Weight Management

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Structure today's talk

- Physiology and pathophysiology of obesity
- Medications for weight loss
- Bariatric Surgery
- Weight Management Clinic
  - Referring patients

Rationale

- Even modest weight loss (5–10 %) →reduced
  - Type 2 diabetes (**remission** or improved HbA_{1C})
  - OSA
  - Hypertension
  - Nonalcoholic fatty liver disease
  - Dyslipidaemia
  - Improved time to pregnancy when obesity is the primary cause of infertility
- Other reported benefits
  - Improved QOL, self esteem
  - Intergenerational benefits→ potential offspring benefits

1 JCEM 2015 100 (2):342-62 2. *Diabetes Care*, 2011 Jul; 34(7): 1481–1486 3. *Arch Intern Med. 2008 Mar 24; 168(6):571-80.*

Aetiology of obesity

1. Genetic[1]
   - Adopted twin studies
   - However recent and rapid increase in obesity- not just genetics
2. Epigenetic[2]
   - DNA methylation can be modified by dietary and behavioural cues
   - Not entirely understood

3. Obesogenic environment
   - Readily available high energy food, low exercise demands
   - **However** not everyone becomes obese when placed in an obesogenic environment.
     - Genes and environment work together

Not a lifestyle choice or a lack of willpower

1. Int J Obes Relat Metab Disord 1992 16:227-36 2. Reprod Toxicol, 2007. **23**(3): p. 297-307.

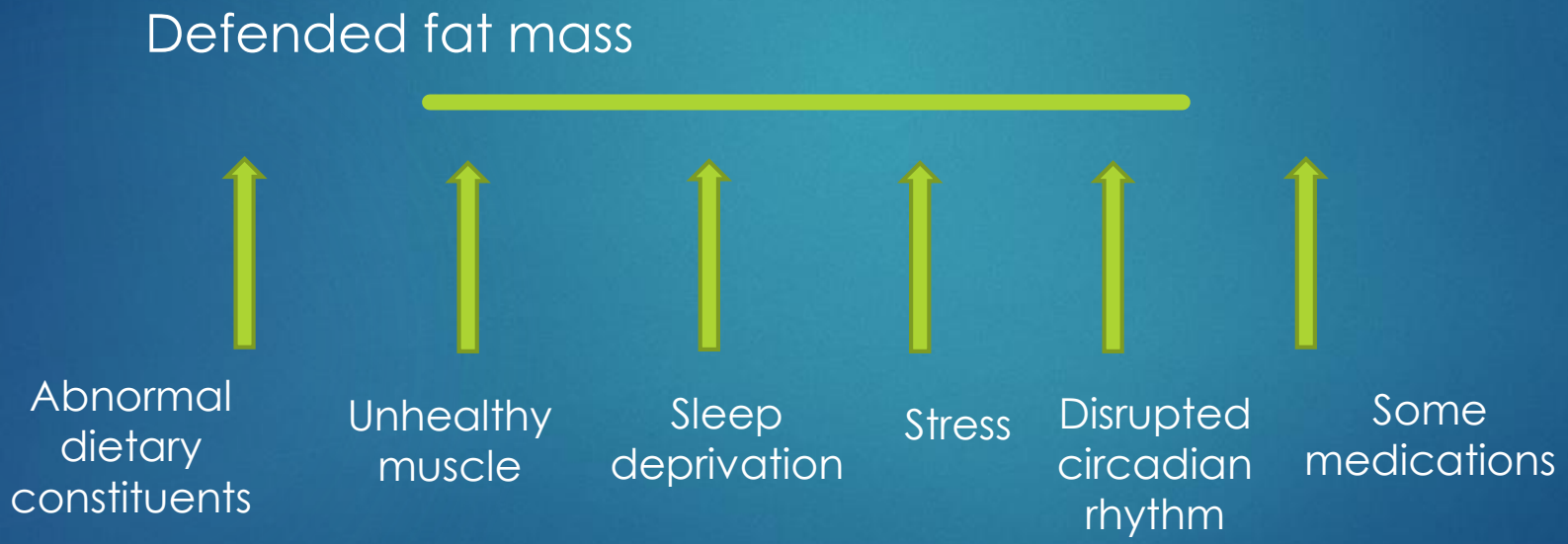
The body defends a biologically determined fat mass

