

# Demystifying milk: Clinical facts vs fiction

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## Disclosures



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There are more **milk choices** than ever, but what might we consider in clinic?

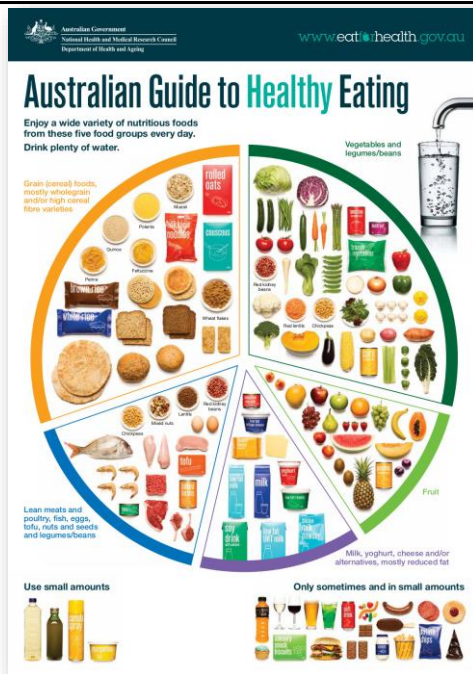


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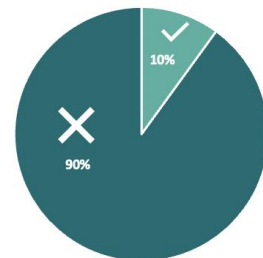
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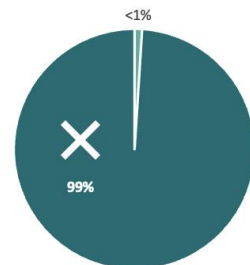
Milk is a **core** food



Australians Aged 2 +



Australians Aged 71+



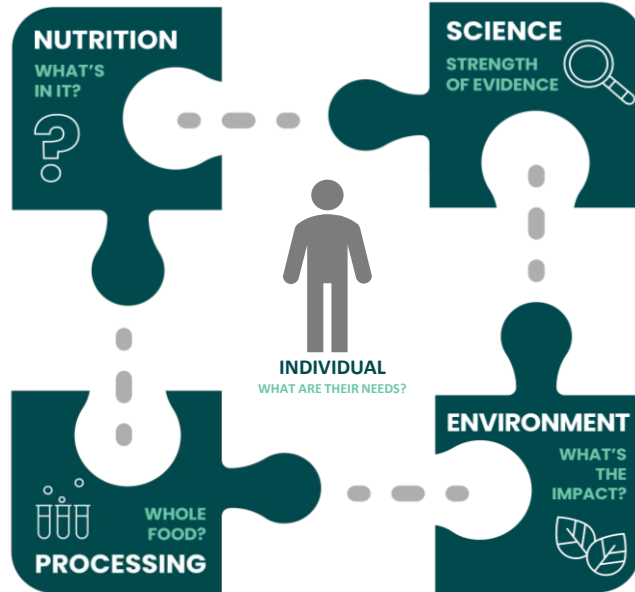
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Eat for Health <https://www.eatforhealth.gov.au/guidelines/australian-guide-healthy-eating>  
 ABS: <https://www.abs.gov.au/ausstats/abs@.nsl/Lookup/by?%20subject%20code%20=6364.0.55.012-2011-12-Main%20Features-Milk,%20Yoghurt,%20Cheese%20and%20alternatives-17>

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# Puzzle pieces when recommending milk



