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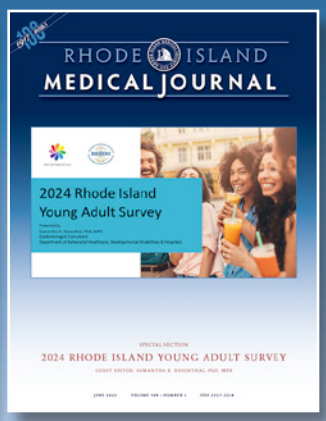

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MEDICAL JOURNAL

Aurora Pryor, MD

Andrew R. Luhrs, MD

SPECIAL SECTION

Obesity and Related Diseases

AURORA PRYOR, MD
ANDREW R. LUHRS, MD
GUEST EDITORS

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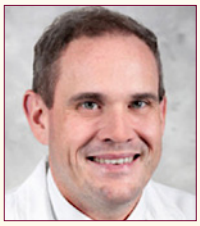

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Obesity: Management Strategies for Patients with Obesity and Related Diseases

AURORA PRYOR, MD;
ANDREW R. LUHRS, MD
GUEST EDITORS

Obesity is a major healthcare problem across the planet. When we account for the metabolic diseases impacted by obesity, including type 2 diabetes, heart disease, cancer and others, obesity is the leading treatable cause of death. Obesity impacts patients of all ages and in almost all of our medical and surgical practices. There are now many effective ways to manage obesity and related diseases. In this special issue of the *Rhode Island Medical Journal*, we will highlight the most up-to-date management strategies for patients suffering from this common problem, presented in the following articles:

- Featured original work from **Viviane Fornasaro-Donahue, MS, RD, LDN**, and colleagues discussing intuitive eating behaviors and the role of anti-obesity medications.
- **Marcoandrea Giorgi, MD**, reviews the gut microbiome and its role in obesity.
- **Kristy Dalrymple, PhD**, and colleagues discuss the current weight loss recommendations for patients with psychiatric comorbidities.
- **Eva Koeller, MD**, and **John Romanelli, MD**, debate the role of bariatric surgery in the era of GLP-1 receptor agonists.
- For pediatric patients, **Artur Chernoguz, MD**, discusses practical recommendations.
- **Andrew R. Luhrs, MD**, contribution includes best practices in primary care and when to refer, as well as how to support patients before and after weight loss surgery.
- **Emily Ortega Goddard, MD**, reviews endoscopic therapeutic options to address obesity and related diseases.
- In an original contribution, **Beth A. Ryder, MD**, and colleagues demonstrate the use and efficacy of preoperative aprepitant as an antiemetic in patients undergoing sleeve gastrectomy.
- Finally, the team from **Brown Health** presents a case on the successful endoscopic management of a subacute leak after sleeve gastrectomy.

We hope this issue helps provide some insight into the management of this important disease and helps to provide alternatives for our patients.

Authors

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Examining Intuitive Eating Behavior Across Metabolic and Bariatric Surgery and Non-Surgical Patients

VIVIANE FORNASARO-DONAHUE, MS, RD, LDN; CEREN GUNSOY, PhD; KATHLEEN J. MELANSON, PhD; LUCIA LARSON, MD

ABSTRACT

BACKGROUND: Intuitive Eating (IE) scales assess eating behaviors by capturing individuals' tendencies to rely on internal cues – such as hunger and satiety – rather than external influences like emotional factors or dieting mentality. IE data within the context of metabolic and bariatric surgery (MBS) patients seeking obesity management treatment remain limited.

OBJECTIVE: This study aimed to explore changes in Intuitive Eating Assessment Scale-2 (IEAS-2) scores among MBS and non-MBS patients and examine how individual-level factors, including obesity management medication (OMM), may influence these changes.

METHODS: We retrospectively analyzed 168 IEAS-2 responses from 84 patients at an obesity medicine clinic, including four subscales: (1) Unconditional Permission to Eat, (2) Eating for Physical Rather Than Emotional Reasons, (3) Reliance on Internal Cues, and (4) Body-Food Choice Congruence. Linear mixed-effects models assessed changes from baseline to follow-up and associations with OMM use, MBS status, depression, sleep duration, and physical activity.

RESULTS: Thirty-five non-MBS and 49 MBS patients (25 gastric bypass, 24 sleeve gastrectomy) were included, with a mean age of 47±11.5 years and BMI of 41.5±8.3 kg/m^2. Total IEAS-2 scores improved marginally over time ($p = .054$), irrespective of MBS status. OMM use ($p < .001$), physical activity ($p = .019$), and sleep ($p = .065$) were associated with better IE scores, while depression ($p < .001$) predicted worse outcomes.