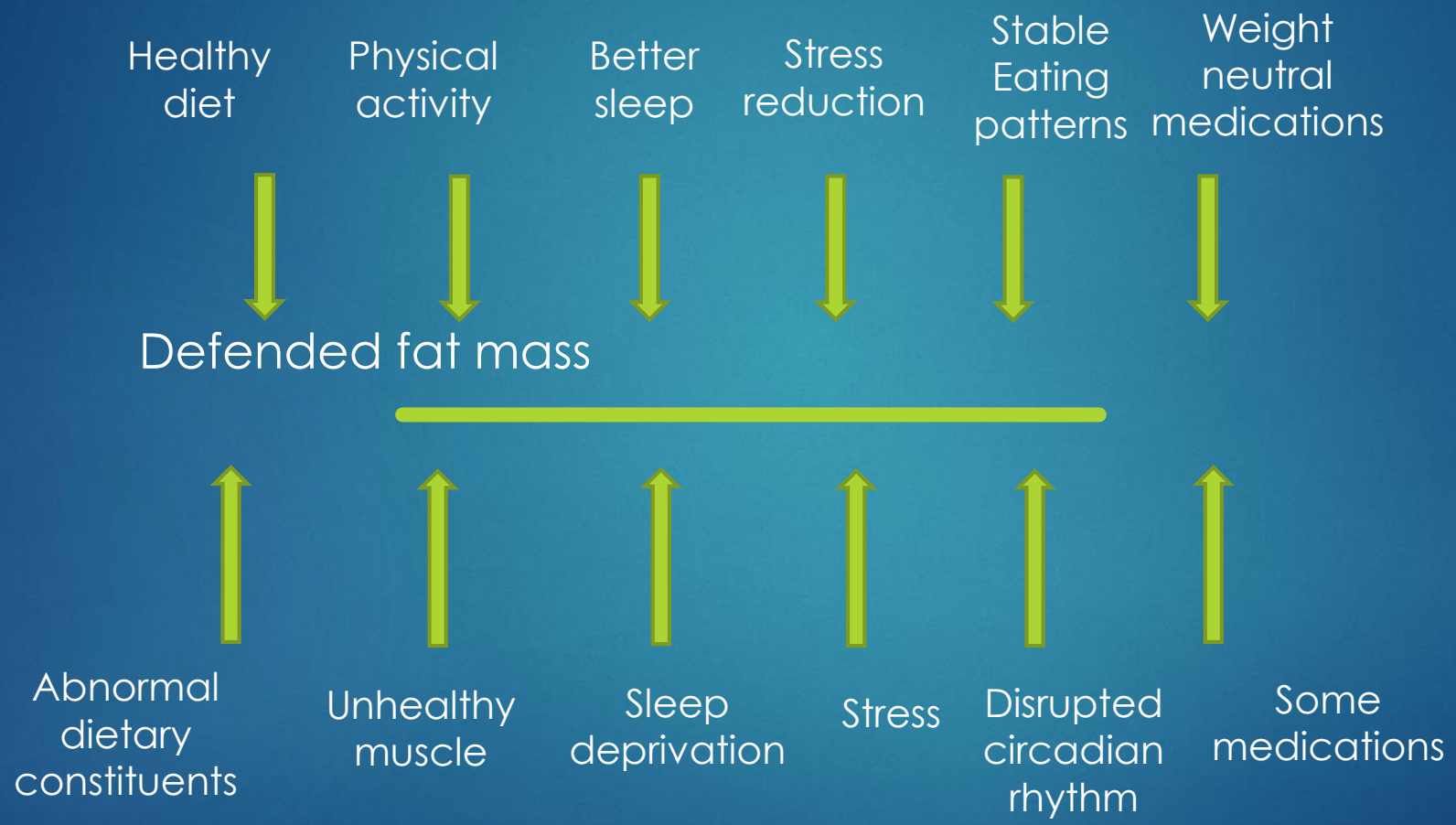
- For most tissues, the body seeks a target mass- including fat
- Obesity results from **inappropriate regulation** of body fat mass

Purposeful behavior **drives** the physiology of energy balance regulation	**VS.**	The physiological regulation of energy balance **drives** behavior
Implications • Increased caloric intake drives weight gain • All types of calories have similar effects • Physical activity causes weight loss directly by burning calories		**Implications** • Changes in the modern diet alter energy balance physiology • The chemical nature of the calories is critical • Re-regulation of abnormal physiology is essential for success

Slide adapted from Lee Kaplan, Blackburn Course in Obesity Medicine 2021

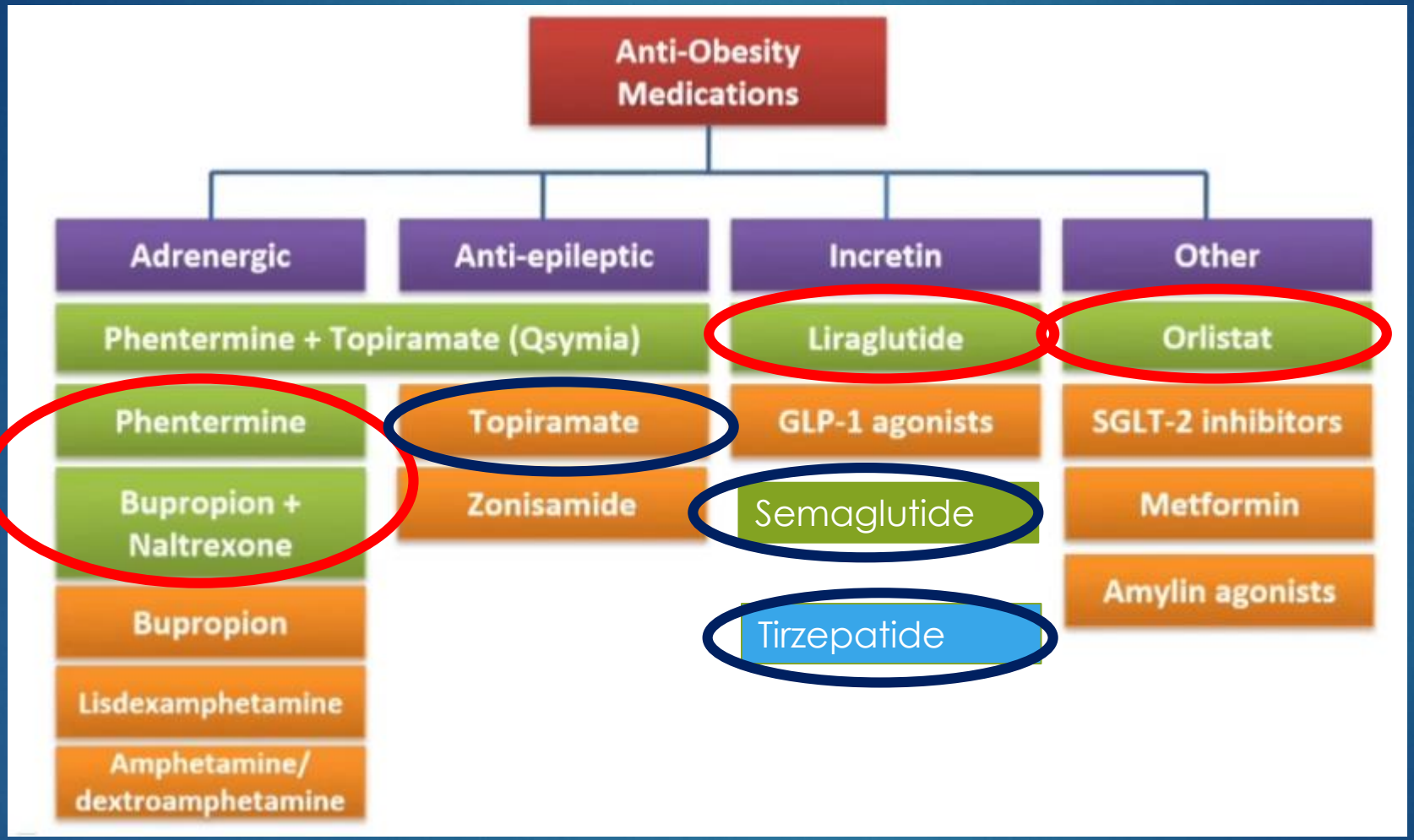
Defended fat mass


Defended fat mass
Abnormal dietary constituents
Unhealthy muscle
Sleep deprivation
Stress
Disrupted circadian rhythm
Some medications