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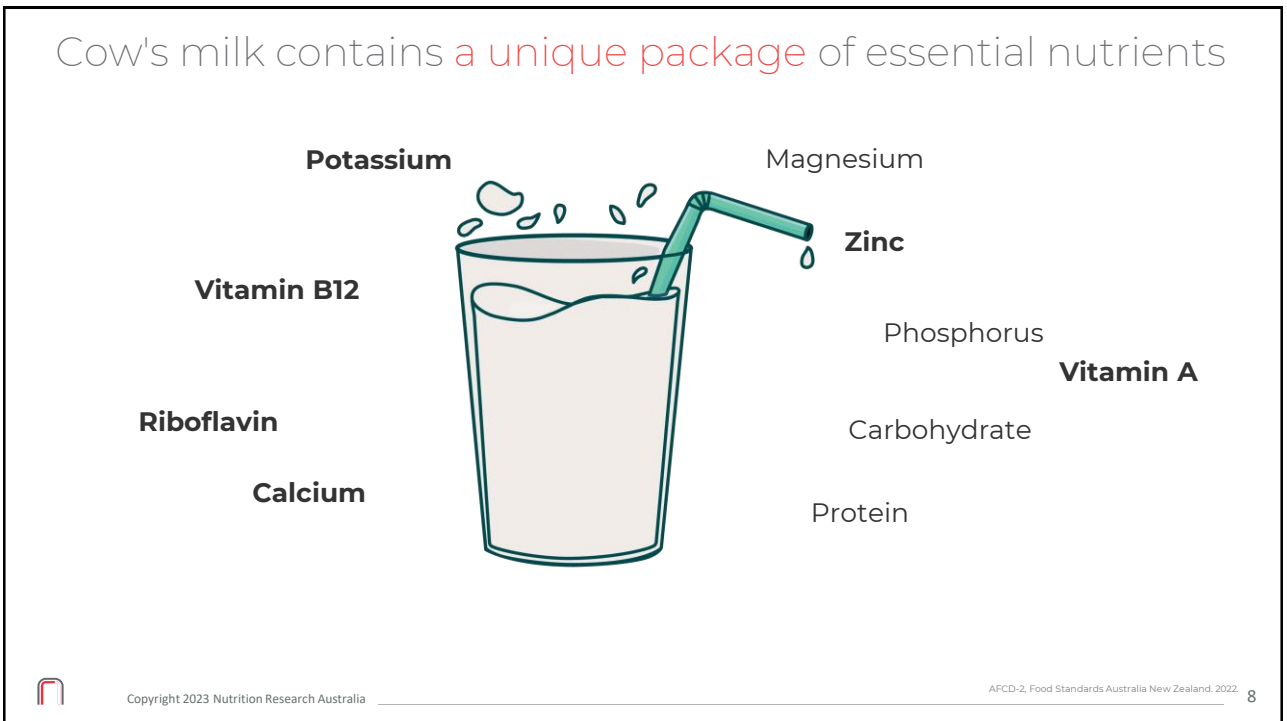
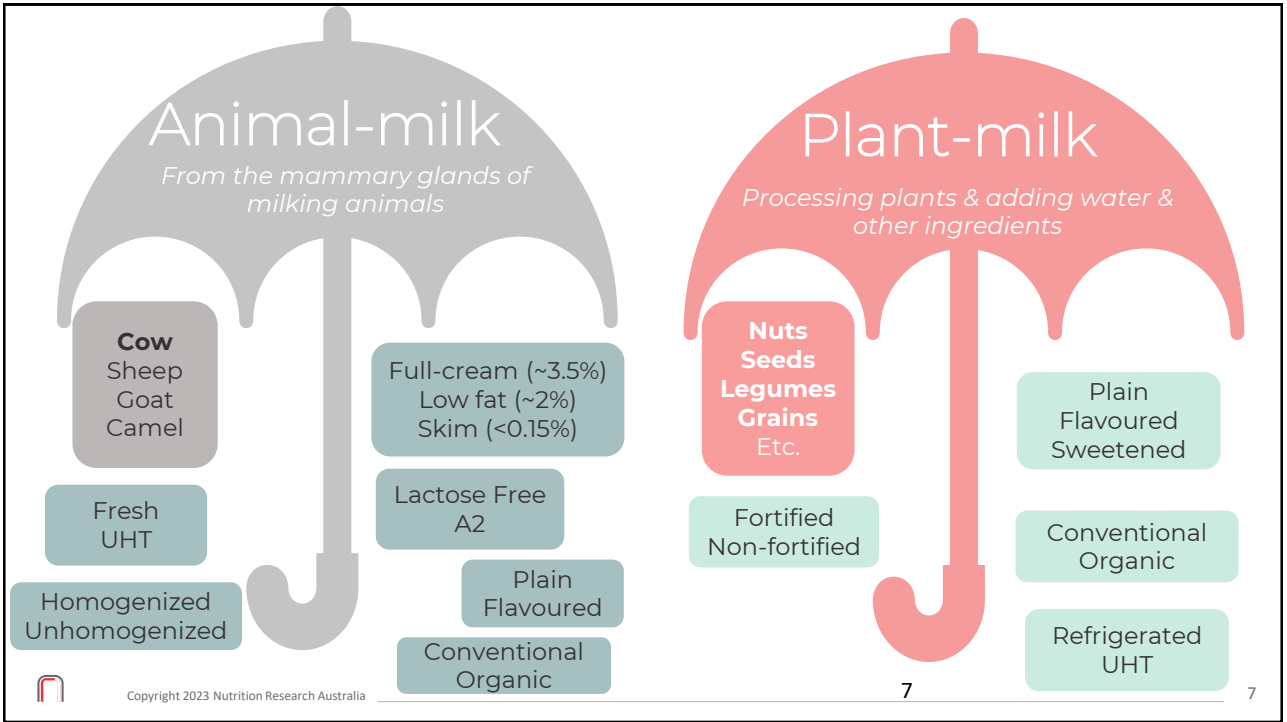
## Nutrition