CONCLUSIONS: Improvements in IE may be influenced more by individual-level factors – such as OMM use, lifestyle behaviors, and mental health – than by treatment modality alone, supporting the importance of interdisciplinary obesity care, integrating medical, psychological, and behavioral support.

KEYWORDS: Metabolic and Bariatric Surgery, Obesity Management Medication, Intuitive Eating, Eating Behavior, Obesity Treatment

INTRODUCTION

Obesity is a chronic, complex disease associated with an increased risk of developing severe health conditions,[1] currently affecting 41.9% of the United States population.[2] Treatment strategies typically include lifestyle interventions (e.g., dietary changes, sleep health, stress reduction, and physical activity), pharmacological therapies (i.e., obesity management medications; OMM, oral and injectables), and metabolic and bariatric surgery (MBS).[3] While behavioral interventions can lead to modest (5–10%) but clinically meaningful weight loss and health improvements,[4,5] sustaining these outcomes over the long-term remains a clinical challenge,[6,7] with most individuals (80%) experiencing weight recurrence after the intervention concludes.[8–10]

MBS is an effective and durable treatment for obesity and its comorbidities,[11] with about 70% of patients achieving a ≥50% loss of excess weight. However, 20–30% may still experience suboptimal weight loss or weight recurrence.[12] More recently, pharmacological options – such as the injectables glucagon-like peptide-1 (GLP-1) and glucose-dependent insulinotropic polypeptide (GIP) receptor agonists – have demonstrated efficacy in modulating appetite and satiety,[13] resulting in 15–21% mean body weight reduction and a lower risk of obesity-related diseases.[14,15] However, they also pose challenges including limited accessibility, regimen adherence, and potential side effects.[16]

A comprehensive, multidisciplinary approach to obesity management – including nutrition, physical activity, pharmacotherapy, surgical, and psychological support – is increasingly recommended to support positive health outcomes.[18,19] Psychological factors, such as stress and depression, are linked to emotional eating and obesity,[18,20] while insufficient or poor quality of sleep has also been associates with increased obesity risk and disordered eating patterns.[21,22]

Each treatment – behavioral, surgical, and pharmacological – offer distinct benefits and challenges, particularly in terms of long-term adherence and weight recurrence. As these modalities increasingly overlap in clinical care,[11,19] there is growing interest in understanding how they intersect with eating behavior patterns, and Intuitive Eating (IE), an evidence-based concept, may facilitate this understanding.

Intuitive Eating

IE promotes eating in response to physiological cues, such as hunger and satiety, rather than emotional cues, encouraging flexibility and self-compassion over restrictive dieting and rigid food rules.[23] Unlike traditional weight-centric models, IE and other health-centric approaches emphasize engagement in health-promoting behaviors and have been associated with favorable health outcomes.[24] Systematic review of non-weight-centric approaches has shown that IE and mindful eating are associated with reduced depressive symptoms, lower disordered eating, improved body image, greater fruit and vegetable intake, higher dietary fiber consumption, better quality of sleep, and increased physical activity.[24–26]

The IE Assessment Scale-2 (IEAS-2) measures IE through four dimensions, which are described in more detail in the Methods section.[23] Counseling based on this assessment may support individuals by measuring their tendency to follow their hunger and satiety cues, thereby helping individuals make food-related decisions aligned with their physiological needs.[27]

The present study integrates behavioral, psychological, and physiological variables related to obesity to emphasize the importance of comprehensive care. It investigates the intersection of MBS, pharmacological intervention, particularly OMM, intuitive eating, and lifestyle factors, such as physical activity, sleep duration, and experiences of depression. To our knowledge, this is the first study to examine these factors collectively, providing insight into how surgical and pharmacological treatments may relate to intuitive eating behaviors while considering lifestyle and psychological factors. Specifically, the study 1) explored the changes from baseline to follow-up in Intuitive Eating Assessment Scale-2 scores across non-MBS and MBS patients, and 2) examined how other variables, including OMM, may influence these scores.

METHODS

Study Design

This study employed a retrospective longitudinal design to compare the change in IEAS-2 scores overtime (i.e., baseline and follow-up) and across non-MBS and MBS patients. Data were collected at an obesity medicine clinic in the state of Rhode Island and received approval from the responsible Institutional Review Board.