Slide adapted from Lee Kaplan, Blackburn Course in Obesity Medicine 2021

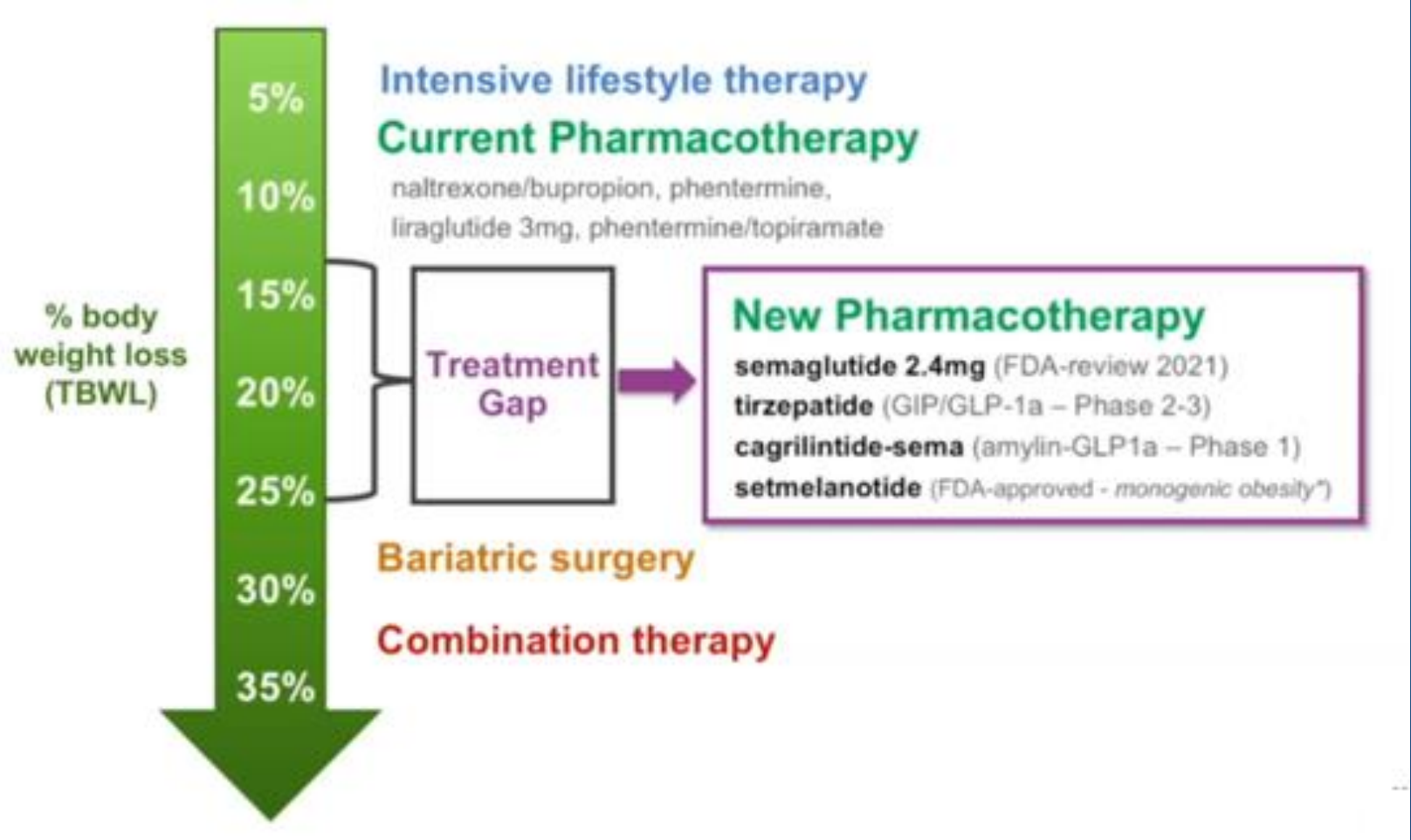
= TGA approved



Obesity treatment in Australia 2021

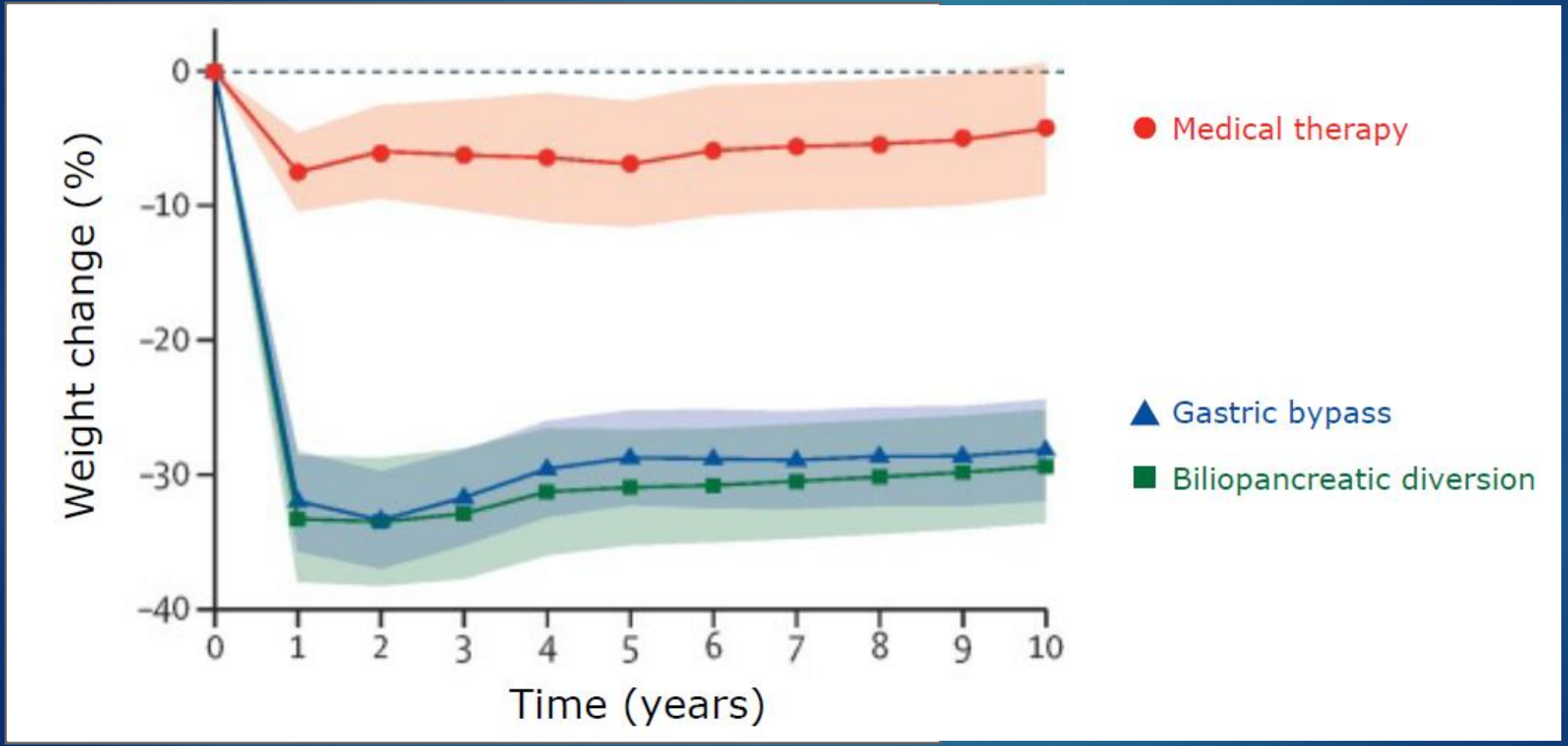
Medication	Pros	Cons
Orlistat $93	Good safety data, cheaper	Doesn't work well Doesn't work on pathophysiology of obesity
Contrave $260	Effective	Nausea, expensive
Phentermine $145	**Relatively effective**	**Concern long term use, potential for abuse?**
Topiramate $9	**Cheap, relatively effective**	**SEs**
Liraglutide $387	**Minimal Ses, effective**	**Nausea, expensive**
Semaglutide $180	Very effective	Not TGA approved, expensive

The future of pharmacotherapy for obesity



*Slide adapted from **Ania Jastreboff**, Blackburn Course in Obesity Medicine 2021*