What's in **milk** and **plant-based** milk alternatives?

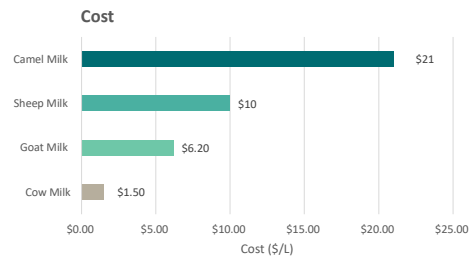
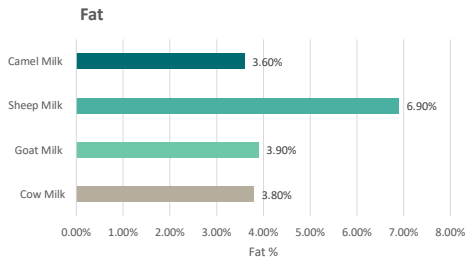
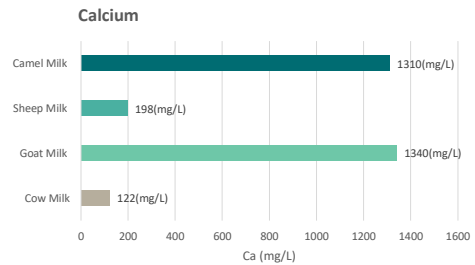
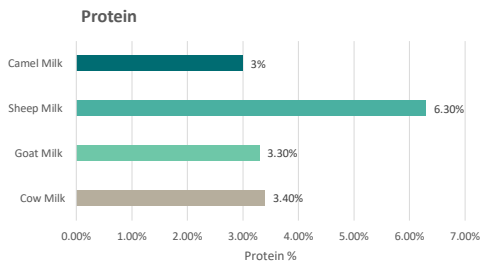
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# How does cow's milk differ to other animal milks?



