



Population Health
Research Institute
HEALTH THROUGH KNOWLEDGE



METABOLIC AND BARIATRIC SURGERY FOR CARDIOVASCULAR RISK REDUCTION: DESIGN, BASELINE CHARACTERISTICS, AND VANGUARD PHASE LESSONS FROM BRAVE

Jorge A. Wong, MD PhD MPH

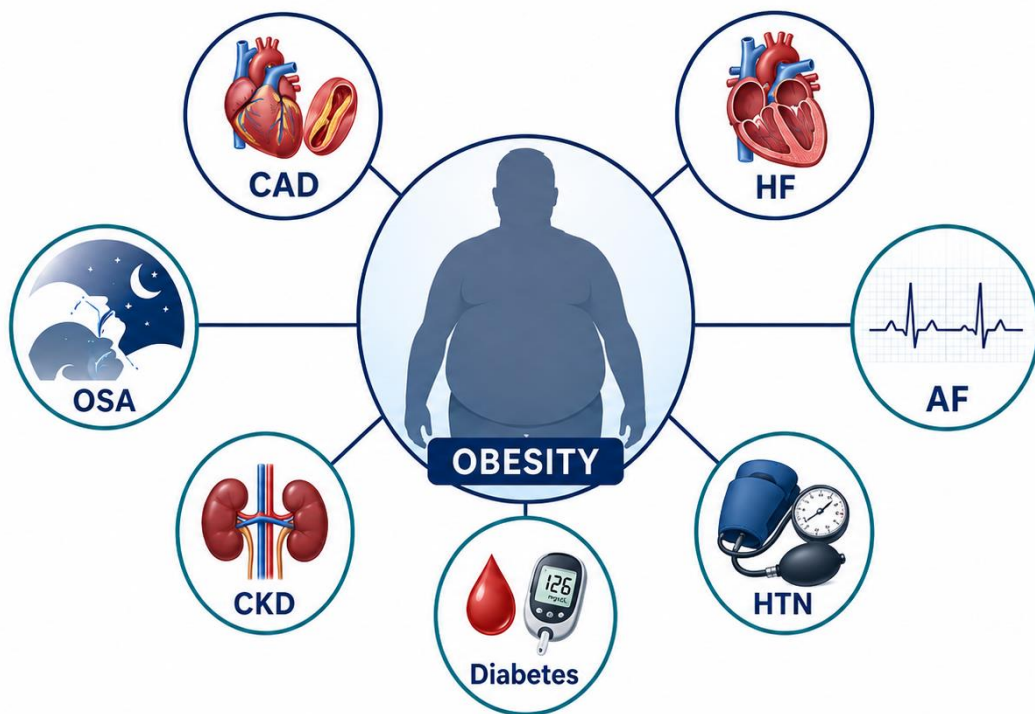
Division of Cardiology

McMaster University