Surgery: Weight loss



1. *Carlsson LMS NEJM 2020 2. Mingrone et al, Lancet 2021*

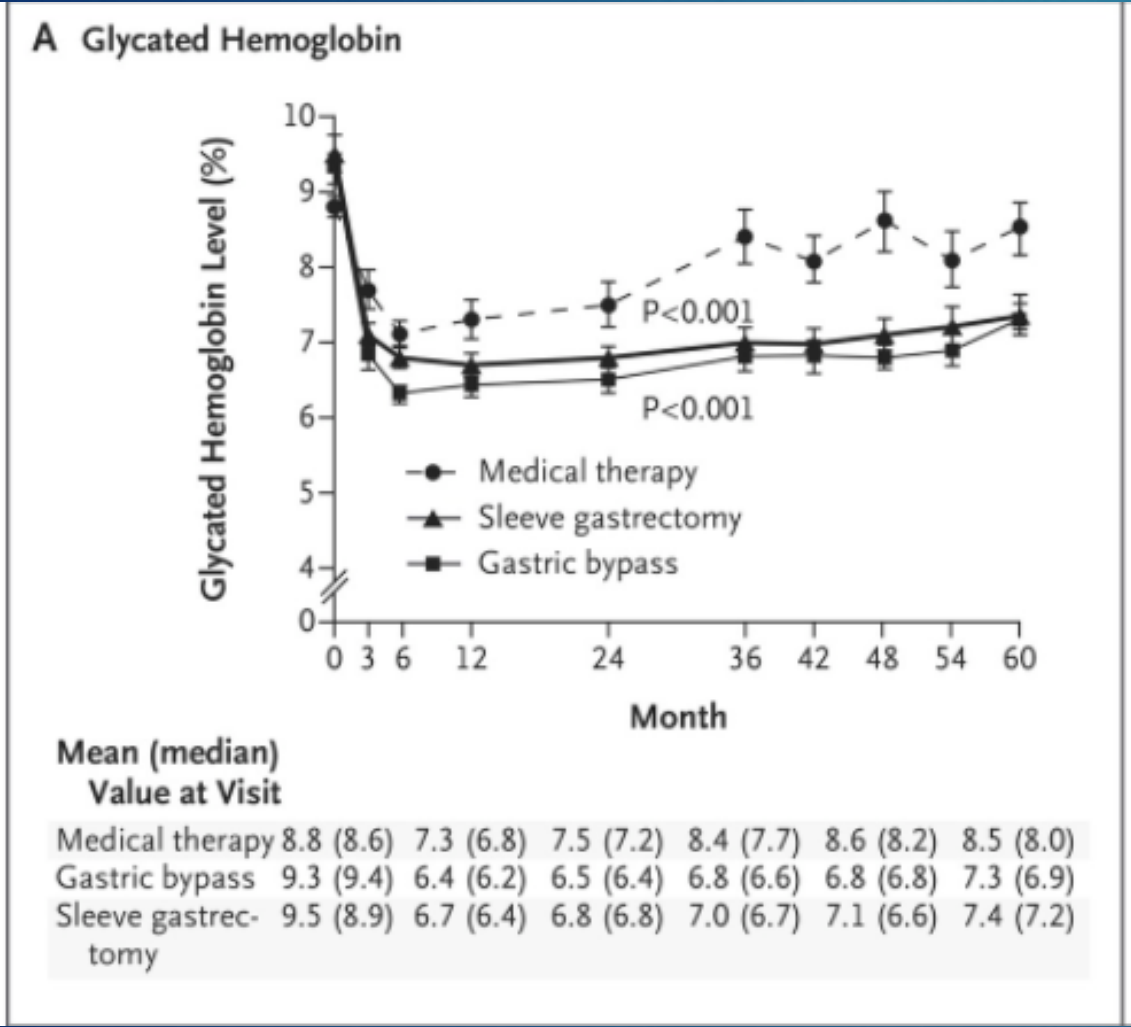
Surgery

- >90% of all bariatric surgery is performed in the private system
- Eligibility and prioritization criteria, procedures available, care pathways are not standardized→ wide variation in access and outcomes
- ANZMOSS: National Framework in 2017 to facilitate bariatric surgery in public hospitals

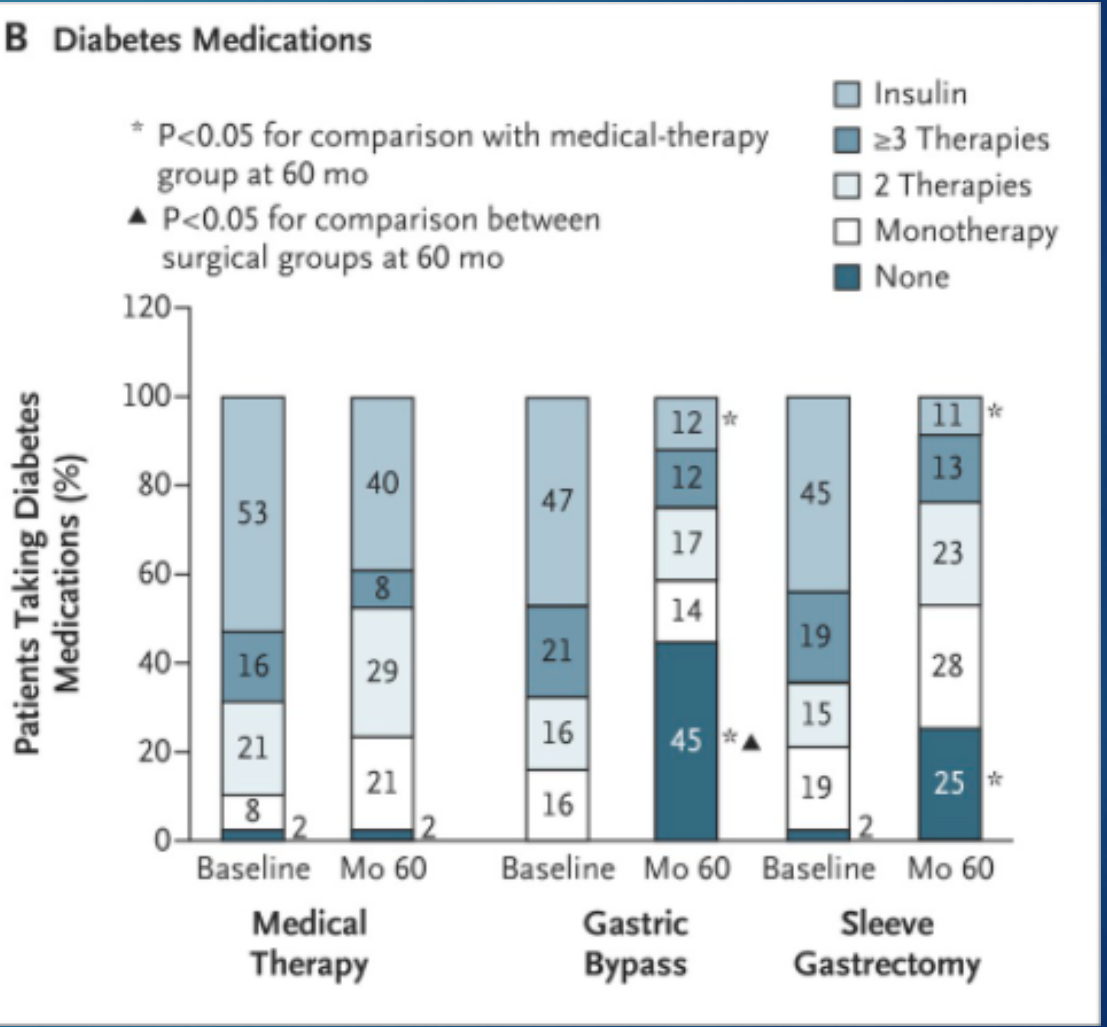
Qualifying criteria
If the patient in review is: • Aged 18-65, BMI >35-40, EOSS 2-3 **AND** • Documented previous weight loss attempts/treatments • Absence of contraindications (see next column)
OR
• Aged 18-65 years, BMI>40, EOSS 1-3 **AND** • Documented previous weight loss attempts/treatments[2] • Absence of contraindications (see next column)
OR
• Aged 65-70, BMI >40, EOSS 2-3 **AND** • Documented previous weight loss attempts/treatments • Absence of contraindications (see next column)
Diabetes
• BMI>30 – 35 **AND** had T2DM for <10 years or has favourable C – Peptide level [3] which is poorly controlled with medication • BMI > 35 with established diabetes