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Mysore et al, J. Agric. Sci., 2020  
Sabahelkhier et al, Res J Rec Sci. 2012

# Plant-milk nutrient composition varies depending on type and fortification



**Lower** in most essential minerals & fats vs. cow's

\*sodium higher in almond, potassium higher in pea



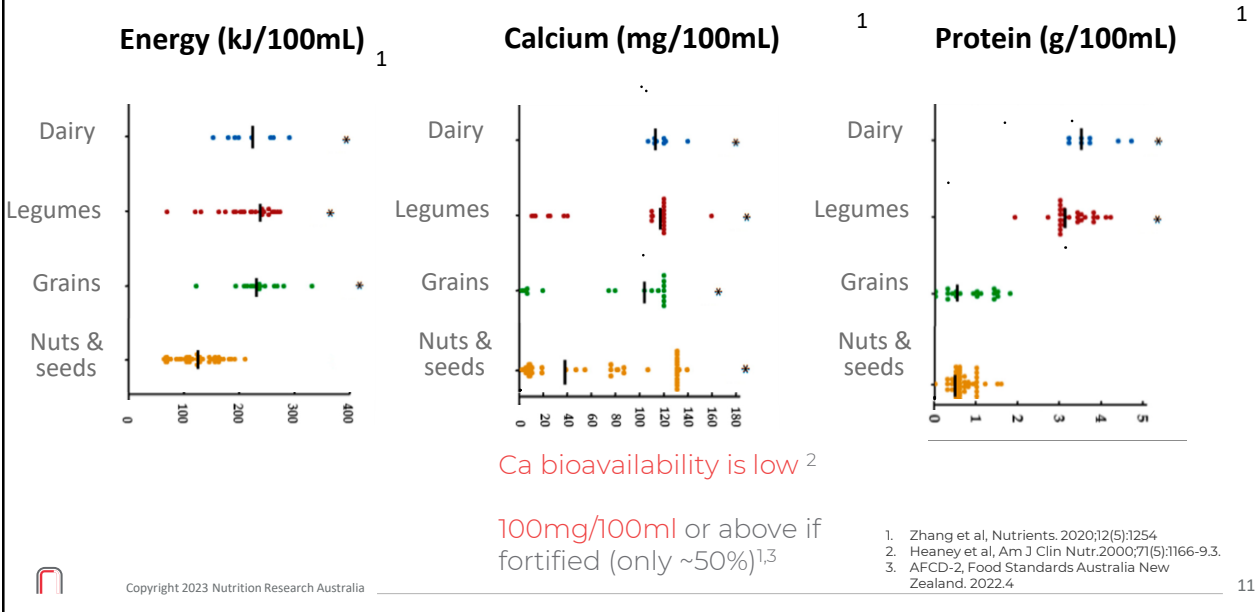
Soy is most **nutrient dense** & higher in vitamin E



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Smith et al, Front Nutr, 2022; Walther et al, Front Nutr, 2022 10

# Wide variation across and within milk types







# Bioactives in milk are well-established, while they vary by type in plant-milk





- Immunoglobulins
- Milk fat globule membrane
- Glycomacropeptide
- Bioactive peptides
- Milk oligosaccharides
- Lactoferrin
- α-lactalbumin



- Phytoestrogens 
- β-glucans 
- Oligosaccharides & prebiotics 



# Science


## What is the evidence on milk & health?

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### What is the strength of the evidence?




**Strong**

**Benefit/Neutral:**


- CVD
- Stroke
- Hypertension
- Colorectal cancer
- Metabolic syndrome
- Obesity
- Osteoporosis
- T2DM
- Alzheimer's Disease

**Caution:**


- Acne
- Fe-deficiency in infants




**Limited and unknown**  
Not suitable for children under 5y




Lower growth in children



Lower absorption and bioavailability of key nutrients



Unclear differences on gut microbiota



Poorer bone health in animal studies

Zhang et al. Nutrition & Metabolism. 2021  
 Morency et al. Am J Clin Nutr. 2017  
 Heaney et al. Am J Clin Nutr. 2000  
 Zhao et al. J Nutr. 2005;  
 Tang, Asia Pac J Clin Nutr 2010  
 Cakebread et al. Peer J. 2022

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# Processing

What are the **differences** between cow's milk and plant-milks?

