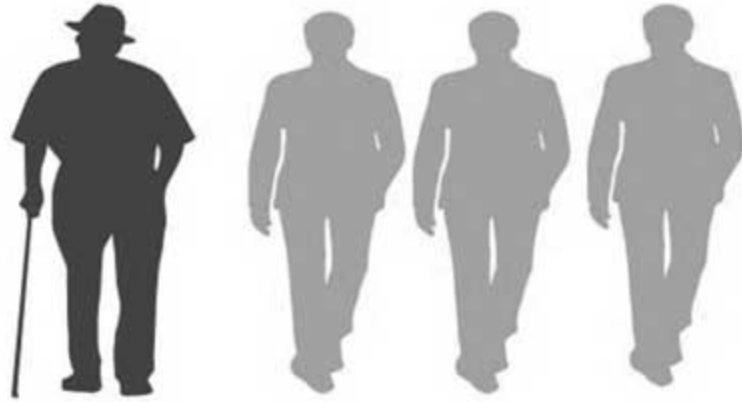




# Ageing and Sarcopenia



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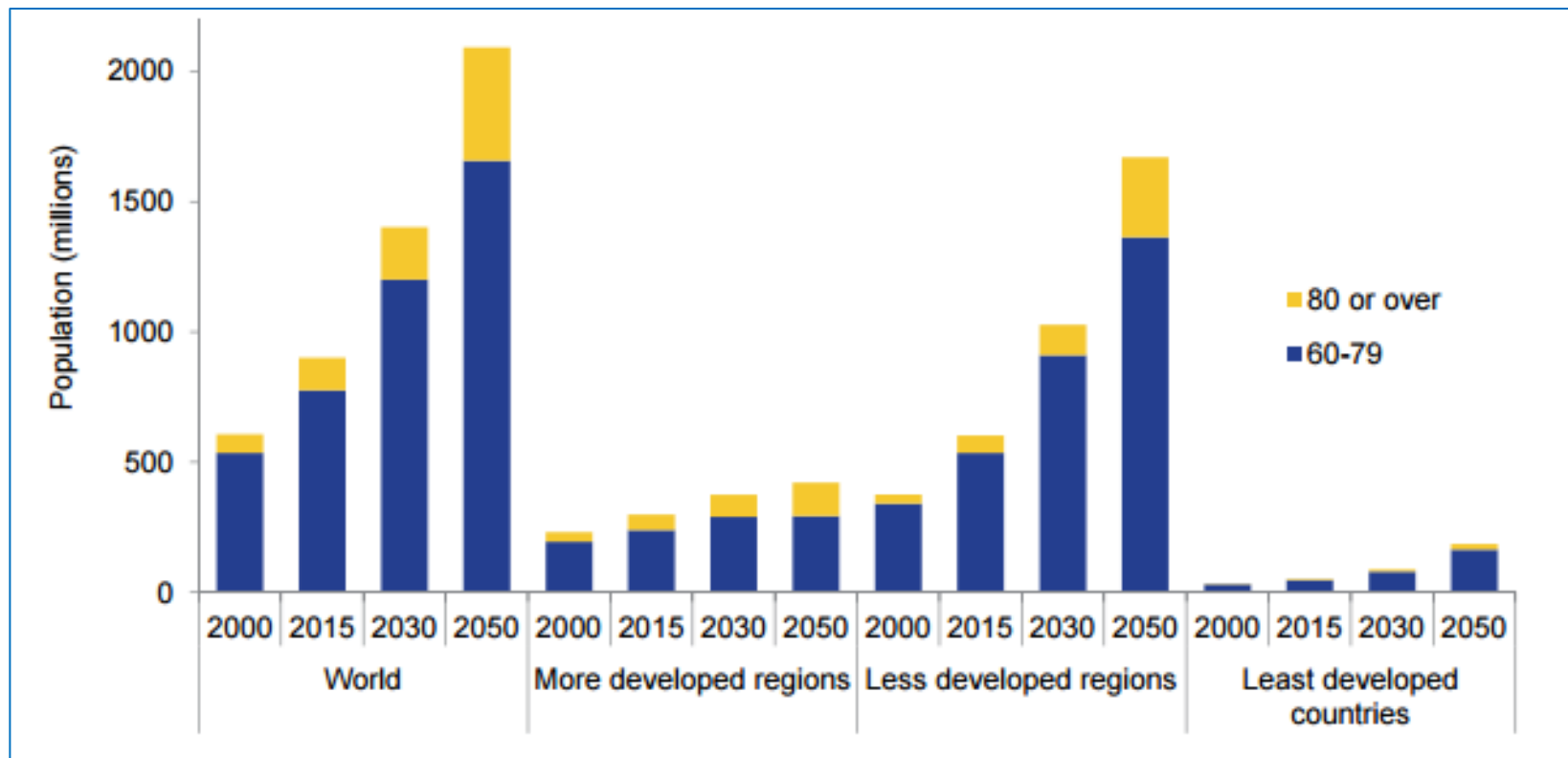


# Ageing Population Statistics



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# Population aged 60-79 years and aged 80 years or over by development group, 2000, 2015, 2030 and 2050



The world's oldest-old people are increasingly concentrated in the developing regions, from 49 per cent in 2000 to 53 per cent in 2015, and that proportion is projected to rise further to 58 per cent in 2030 and to 71 per cent in 2050.