September 3, 2026

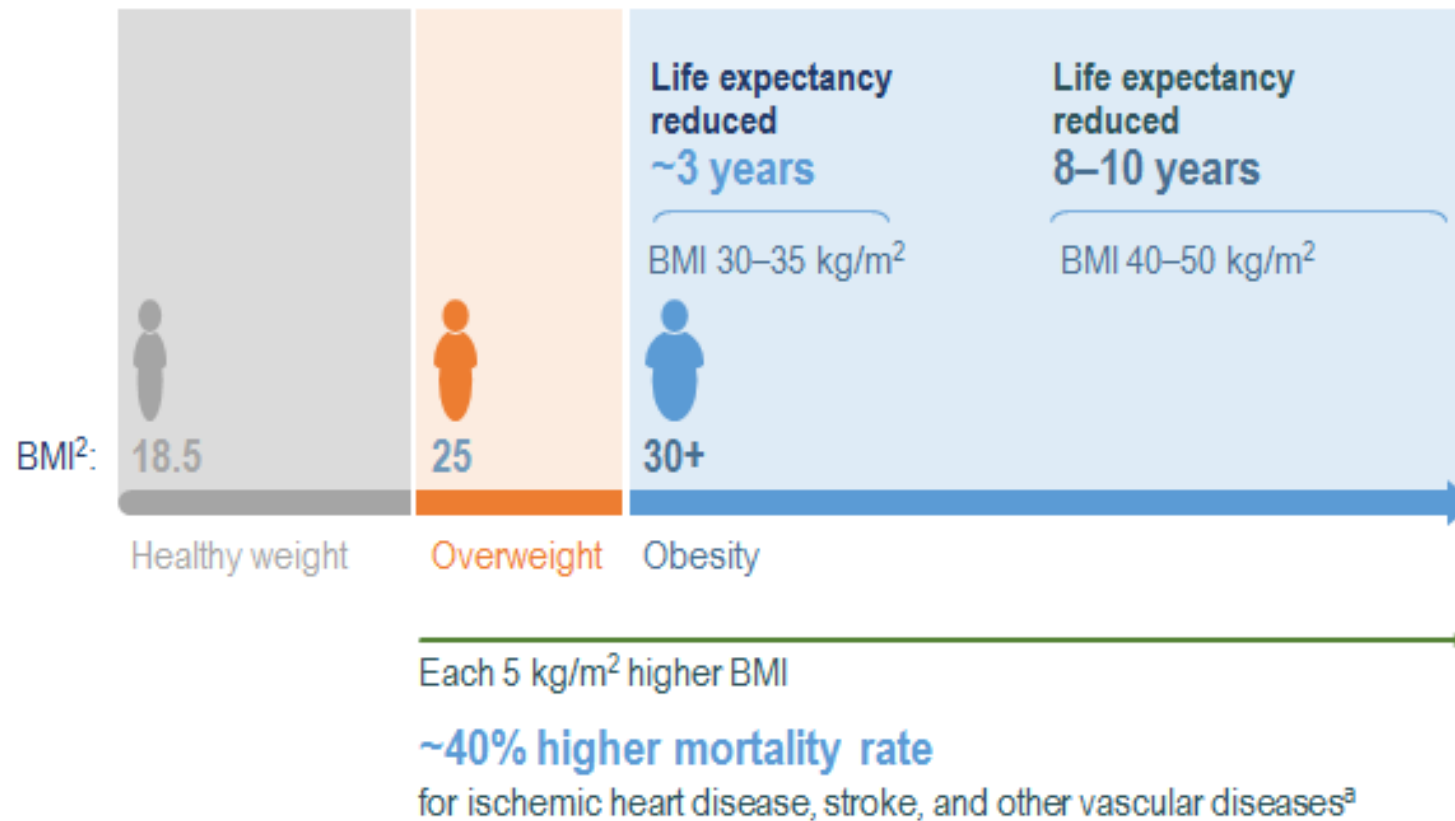
Nothing to disclose

Obesity is a major driver of CVD



CAD / MI	Heart failure	Atrial fibrillation
INTERHEART Highest vs lowest waist-to-hip ratio ~2.5× higher MI risk	Framingham Obesity vs normal BMI ~2× higher HF risk	Women's Health Study Per +5 kg/m ² BMI ~25% higher AF risk