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## Cow's milk is **minimally-processed** Plant-milk is **ultra-processed**



**Ingredients**  
Milk



**Ingredients**  
Filtered Water, Soy Protein (3.5%), Corn Maltodextrin, Vegetable Oils (Sunflower, Canola), Cane Sugar, Minerals (Calcium, Phosphorus, Magnesium), Acidity Regulators (332, 450), Antioxidant (Ascorbic Acid), Vitamins (B12, D2, A, B2, B1), Natural Flavour. All ingredients are of non-animal origin.

**“90% of plant-based beverages met the NOVA criteria for ultra-processed foods^”**

**“The majority of plant-based beverages contain added sugars & added salt^”**

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<sup>a</sup>Drewnowski. Adv Nutr. 12(6); 2021



# The plant-based mylk paradox

✓ Plant-based dietary patterns  
→ lower risk for all-cause mortality, obesity, diabetes, cancer.



✗ Ultra-processed foods  
→ higher risk for all-cause mortality, obesity, diabetes, cancer.

**“Guidelines that promote plant-based diets but penalize industrial processing may need to acknowledge that most plant-based milks are ultra-processed foods.”**



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# Food synergy

Casein & phosphopeptides

Whey proteins

Amino acids (eg. L-lysine)

Lactose

Phosphorous

Fat



↑ passive calcium diffusion by slow binding & slow release during digestion

↑ passive calcium diffusion via paracellular transport

↑ passive calcium reabsorption in kidneys  
↑ calcium uptake into bones

↑ enhance absorption of fat-soluble vitamins



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## Environment:

What is the carbon footprint of **milk** vs **plant**-based alternatives

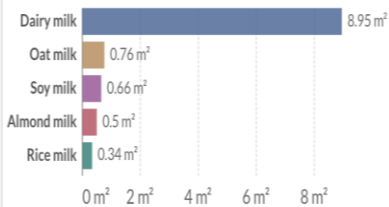
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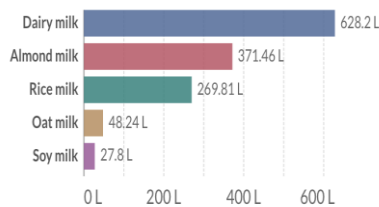
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## Per litre impact of dairy milk vs. plant-milks

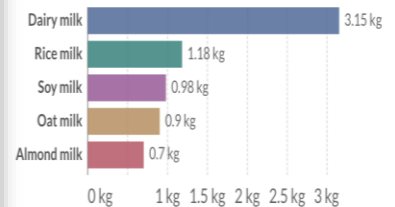
### Land use



### Freshwater use



### Greenhouse gas emissions



*Based on supply chain meta-analyses including land use change, production, processing, transport & packaging*



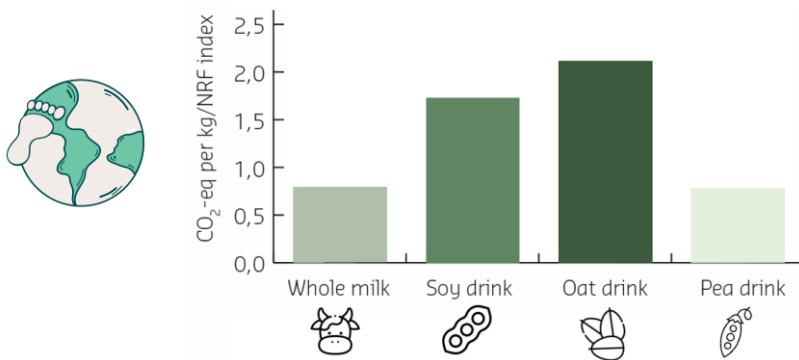
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Joseph Poore and Thomas Nemecek (2018); [ourworldindata.org/environmental-impacts-of-food](https://ourworldindata.org/environmental-impacts-of-food) (CC BY)

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When carbon footprint and nutrient density are considered, the impact changes



NRF index (NRF15): protein, fibre, vitamin A, B1, B2, B12, C, D and E, calcium, iron, magnesium, potassium, zinc, unsaturated fats, folic acid.