**Source from: United Nation, 2015.**

# Population ageing in ASEAN countries, 1950-2050

Country	1950	1980	2010	2035	2050
	percentage of older population in total population				
<b>Brunei</b>	7.6	4.3	6.2	23.2	28.3
<b>Cambodia</b>	4.5	4.7	7.2	14.3	21.2
<b>Indonesia</b>	6.2	5.6	7.6	16.2	21.1
<b>Laos</b>	3.9	5.7	5.6	9.6	15.7
<b>Malaysia</b>	7.3	5.6	7.8	15.8	23.1
<b>Myanmar</b>	5.6	6.2	7.7	16.1	22.3
<b>Philippines</b>	5.5	4.9	5.9	10.4	13.7
<b>Singapore</b>	3.7	7.2	14.1	29.7	35.5
<b>Thailand</b>	5.0	5.6	12.9	30.5	37.5
<b>Viet Nam</b>	7.0	7.8	8.9	21.2	30.6
<b>ASEAN</b>	6.0	5.9	8.1	17.0	22.4

An upsurge in ageing is projected in all countries during 2010-2035 and further during 2035-2050. The proportion of older persons in the ASEAN region is projected to increase to 17.0 percent in 2035 and to 22.4 percent in 2050.

***Source from: United Nation (2013).***

# The past and future of population ageing in Indonesia, 1971-2010-2035



Period	Increments in population (000)				Increment as % of increase in total population		
	Total	0-14	15-59	60 & >	0-14	15-59	60 & >
1971-2010	119,273	16,563	89,973	12,737	13.9	75.4	10.7
2010-2035	67,1341	-2,432	39404	30,162	-3.6	58.7	44.9

- Census results have thus shown that the demographic scenario in which Indonesia is facing is characterized by a consistent increase in the older population.
- Within the next 25 years, the share of older population will have more than doubled.

**Source from: Population Census 2010 [data file]; Indonesia Population Projection 2010-2035.**

# Major Concerns of Ageing





# Sarcopenia



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# What is Sarcopenia?

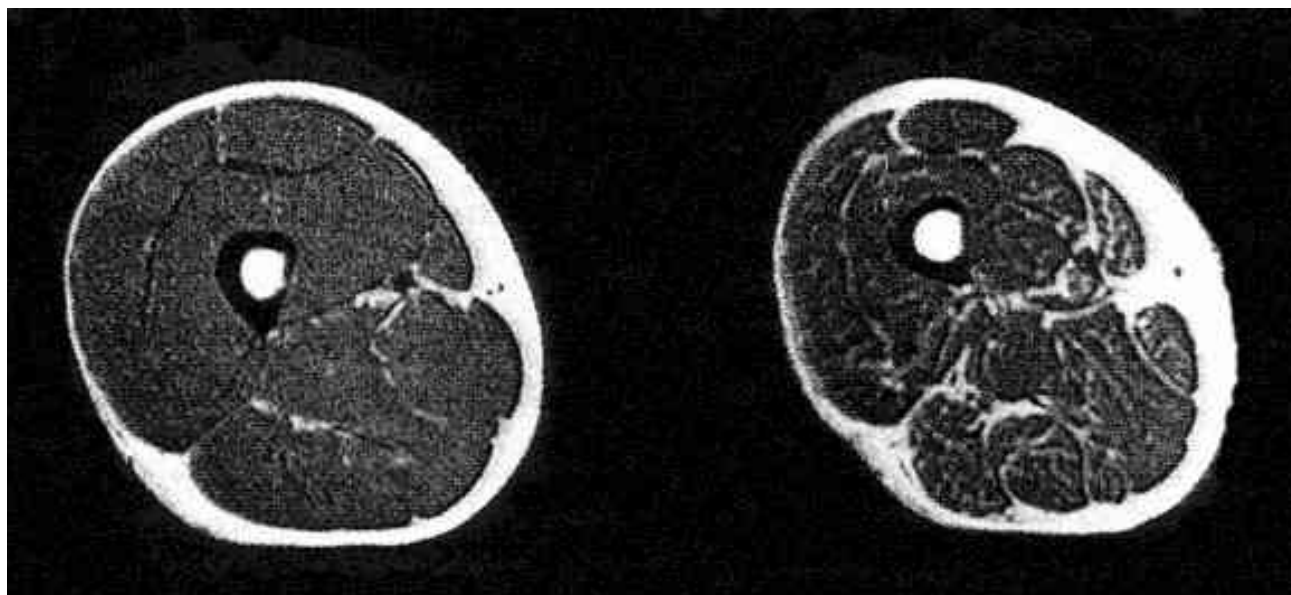




# What is Sarcopenia?

- Declining of skeletal muscle mass and function which occurs with advancing age.
- The loss of lean body mass can be debilitating and lead to clinical and functional complications.