1. *Australian & NZ Metabolic & Obesity Surgery Society*

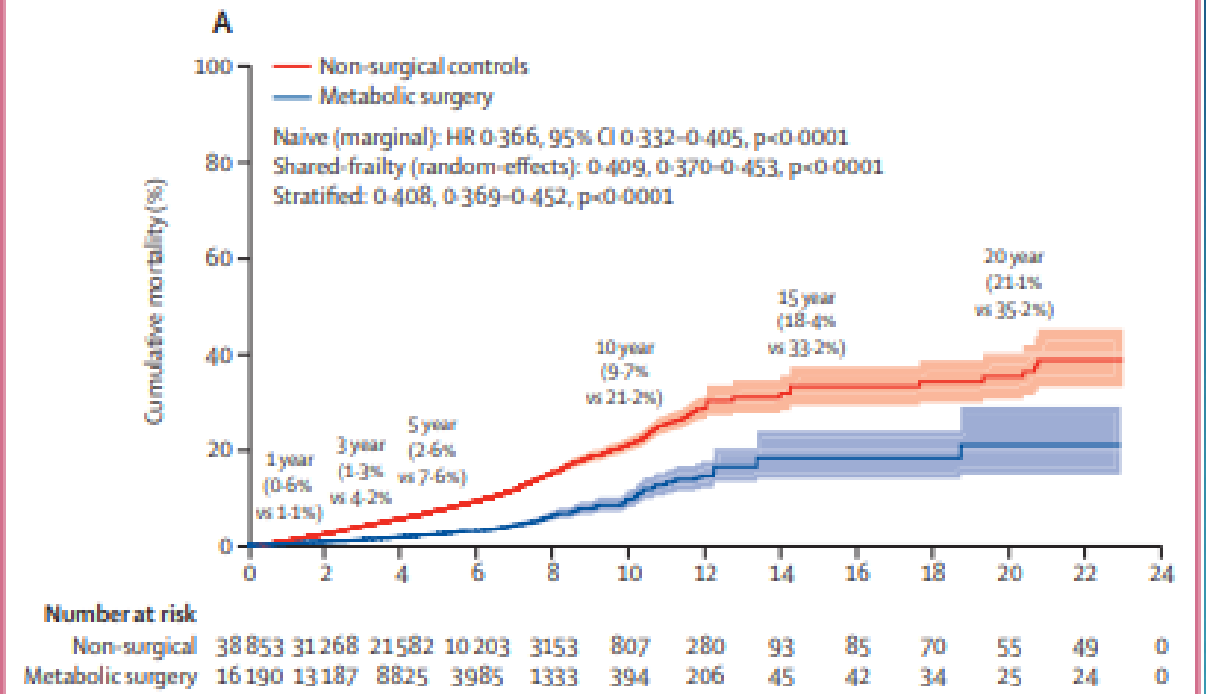
Surgery: Diabetes

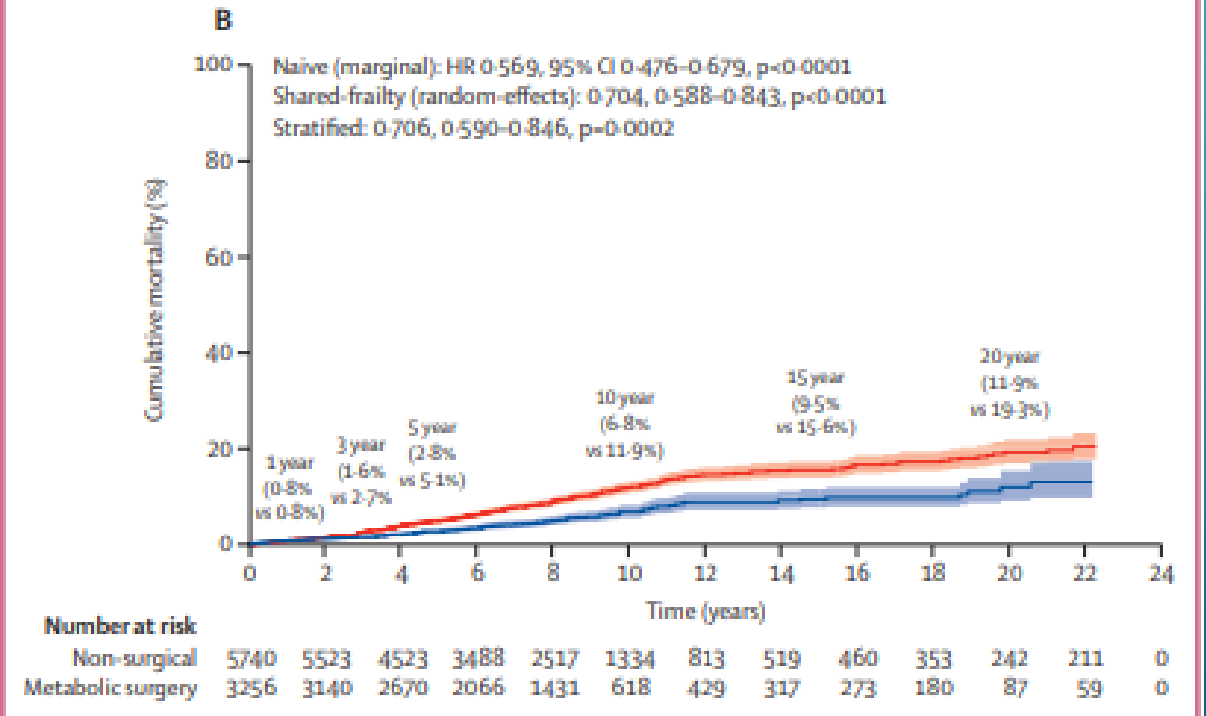


Mean (median) Value at Visit						
Medical therapy	8.8 (8.6)	7.3 (6.8)	7.5 (7.2)	8.4 (7.7)	8.6 (8.2)	8.5 (8.0)
Gastric bypass	9.3 (9.4)	6.4 (6.2)	6.5 (6.4)	6.8 (6.6)	6.8 (6.8)	7.3 (6.9)
Sleeve gastrectomy	9.5 (8.9)	6.7 (6.4)	6.8 (6.8)	7.0 (6.7)	7.1 (6.6)	7.4 (7.2)



1. *Schauer et al NEJM 2017; 376:641*





With Diabetes
HR: 0.409
Reduction in the Hazard Rate of death: 59.1
Median life expectancy gain: 9 ·3 years (95% CI 7 ·1–11 ·8)
NNT to prevent one additional death over a 10-year time frame: 8 ·4 (95% CI 7 ·8–9 ·1)

Without Diabetes
HR: 0.704
Reduction in the HR of death: 29.6
Median life expectancy gain: 5 ·1 years (2 ·0–9 ·3)
NNT to prevent one additional death over a 10-year time frame were 29.8 (95% CI 21.2-56.8)

1. *Syn et al, Lancet, 2021*

Surgery: QoL and psychosocial wellbeing

- QoL improved in most studies[1]
- Minority struggle with post-operative psychological issues[2]:
  - Depression
  - Disordered eating
  - Body image dissatisfaction
  - Suboptimal weight loss
  - Relapse depression with weight regain

Highlights the important of psychological support in an MDT within the bariatric surgery service and/or primary care

1. *NHMRC surgery for obesity guidelines*

2. Journal of Psychosomatic research 1(52) 155-166

Surgery: Why is it so effective?