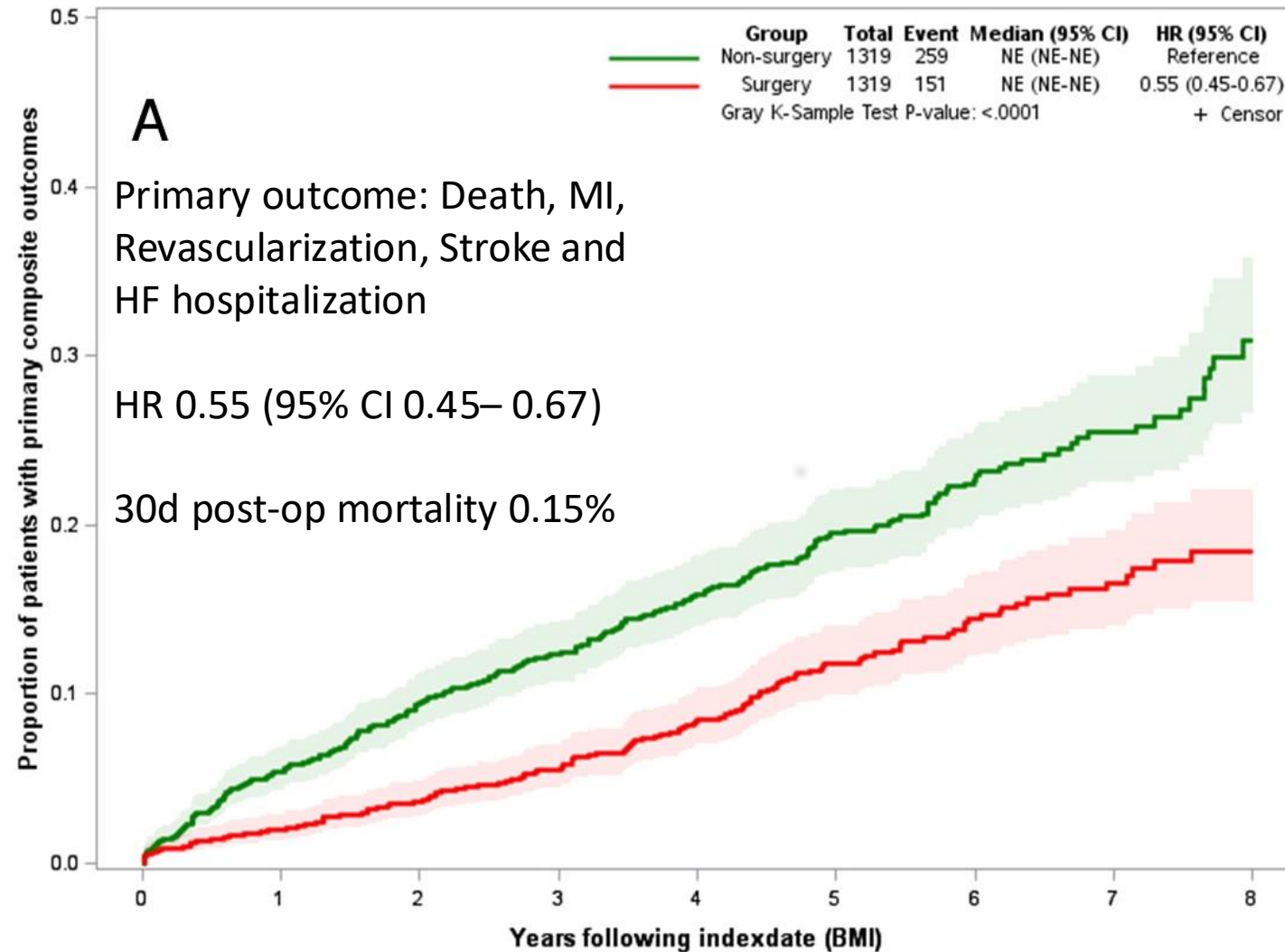
Obesity increases the risk of death



Increasing BMI is associated with reduced life expectancy, by as much as 10 years, and a higher cardiovascular mortality rate.

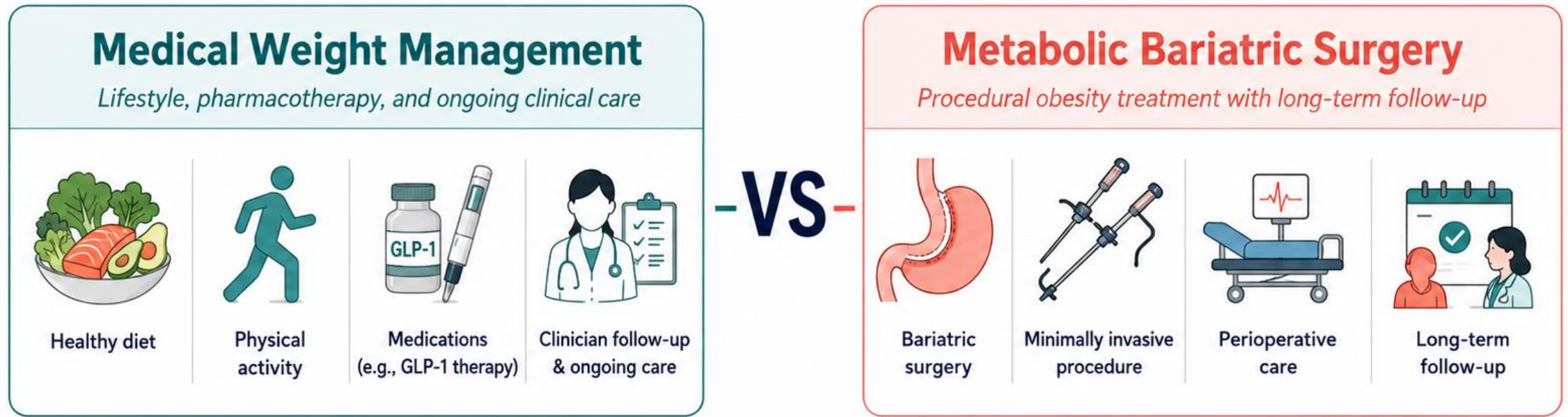
^aBased on a meta-analysis of 57 international prospective studies predominantly based in Europe, the United States, Israel, and Australia, including BMI information for 894,576 adults.