## **MRI Cross Section of Thigh: Muscle mass decreases as you age**



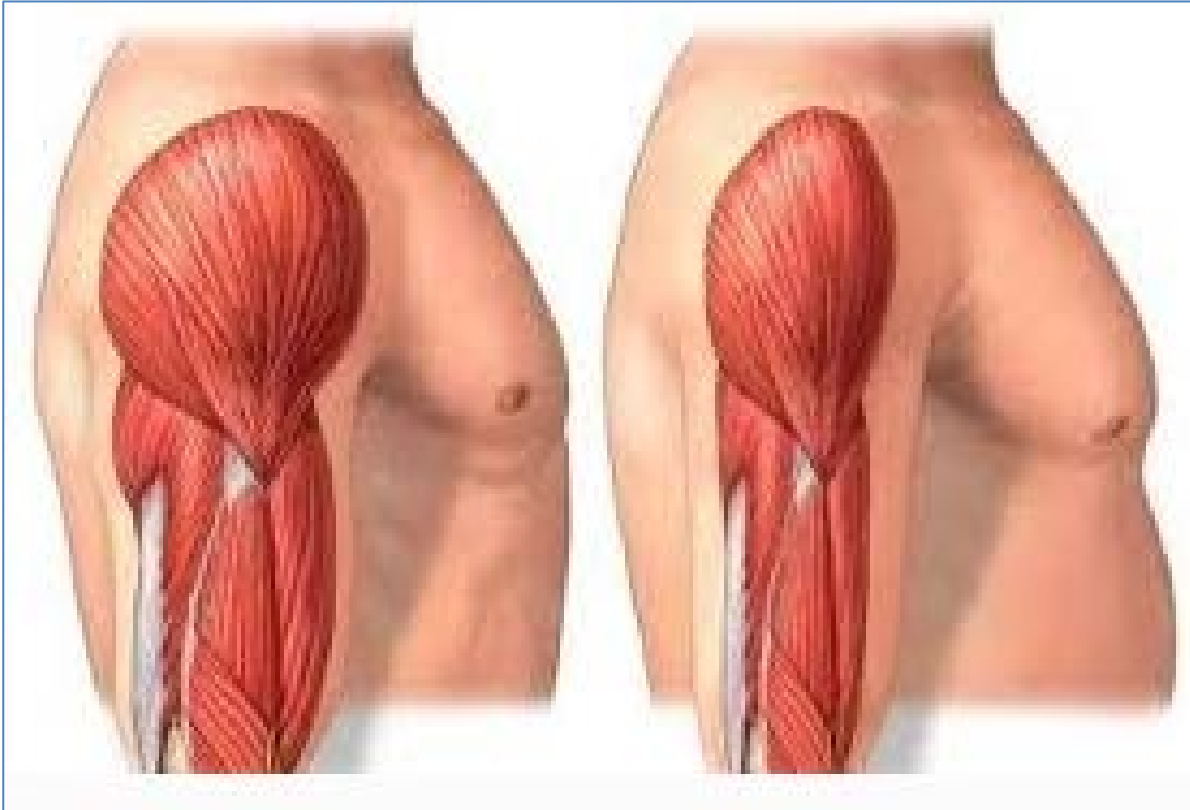
**Age at 25**

**Age at 63**

*Source from: Abbott, 2016; Spirduso, 2005.*

# What is Sarcopenia?

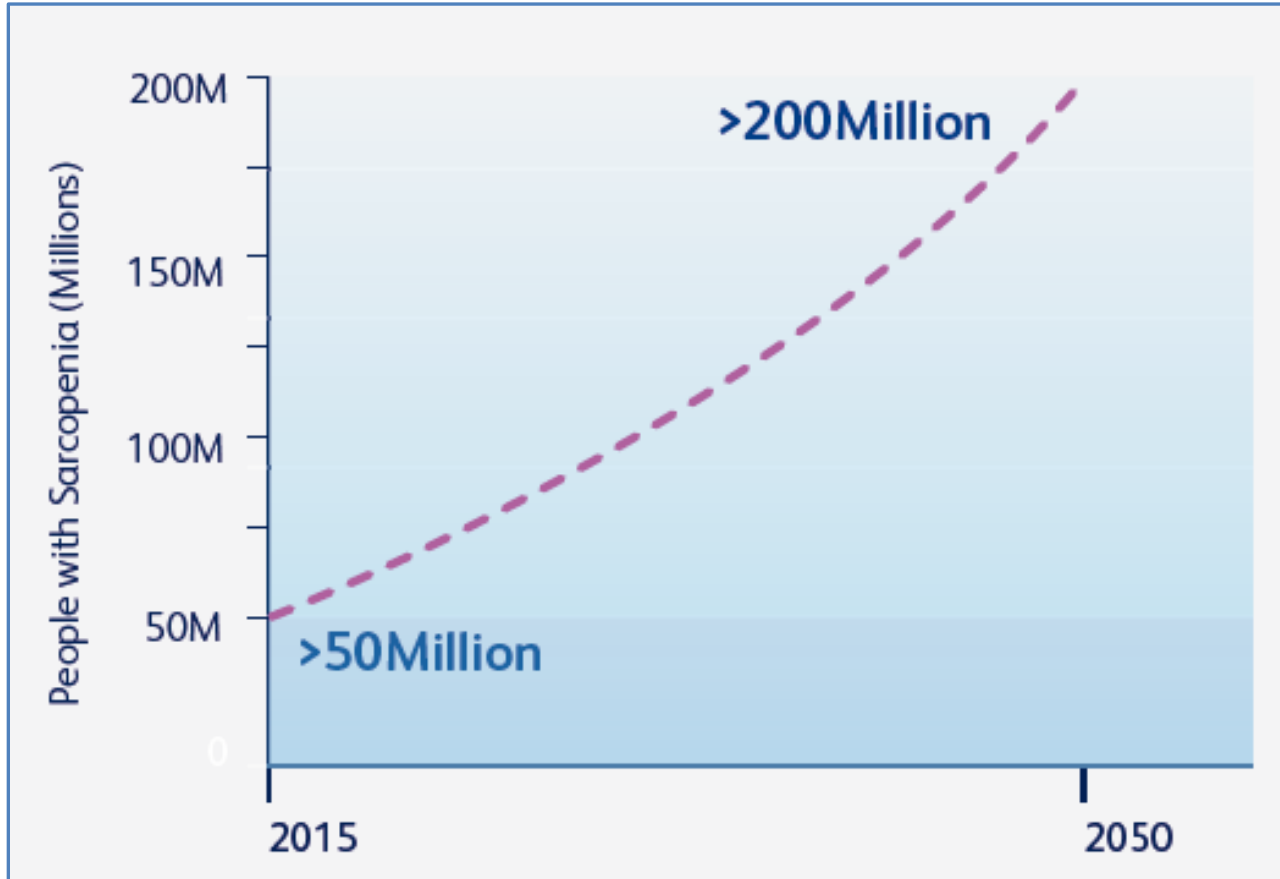
**Normal muscle mass on left, muscle wasting on right**