Changes physiology

- Altered GI signals to the brain
  - Neuronal
  - Endocrine
- Altered GI signals to other tissues

The evidence

- Dramatic effects on hunger and satiety
- Few patients become underweight after surgery
- Little or no weight loss in thin patients (and animal studies)

	Diet	RYGB
Energy expenditure	↓	↑
Appetite	↑	↓
Hunger	↑	↓
Satiety	↓	↑
Reward-based eating	↑	↓
Stress response	↑	↓
Gut peptides		
Ghrelin	↑	↓
GLP-1, PYY, CCK, amylin	↓	↑

1. *Table courtesy LM Kaplan, Harvard Blackburn Obesity course*

Surgery: complications/risks

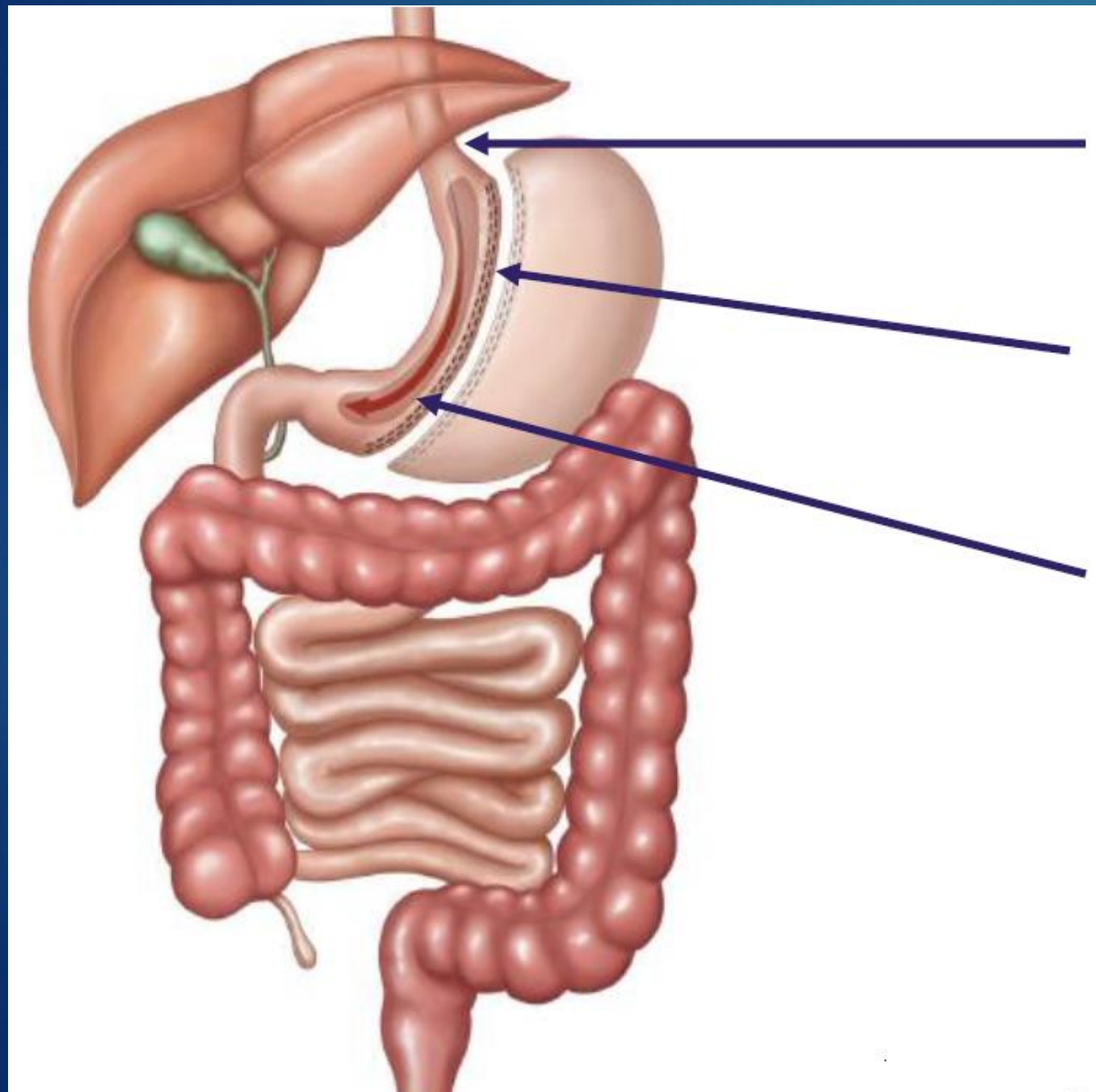
Aust. & NZ Bariatric Surgery Registry

- Adverse event rate
  - 2.4% primary bariatric surgeries
  - 6.6% revisional procedures
- Mortality
  - 0.05% gastric band, 0.09% Sleeve, 0.5% RYBG

	LSG	RYGB
30-day mortality	0.1%	0.1-0.2%
30-day morbidity	3%	5%
Leaks	<1%	<1%
Other risks	Worsening GERD Strictures	Dumping syndrome Ulcers Internal hernias

1. *Australian & NZ Metabolic & Obesity Surgery Society* 2. *Podnos et al Arch Surg 2003*