Effect of MBS on CV outcomes



The fundamental evidence gap

Does MBS reduce cardiovascular events?



We still do not have randomized evidence!



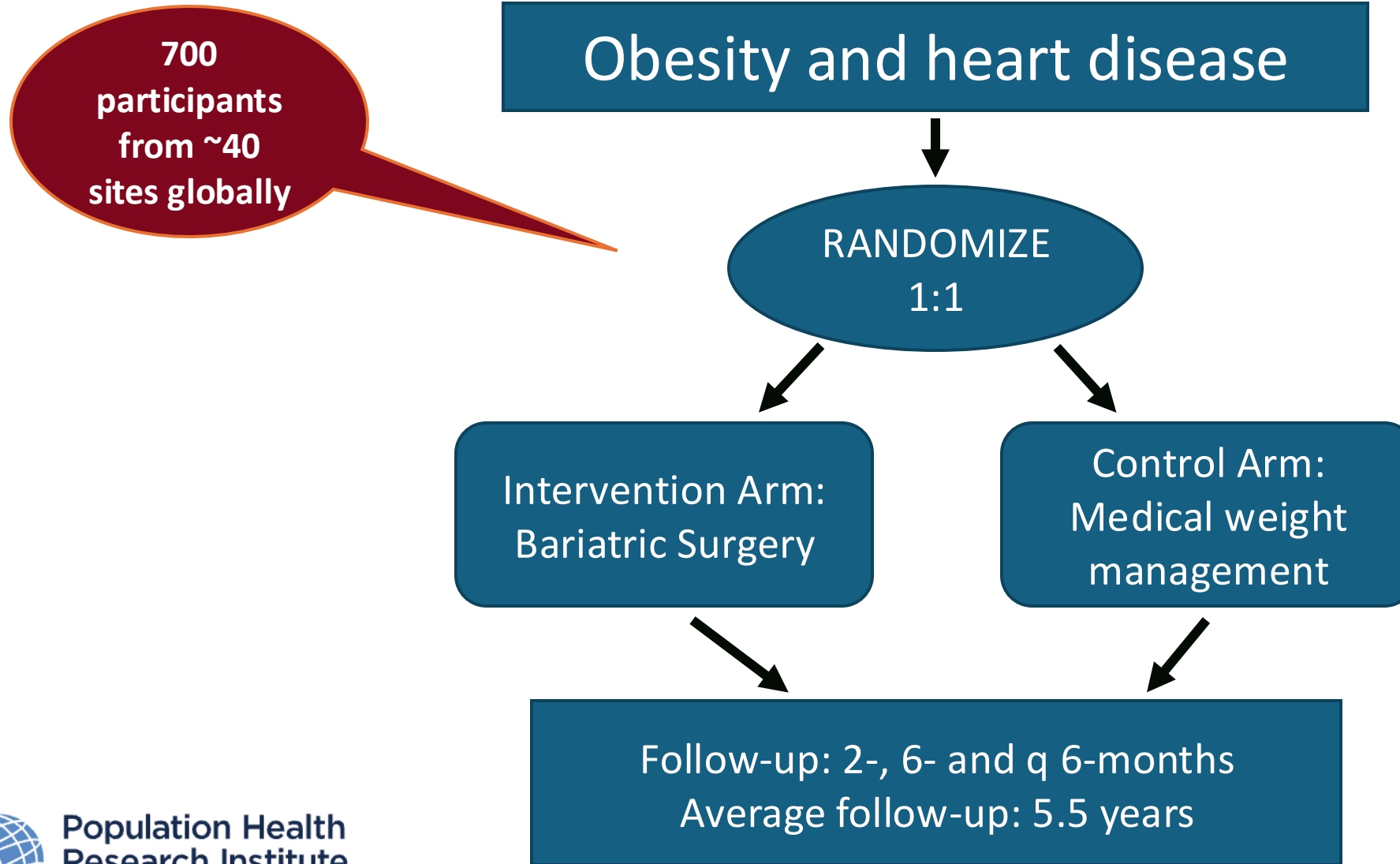
Bariatric surgery for the **R**eduction of **cA**rdio**V**ascular **E**vents
randomized controlled trial