**As we age, we naturally lose muscle mass, strength and function.**

*Source from: International Osteoporosis Foundation, 2015.*

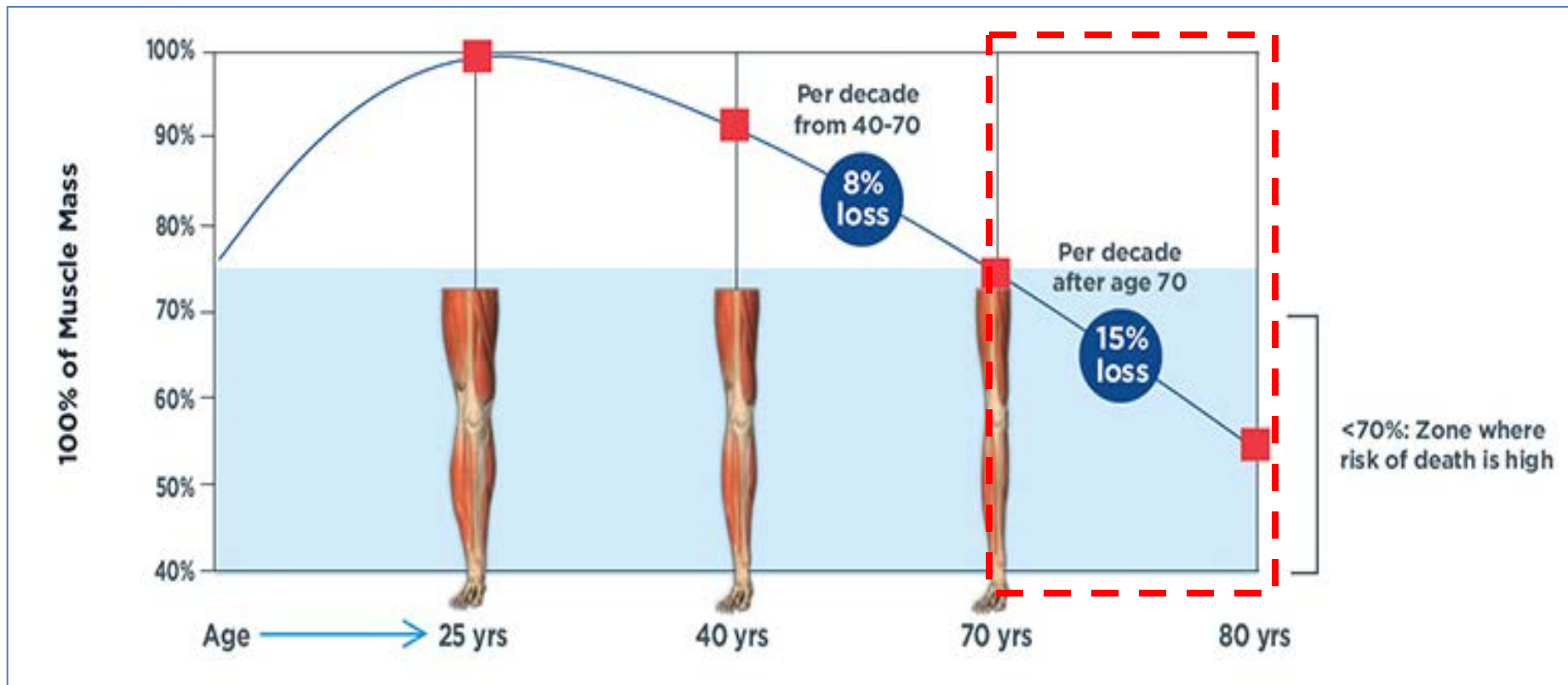
# Estimation Number of People with Sarcopenia in 2050



The estimated loss of muscle mass is 1–2% per year after the age reaches 50. With a prevalence in the 7th decade of life (60–70 yrs) of 5–13%, sarcopenia currently affects >50 million people and is predicted to affect >200 million by 2050.

