & Paddon-Jones, D. (2019). 2,000 steps/day does not fully protect skeletal muscle health in older adults during bed rest. *Journal of Aging and Physical Activity*, *27*(2), 191–197.
<https://doi.org/10.1123/japa.2018-0093>

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In an era of spiraling health care expenditures, getting patients to be more active may be the ultimate low-cost therapy for achieving improved health outcomes. Studies show that regular physical activity (PA) has health benefits at any body weight and is critical for long-term weight management. Decades of research have shown that exercise is as effective as prescription medication in the management of several chronic diseases. Just as weight and blood pressure are addressed at nearly every health care visit, so should attention be given to PA.

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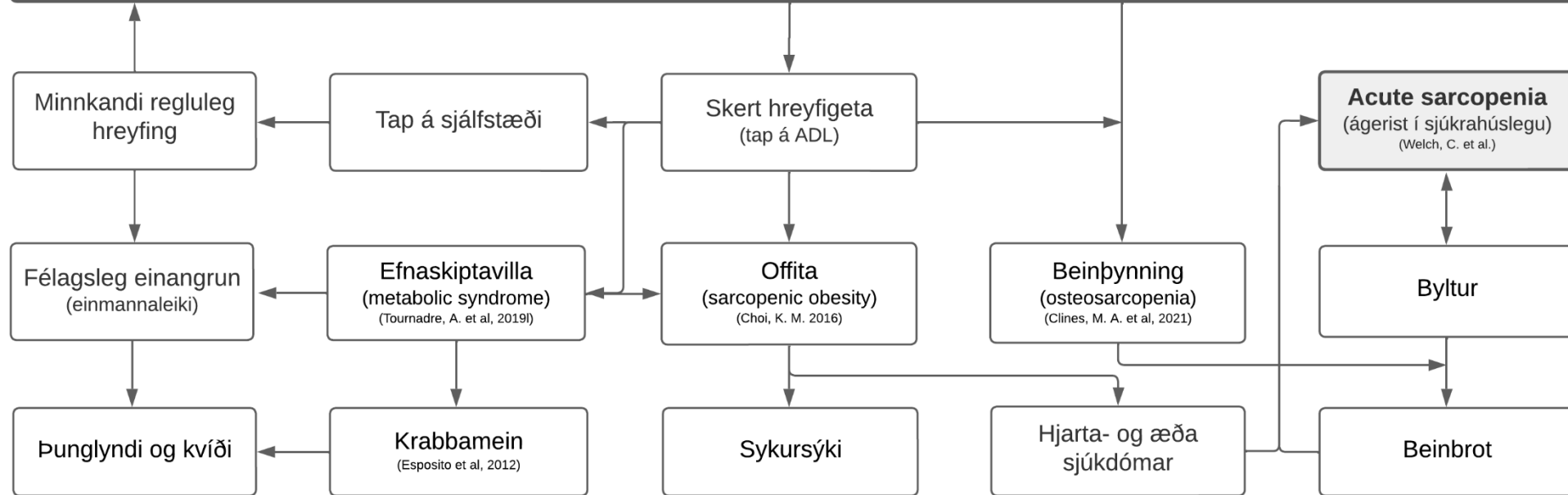
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KOSTNAÐUR VIÐ SARCOPENIA

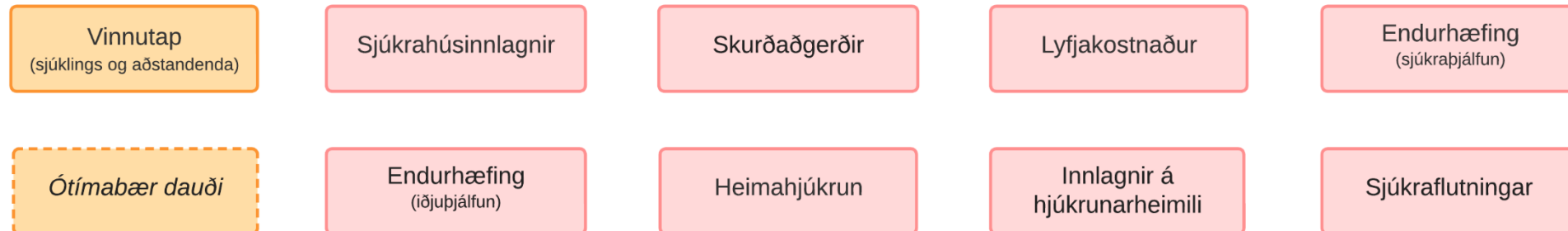
Sarcopenia



Beinn kostnaður fyrir heimilin

Beinn og óbeinn kostnaður fyrir heilbrigðiskerfið

(Janssen, I. et al, 2004), (Pinedo-Villanueva, R. et al, 2019)



Kostnaður vegna sarcopenia

- Árið 2000 var áætlaður kostnaður innan bandaríska heilbrigðiskerfisins vegna hreyfihömlunar (disabilities) vegna sarcopenia, **18,5 milljarðar USD (11,8- 26,2 millj.)**
- Donald Shepard, í fyrirlestri 2012; áætlaði hlutfallslega hækkun á árinu 2011, **24 milljarða USD (lægsta gildi).**
- **1.5 %** af heildar útgjöldum heilbrigðiskerfisins árið 2000 (USA)
- Hærri en útgjöld vegna beinþynningarbrotá (osteoporotic fractures)

The Healthcare Costs of Sarcopenia in the United States

Ian Janssen, PhD,^{*†} Donald S. Shepard, PhD,[§] Peter T. Katzmarzyk, PhD,^{†‡} and Ronenn Roubenoff, MD, MHS^{*}

OBJECTIVES: To estimate the healthcare costs of sarcopenia in the United States and to examine the effect that a reduced sarcopenia prevalence would have on healthcare expenditures.