Overall research question

In people with obesity ($\text{BMI} \geq 30 \text{ kg/m}^2$) and heart disease, does metabolic bariatric surgery safely reduce the risks of death and major cardiovascular events compared to guideline-based medical weight management?

BRAVE Study Design



Eligibility Criteria

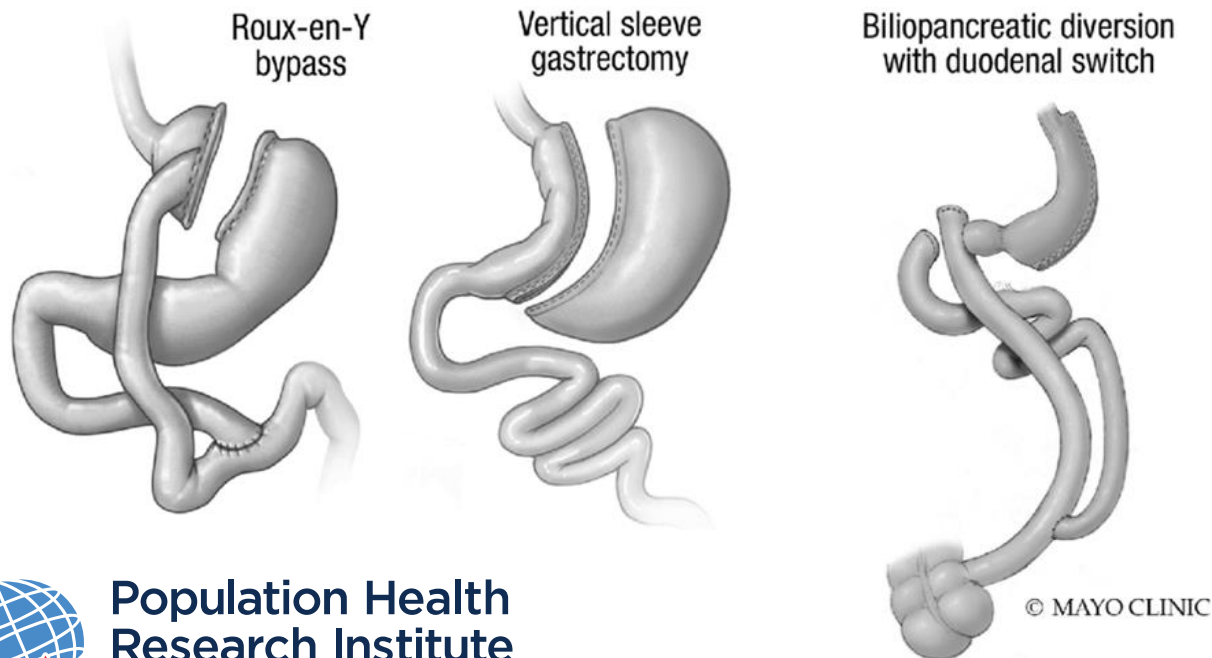


- Body mass index ≥ 35 kg/m²; OR
- BMI ≥ 30 kg/m² and age >55 or type 2 diabetes; AND
- **Cardiovascular disease**, defined as follows:
 - High-risk CAD (Prior MI, PCI, CABG, or multivessel coronary artery disease)
 - History of LVEF $< 40\%$
 - Heart failure with preserved ejection fraction (LVEF $> 40\%$)
 - Documented AF with CHA2DS2-VASc ≥ 2 stroke risk score
 - Prior stroke
 - PAD
- Key exclusions:
 - Contraindication to bariatric surgery in accordance with local clinical practice
 - Prior MBS, other than gastric banding