***Source from: Carbery, 2016.***

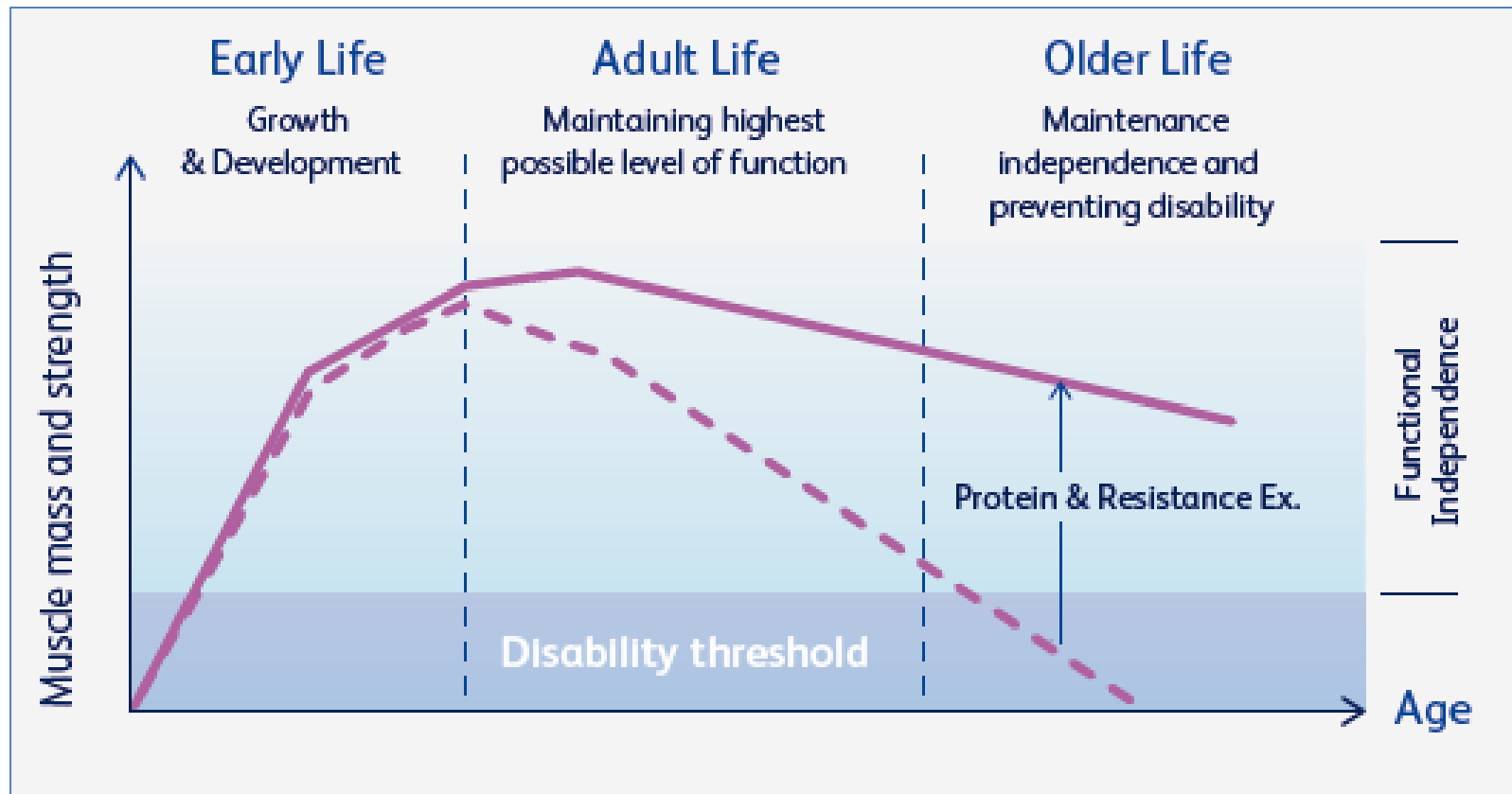
# Loss of Muscle Mass Over Time



- Progressive loss of muscle mass occurs at the age of 40 at the rate of 8% per decade and increases to 15% per decade after 70 years.
- For muscle strength, it declines 10-15% per decade and more rapidly after the age of 70 years.

**Source from: Abbott, 2016; Limpawattana et al., 2015.**

# Change In Functional Capacity Over The Lifespan



Critical to public health and its associated cost, if the decline in muscle mass, strength and function is severe in nature, individuals may fall below a disability threshold whereby independent living is no longer viable.

**Source from: Carbery, 2016.**

# AWGS: Sarcopenia in Asia



The Asian Working Group for Sarcopenia (AWGS) issued regional consensus guidelines in 2014, and many more research studies from Asia have since been published; this review summarizes recent progress. The prevalence of sarcopenia estimated by the AWGS criteria ranges between 4.1% and 11.5% of the general older population.



*Source from: Chen et al., 2016; Limpawattana et al., 2015.*

# 'Target' of Sarcopenia

- According to Tanimoto et al., (2011), prevalence of sarcopenia is higher in female subjects (19.9% in female and 17.2% in male), which was relevant to the finding of this study of about 12.3% in female and 2.3% in male.
- Setiati (2013) also reported 8% low grip strength and 2.8% limited mobility in 251 geriatric outpatients in Cipto Mangunkusumo Hospital, Jakarta, Indonesia.



***Source from: Setiati, 2013; Tanimoto et al., 2011.***

# Factors of Sarcopenia Prevalence



- Age
- Sex
- Heart disease
- Hyperlipidemia
- Daily alcohol consumption
- Inadequate protein intake
- Insufficient of vitamin intake
- Less daily physical activity





# Relationship between Protein Intake and Sarcopenia

- Inadequate protein intake is particularly the key component of established sarcopenia.