Complications Sleeve



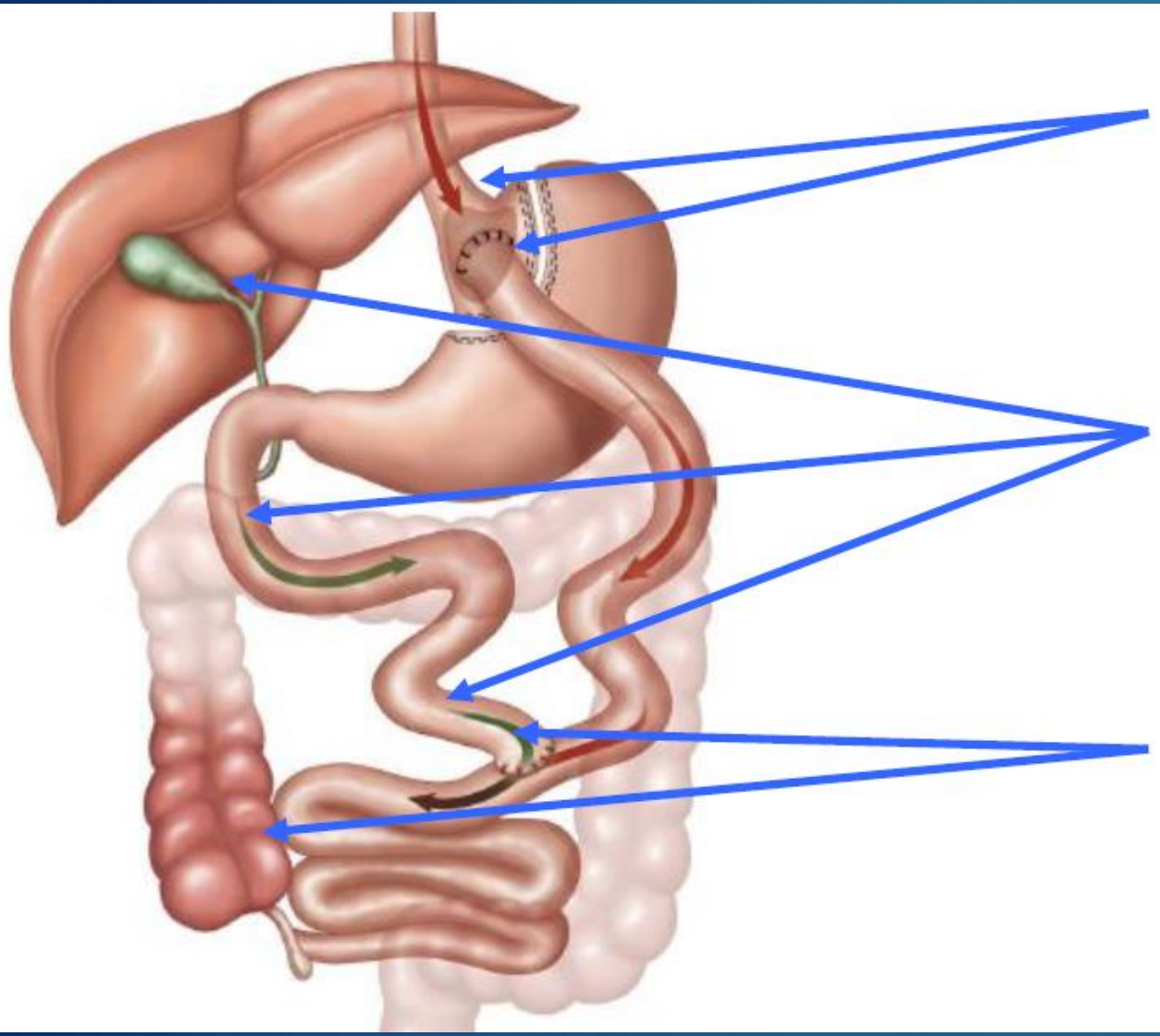
Recurrent GERD (3-22%)
Strictures (3.5%)

Gastrointestinal Leakage (<5%)
Gastrointestinal Bleeding (1-6%)

Selective Vitamin Deficiencies:
B12(9%), Folate(15%) Iron (43%)

Kaplan, Gatroent Clin N Am 2004,
Matlaga J Urol 2009, 181 (6)

Complications RYGB



Stenosis/Stricture(5-12%)
Anastomotic Ulcer
Fistula/Staple line disruption

Gallstones (15%)
Bacterial Overgrowth (~1%)
Selective malabsorption of vitamins and minerals

Small bowel Obstruction
Internal Hernia (1-9%)
Bile Acid-Induced Diarrhea

Chiu S et al, SORD 2011, Himpens Ann Surg 2010

Top End Weight Management Clinic

Commenced August 2021

- Fortnightly PRH
- 1 dietitian (Kelly Taylor)
- 3 physicians (Diana MacKay, Anna Wood, Kaspar Willson)

Model

- Patient centred, individualised management plan
- Very Low Energy Diet (VLED)
  - Optislim, Optifast
- Pharmacotherapy
  - 1st Line: Phentermine and Topiramate or Liraglutide
- 2-year program
- Potential pathway to surgery

Top End Weight Management Clinic

Case studies

1. CR, 33yr Aboriginal woman from Milikapiti, BMI 60 , initial weight 176 kg

- Complications: Idiopathic intracranial hypertension, obesity hypoventilation syndrome, reduced mobility, osteoarthritis knees.
- Commenced VLED & semaglutide Feb 2022 → May 2022 151kg (15% loss body weight)
- Improved headaches, mobility, breathing

"I am wearing clothes I haven't worn before my son was born, I feel so much better, my skin is better, I can walk now"

2. DT, 37yr Aboriginal woman from Palmerston, BMI 63 , initial weight 175 kg

- Complications: OSA, obesity hypoventilation syndrome, heart failure with multiple hospital presentations with SOB
- Had difficulty committing to our clinic. Managed to lose a few kg but dropped out due to cost VLED and frequency visits needed