DESIGN: Cross-sectional surveys.

SETTING: Nationally representative surveys using data from the U.S. Census, Third National Health and Nutrition Examination Survey, and National Medical Care and Utilization Expenditure Survey.

PARTICIPANTS: Representative samples of U.S. adults aged 60 and older.

MEASUREMENTS: The healthcare costs of sarcopenia were estimated based on the effect of sarcopenia on increasing physical disability risk in older persons. In the first step, the healthcare cost of disability in older Americans was estimated from national surveys. In the second step, the proportion of the disability cost due to sarcopenia (population-attributable risk) was calculated to determine the healthcare costs of sarcopenia. These calculations relied upon previously published relative risk values for disability in sarcopenic individuals and sarcopenia prevalence rates in the older population.

RESULTS: The estimated direct healthcare cost attributable to sarcopenia in the United States in 2000 was \$18.5 billion (\$10.8 billion in men, \$7.7 billion in women), which represented about 1.5% of total healthcare expenditures for that year. A sensitivity analysis indicated that the costs could be as low as \$11.8 billion and as high as \$26.2 billion. The excess healthcare expenditures were \$860 for every

sarcopenic man and \$933 for every sarcopenic woman. A 10% reduction in sarcopenia prevalence would result in savings of \$1.1 billion (dollars adjusted to 2000 rate) per year in U.S. healthcare costs.

CONCLUSION: Sarcopenia imposes a significant but modifiable economic burden on government-reimbursed healthcare services in the United States. Because the number of older Americans is increasing, the economic costs of sarcopenia will escalate unless effective public health campaigns aimed at reducing the occurrence of sarcopenia are implemented. *J Am Geriatr Soc* 52:80–85, 2004.

Key words: skeletal muscle; sarcopenia; disability; healthcare costs

The aging process is associated with sarcopenia (loss of skeletal muscle mass)^{1–3} and an increase in the prevalence of physical disability.⁴ Sarcopenia^{5–8} and disability^{9–11} are highly prevalent in older Americans. Recent estimates indicate that approximately 45% of the older U.S. population is sarcopenic⁷ and that approximately 20% of the older U.S. population is functionally disabled.¹⁰ Not surprisingly, sarcopenia is related to physical disability in older men and women.^{5–8} At the individual level, disability leads to reduced quality of life; at the societal level, it leads to an increase in healthcare expenditures. In older persons, physical disability is associated with an increased risk of nursing home placement,¹² home healthcare¹³ and hospital¹⁴ use, and healthcare expenditures.^{4,15}

Given the high prevalence of sarcopenia and disability in older persons, the strong effect sarcopenia has on disability, and the increased healthcare expenditures in disabled persons, the economic burden of sarcopenia is presumed to be great. Nevertheless, even though the economic costs of illnesses play an important role in health policy,¹⁶ there is a worldwide absence of reports that seek to quantify the effect of sarcopenia on the use of health services. Thus, the primary objective of this study was to estimate the healthcare costs of sarcopenia in the United States. Because sarcopenia is a potentially avoidable and reversible condition, a secondary objective was to examine the effect that reduced sarcopenia prevalence would have on healthcare expenditures.

From the *Nutrition, Exercise Physiology, and Sarcopenia Laboratory, Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University, Boston, Massachusetts; †Department of Community Health and Epidemiology and ‡School of Physical and Health Education, Queen's University, Kingston, Ontario, Canada; §Schneider Institute for Health Policy, Heller School for Social Policy and Management, Brandeis University, Waltham, Massachusetts.

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Address correspondence to Ian Janssen, PhD, Department of Community Health and Epidemiology, Abramsky Hall, Queen's University, Kingston, Ontario, Canada, K7L 3N6. E-mail: janssen@post.queensu.ca



Fjárlög heilbrigðismála 2022

322.061.000.000 kr.

Reiknað hlutfall beins kostnaðar sarcopenia í heilbrigðiskerfi Bandaríkjanna árið 2000 (Janssen, I. 2004)

1.5%

Mögulegt hlutfall beins kostnaðar sarcopenia í af fjárlögum heilbrigðismála á Íslandi árið 2022

4.830.915.000 kr.

Skilaboñin eru ...

Editorial

Urgent need for integrating physical exercise into geriatric medicine: a call to action

 Mikel Izquierdo^{1, 2}, Maria Fiatarone Singh^{3, 4}

Correspondence to Professor Mikel Izquierdo, Universidad Pública de Navarra (UPNA), Pamplona, Spain; mikel.izquierdo@gmail.com

Kærar þakkir!

arnarh@ru.is