- Older adults usually intake less protein than the daily recommendation.
- Independent of the amount, the protein source can alter the rate of MPS.
- Milk proteins are considered to be of high quality due to their high relative essential amino acid composition, rapid rate of digestion and absorption.



***Source from: Carbery, 2016; Limpawattana et al., 2015.***

# Impacts of sarcopenia in elderly



- Presence of recent functional decline or functional impairment
- Unintentional body weight loss over 5% in a month
- Depressive mood or cognitive impairment
- Repeated falls
- Undernutrition
- Chronic conditions such as chronic heart failure, chronic obstructive pulmonary disease, diabetes mellitus, chronic kidney disease, connective tissue disease, tuberculosis infection, and other chronic wasting conditions.



**Source from: Limpawattana et al., 2015.**



# Whey Protein and Sarcopenia



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# Carbery for Healthy Ageing



**A milk protein supplement that maintains muscle in healthy older individuals, also improving femoral bone mineral density (BMD).**



**Patent application published**



**Peer reviewed publication published in  
Journal of Nutrition**



**Great tasting**



**Suitable in a wide variety of applications.**

# The Unique Role of Whey Protein in Sarcopenia

- May help preserve and minimize body protein (muscle) loss during aging to help protect against sarcopenia or muscle loss.
- Improves glutathione levels to help protect against various age related diseases including: Alzheimer's disease, Parkinson's disease, cataracts and arteriosclerosis.
- Stimulates (postprandial) protein synthesis to help limit body protein loss better than casein and other proteins in elderly populations.
- May help enhance memory performance in elderly adults.