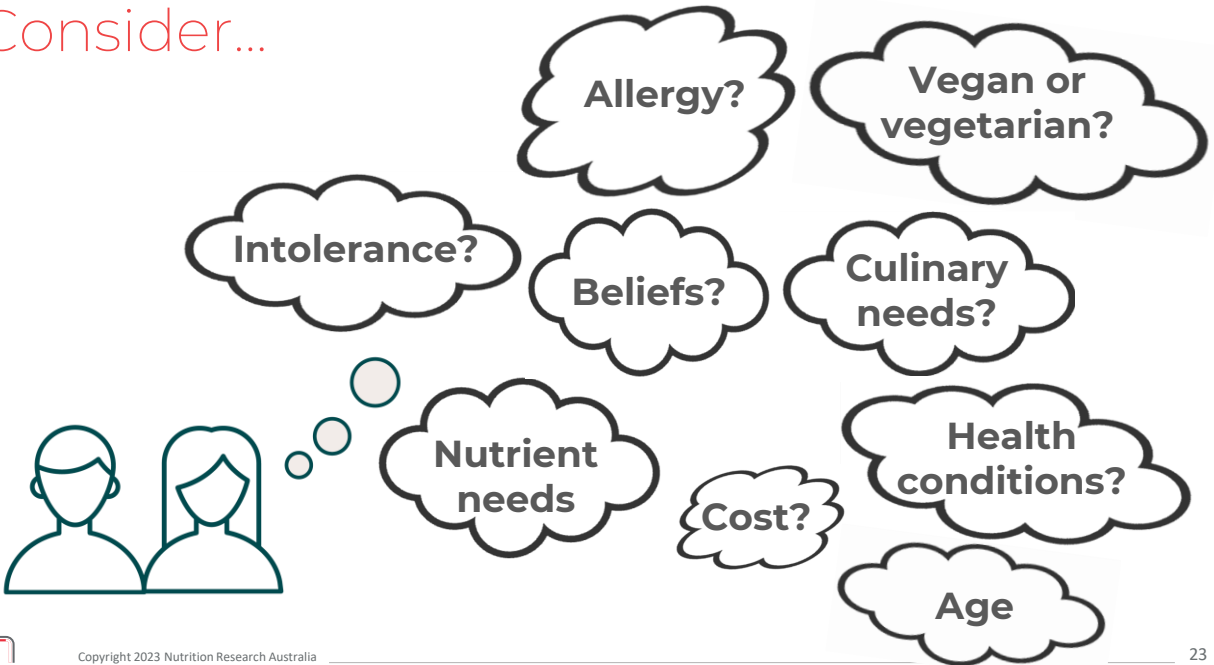
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Individual

What are their needs and preferences?

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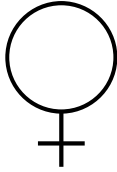
# Consider...



 <b>INDIVIDUAL</b>	Lactose intolerance/ symptoms of	✓ lactose-free ? A1- free	✓ lactose-free
	Vegetarian	✗ if strict ✓ if lacto or lacto-ovo	✓ plant-based
	Vegan	✗ animal - based	✓ plant-based
	Age	✓ appropriate all ages	✗ ✓ some not suitable <5 years
	Beliefs	✗ ✓ depends	✗ ✓ depends
	Culinary	✓ more applications	✗ ✓ may challenge
	Allergies	✗ dairy protein	✗ nut or soy
	Health conditions	✓ limited exclusions	✓ limited exclusions



## Case study 1



\*Fortified

\*Fortified

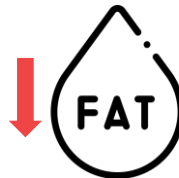


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## Case study 2



\$

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## Case study 3



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Putting it all together

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