Intervention Arms

Bariatric Surgery

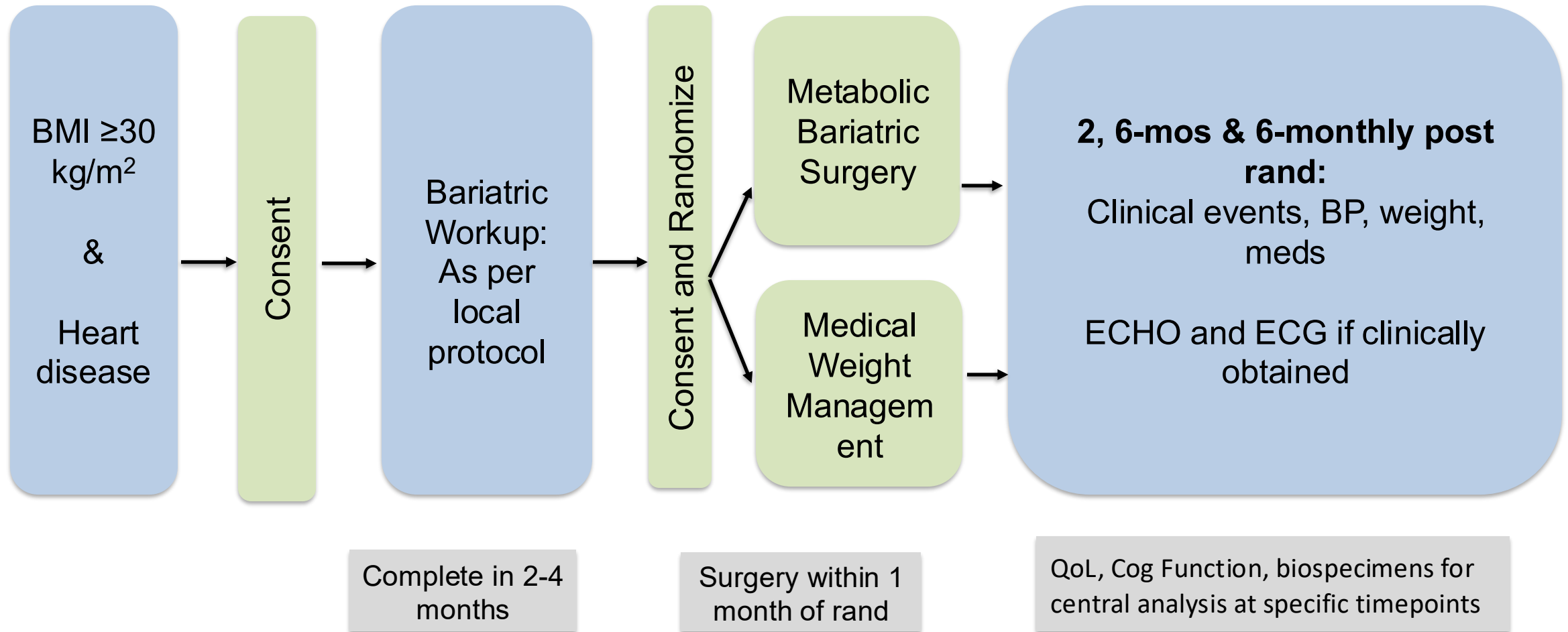
- MBS procedures include either gastric bypass, sleeve gastrectomy or duodenal switch at the surgeon's discretion
- AOMs allowed



Medical Weight Management

- Reflects the standard medical therapy available locally
- May include:
 - Counseling on dietary, lifestyle and/or behavioral modification (e.g. nutritional counseling, dieting)
 - Low-calorie meal replacement (Optifast-900)
 - Anti-obesity medications (e.g., GLP-1 RA, bupropion / naltrexone or other locally approved medications)

BRAVE Study Workflow



Primary Outcome



Composite of all-cause death, MI, stroke, HF hospitalization, new HF, AF hospitalization, renal events