***Source from: Whey Protein Institute, 2015.***



# Clinical Studies



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# New Research: Food for Health Ireland (FHI)



**Carbery recently completed a Clinical Trial on Healthy Ageing in partnership with Food for Health Ireland (FHI).**

- **Subject:** 60 participants aged between **50-70 years** completed a 6 month intervention study.
- **Method:** 60 healthy older men and women (aged  $61 \pm 5y$ ) with a body mass index (in  $kg/m^2$ ) of  $25.8 \pm 3.6$  consumed either 0.165 g/kg body mass of a milk-based protein matrix (PRO) or an isoenergetic, nonnitrogenous maltodextrin control (CON) at breakfast and midday meals, the lower protein-containing meals of the day, for 24 wk.
- **Findings:** Protein supplementation at breakfast and lunch for 24 week in healthy older adults resulted in a positive (+0.6 kg) difference in lean tissue mass compared with control. These observations suggest that an optimized and balanced distribution of meal protein intakes could be beneficial in the preservation of lean tissue mass in the healthy ageing population.

***Source from: FHI, 2016.***



# Clinical Studies: Protein intake and Sarcopenia

Study Title	Subjects and Method	Outcome	References
Dietary protein intake in elderly women: association with muscle and bone mass.	Elderly women older than 65 years with sarcopenia (n = 35) and without sarcopenia (n = 165) participated in the study.	Muscle, bone, and fat mass was significantly higher in women who had protein intake >1.2 g/kg/d. A lower intake of essential amino acids in women with sarcopenia was also observed. Protein and energy intake were significant predictors of muscle mass. An adequate protein intake could have a positive impact on bone mineral density, lean mass, and skeletal muscle mass.	Genaro et al., 2015.
Fast-digestive protein supplement for ten days overcomes muscle anabolic resistance in healthy elderly men.	Adequate-protein or high-protein diet and protein source as caseins or soluble milk proteins was provided to 31 healthy elderly men.	Fast-digesting soluble milk proteins improved postprandial muscle protein synthesis in elderly subjects.	Walrand et al., 2015.



# Clinical Studies: Protein intake and Sarcopenia

Study Title	Subjects and Method	Outcome	References
Dietary protein intake in sarcopenic obese older women	A group of sarcopenic obese older women (n=104) was divided in two subgroups: the first (normal protein intake [NPI], n=50) administered with a hypocaloric diet (0.8 g/kg desirable body weight/day of proteins), and the second treated with a hypocaloric diet containing 1.2 g/kg desirable body weight/day of proteins (high protein intake [HPI], n=54), for 3 months.	Adequate protein intake could contribute to the prevention of lean-mass loss associated with weight reduction in obese older people.	Muscariello et al., 2015.

# Clinical Studies: Protein intake and Sarcopenia

Study Title	Subjects and Method	Outcome	References
Effectiveness of exercise and protein supplementation intervention on body composition, functional fitness, and oxidative stress among elderly Malays with sarcopenia.	Sarcopenic elderly Malays aged 60 - 74 years (n = 65) were assigned to the control group, exercise group, protein supplementation group, or the combination of exercise and protein supplementation group for 12 weeks.	Protein supplementation reduced body weight and increased upper body strength.	Shahar et al., 2013.

# Clinical Studies: Protein intake and Sarcopenia

Study Title	Subjects and Method	Outcome	References
Physiological effects beyond the significant gain in muscle mass in sarcopenic elderly men: evidence from a randomized clinical trial using a protein-rich food.	40 sarcopenic elderly men and women over 60 years old were divided into two groups and followed for 3 months. The intervention group received 210 g/day of ricotta cheese plus the habitual diet, while the control group followed the habitual diet with no additional intervention.	Muscle strength improved in the intervention group.	Aleman et al., 2012.

# Clinical Studies: Protein intake and Sarcopenia

Study Title	Subjects and Method	Outcome	References
Lean mass loss is associated with low protein intake during dietary-induced weight loss in postmenopausal women.	Protein intake averaged 0.62 g/kg/day (0.47 - 0.8 g/kg/day) among postmenopausal aged 50 to 70 years women during a 20-week.	Results suggested that an inadequate protein intake may be associated with LM loss, and daily protein intake $\leq 0.8$ g/kg was not sufficient to prevent LM loss in postmenopausal women.	Bopp et al., 2008.

# Recommended Daily Allowance for Protein



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# BPOM: Recommended Daily Allowance for Protein



Recommended Protein Intake (g/day) Age (Years Old)	Men	Women
50 - 64	65	57
65 - 80	62	56
> 80	60	55

*Source from:BPOM, 2016.*



# Market Examples

## Milk Products for Elderly in Indonesia



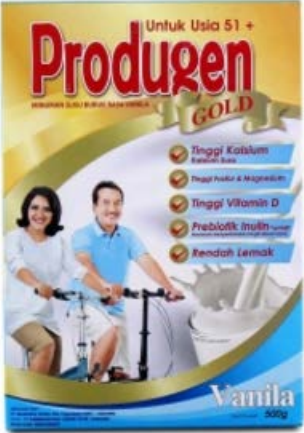

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# Market Examples



Products	Product Name and Descriptions	Ingredients	Reference
	<p><b>Fontera-</b></p> <p><b>Anlene Gold Plain BoneMax, Dietary Fibre, Low Fat, High Calcium</b></p> <p>For Men and Women 51+ years old</p> <p>(Also available in Vanilla/Mocha Caramel/Chocolate flavour)</p>	<p>Skimmed milk powder, Maltodextrin, Whey powder, Whole milk powder, FOS-Inulin, Calcium carbonate, Magnesium oxide, Soy lecithin, Vitamin D3, Vitamin A acetate, Zinc oxide</p>	<p><a href="http://www.anlene.co.id/products.html">http://www.anlene.co.id/products.html</a></p>
	<p><b>Nutrifood Indonesia –</b></p> <p><b>HiLo Gold Vanilla, Low Fat, High Calcium</b></p> <p>For 51+ years old</p> <p>(Also available in Plain and Chocolate flavour)</p>	<p>Skimmed milk powder, Maltodextrin, Full krim milk powder, Vitamin and mineral premix, Artificial vanilla flavor, Glucosamine, Red algae, Choline, Chondroitin, Artificial sweetener Acesulfame K -25mg (ADI= 15mg/kg body weight/day), Chromium Picolinate</p>	<p><a href="http://www.hilo.co.id/product/">http://www.hilo.co.id/product/</a></p> <p><a href="http://www.juzdeals.com/id/d/55199/up-off-hilo-gold-vanilla.html">http://www.juzdeals.com/id/d/55199/up-off-hilo-gold-vanilla.html</a></p>



# Market Examples

Products	Product Name and Descriptions	Ingredients	Reference
	<p><b>Produgen Gold Vanilla</b></p> <p>Low fat milk for age 51+ and contains prebiotics Inulin.</p>	Skim milk powder, maltodextrin, beta carotene coloring, full cream milk powder, calcium, Inulin, Buttermilk powder, Glucosamine, Vanilla Powder, vitamins and minerals premix, milk flavorings, sucralose.	<a href="https://www.arami.co.id/produgen-gold-vanilla-500gr.html">https://www.arami.co.id/produgen-gold-vanilla-500gr.html</a>
	<p><b>Indomilk Full Cream Box</b></p> <p>Contains omega-3.</p> <p>(Available in plain and chocolate flavor.)</p>	Fresh Cow's Milk, Nonfat Milk Powder, Milk Fat, Oligofructose, Lecithin Emulsifier Soy, Vitamin Mineral Premix, Perisa Vanilla, Cream Flavor, Choline, Vitamin E, Vitamin C, Omega 3	<a href="http://www.america-retail.com/industria-y-mercado/costa-rica-sweetwell-iniciara-exportacion-de-sus-productos-a-mexico-via-walmart/">http://www.america-retail.com/industria-y-mercado/costa-rica-sweetwell-iniciara-exportacion-de-sus-productos-a-mexico-via-walmart/</a>

# Market Examples

Products	Product Name and Descriptions	Ingredients	Reference
	<p><b>Kalbe – Entrasol Gold Pro-fit Formula</b></p> <p>High calcium nutritious milk for &gt; 51+</p>	<p>Maltodextrin, Skimmed Milk, Vegetable Oil, Concentrated Whey Protein, Caseinates, Fibers, Full Cream Milk, Soy Lecithin, Sucrose, Vanilla flavor, vitamins and minerals,</p>	<p><a href="http://akmalsehat.com/produk-sus/entrasol-gold">http://akmalsehat.com/produk-sus/entrasol-gold</a></p>
	<p><b>Appeton – Wellness 60+ Powder Drink with Vanilla Flavor</b></p> <p>Lactose free, gluten free, Inulin for good intestinal environment</p>	<p>Maltodextrin, Vegetable Oil with MCT oil, Sodium Caseinates, Sucrose, Soy Protein, Inulin, Vitamins and Minerals, Vanilla flavor and Choline Bitartrate.</p>	<p><a href="http://www.lazada.co.id/appeton-60-plus-vanilla-900-gr-102461.html">http://www.lazada.co.id/appeton-60-plus-vanilla-900-gr-102461.html</a></p>

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