Secondary & Other Outcomes

- Cardiovascular mortality
- New / remission of diabetes
- Atrial fibrillation
- Obesity-related cancers
- Quality of life
- 6 MWT
- Cognition / mental health
- Weight
- Cost effectiveness

Safety

- Perioperative complications
- Long-term procedure morbidity

BRAVE recruitment

- Screened: 2495
- Ineligible: 479
- Randomized: 253
- Ongoing MBS work-up: 35
- Recruitment rate: 0.5 patients/centre/month
- 16 sites in Vanguard: Brazil 2, Canada 10, Germany 1, Spain 1, Italy 2
- Reasons for refusal: Personal (33%), fear of surgery (19%), wanted to lose weight on their own (17%)

Baseline characteristics



	N = 200
Age; years	59.8 $\pm$ 10.0
Female	72 (36.2%)
BMI; kg/m ²	44 $\pm$ 7.5
Hypertension	164 (82.4%)
Type 2 Diabetes	90 (45.2%)
Hypercholesterolemia	138 (70.1%)
Heart failure	77 (38.7%)
Stroke	17 (8.5%)
Coronary disease	88 (44.2%)
Prior MI	68 (34.0%)
prior CABG	23 (11.5%)
Prior PCI	65 (32.5%)
Atrial fibrillation	96 (48.2%)
Left ventricular ejection fraction (%)	53.5 $\pm$ 11.2

Median follow-up: 1.6 years

6 MWT: 368.1 $\pm$ 120 metres

EQ-VAS: 65 $\pm$ 17.6

Baseline GLP-1 RA: 25%



Sample size

Sample size	Power	Minimum 4 years follow-up			Minimum 5 years follow-up		
		6%/yr	7%/yr	8%/yr	6%/yr	7%/yr	8%/yr
700	80%	33.5%	30.9%	28.7%	31.0%	28.5%	26.4%
600	80%	36%	33.2%	30.9%	33.3%	30.6%	28.4%

Assumptions: 3-year enrolment, LTFU rate 0.5% per year, crossover to medical 2.5%, crossover to surgery 1% per year, alpha 0.05

Intervention delivery / safety

- Time from rand to surgery: 35 days
- 72% sleeve, 28% RYGB
- Perioperative safety (30-days):
 - Mortality: No perioperative deaths
 - DSMB: no concerns

Recruitment Lessons Learned



Key lessons

- **Higher-performing sites:** greater PI/staff involvement, use of recruitment strategies
- **Barriers:** limited site funding, patients fear surgery and randomization
- **Facilitators:** trust in referring clinicians, surgical readiness, family and staff support

Key strategies

- Engage sites to strengthen interdisciplinary communication
- Disseminate proven recruitment strategies
- Improved recruitment scripts
- Incorporated patient testimonials into recruitment aids
- Encouraging family involvement

Vanguard Key Lessons

- Enrolling high-risk population
- No harm signal
- Feasible with more sites
 - Need ~450 more patients
 - ~40 sites to complete enrolment in the next 3 years
- BRAVE Vanguard already largest RCT comparing MBS with medical therapy



How can you help?

- Want to get involved?
- Email: Jorge.wong@phri.ca

Thank you!

- Salim Yusuf
- Paul Poirier
- David Conen
- Mehran Anvari
- Ari Doumouras
- Emma Van Reekum
- Maria Tiboni
- Satya Dash
- Ricardo Cohen
- Denis Pajacki
- Radu Pescarus
- Remi Kouz
- Remi Kouz
- Olga Castaner-Nino
- Alvaro Avezum
- Roselynn Villiard
- Ryan Davey
- Ahmad El-Nahas
- Krista Hardy
- Francois Pattou
- Claire Nomine
- Aldo Magionni
- Stefan Stoerk
- Georg Ertl
- Romano Schneider
- Amin Andalib
- Thao Huynh
- Mo Shurrab
- Adnan Hameed
- Hassan Mir
- Sumathy Rangarajan
- Dawn Agapay
- Sara Chenier
- Nora Sabet
- Shrikant Bangdiwala
- Kumar Balasubramanian
- Elorm Vowotor
- Kiran Qamar



XXX IFSO WORLD CONGRESS

"Advancing Multimodal Obesity Care"

24-27 August 2027

ifso2027.org



IFSO
PARIS 2027

See you in

PARIS