Participants

Participants included non-MBS and MBS patients who visited the obesity medicine clinic between January 2021 and July 2023. Eligibility criteria included: all patients who (a) are 18 years of age or older, and (b) had completed the IEAS-2 at baseline and at follow-up as part of the clinic's standard of care. MBS patients in this sample likely represent a specific subgroup of bariatric surgery patients – those experiencing either inadequate weight loss or weight regain – since patients with sustained success would be less likely to present to the clinic for further obesity management.

Data Collection

The following data were retrieved from electronic medical records using Research Electronic Data Capture (REDCap): (a) demographics of all participants, including age, date of birth, legal gender, marital status, employment status, race, and ethnicity, (b) the use or no use of OMM, (c) anthropometrics including weight, height, and body mass index (BMI), (d) the type of MBS and day of surgery, when applicable, (e) baseline and follow-up IEAS-2 completed by each patient, and (f) a brief health questionnaire about experiencing depression, sleep duration, and physical activity level.

Measures

The study examined IE responses across non-MBS and MBS patients, utilizing the IEAS-2. The scale is composed of 23 items distributed across four domains that indicate the core characteristics of intuitive eaters: (1) unconditional permission to eat, (2) eating for physical rather than emotional reasons, (3) reliance on hunger and satiety cues to decide when and how much to eat, and (4) body-food choice congruence.[28] Patients were instructed to answer 'yes' or 'no' for each statement, and when in between answers, they were instructed to pick the answer that most often applies to them.[29] For domains 1 and 2, each 'yes' is added up, and it represents an IE area that the individual may need to work on more. For domains 3 and 4, all 'no' answers are added and indicate the areas for improvement; thus, higher scores correspond to more negative IE outcomes. For easier analysis and interpretation, we standardized the scoring across the subscales so that lower IEAS-2 scores indicate better outcomes, as the individual has fewer areas to improve. Scores were not replaced if missed but the following criteria were applied: For subscales 1–3, if at least 50% of the questions were answered (i.e., 3 out 6, 4 out of 8, and 3 out of 6 for subscales 1,2, and 3, respectively), they were accounted for and added to the IEAS-2 subscales' total and overall scores. For subscale 4, the answers were accounted for if at least 2 out of 3 items were answered. The IEAS-2 subscales were calculated by counting the number of "yes" responses to items in subscales 1 and 2 and the number of "no" responses to items in subscales 3 and 4. Total scores were the sum of all subscales items.

Subscales

Unconditional Permission to Eat (UPE)

This subscale assesses individuals' permission – or lack of permission – to consume food when experiencing hunger without attempting to suppress it (e.g., "I don't allow myself to eat what food I desire at the moment"), categorize specific foods as off-limits (e.g., "I have forbidden foods that

I don't allow myself to eat") or as healthy/unhealthy (e.g., "I get mad at myself for eating something unhealthy"), and without rules that dictate what, when, and how to eat.[28,29]

Eating for Physical Rather than Emotional Reasons (EPR)

This subscale represents whether individuals' eating decisions are in response to physical hunger or driven by emotional distress, such as anxiety, loneliness, or boredom. For example, "I find myself eating when I'm feeling emotional (i.e., anxious, sad, depressed), even when I'm not physically hungry."[28]

Reliance on Hunger and Satiety Cues (RHSC)

This subscale assesses individuals' confidence in their internal hunger and satiety signals and their capacity to utilize these cues to regulate their eating behavior. For example, "I trust my body to tell me *when* to eat."[28]

Body-food Choice Congruence (B-FCC)

The B-FCC subscale assesses individuals' reliance on making food choices that honor health and taste preferences, while maintaining a flexible nutrition approach, listening to how food makes one feel, without a rigid focus on healthy foods and perfection – "gentle nutrition."[23,28]

Table1. Participant Demographics

Frequencies Descriptives	Total, n (%) Mean ± SD	Non-MBS	MBS	Significance
Sample	84 (100)	35 (41.6/100)	49 (58.4/100)	>0.05
Type of Surgery Gastric Bypass, n Vertical Sleeve			25 (52) 24 (48)	
Initial Body Mass Index (kg/m²) Mean ± SD	41.54 ± 8.3	42.64 ± 7.87	40.75 ± 8.6	.307
Age, years Mean ± SD	47.29 ± 11.5	46.74 ± 12.55	47.67 ± 10.81	.717
Gender Men Women	12 (14.3) 72 (85.7)	10 (28.6) 25 (71.4)	2 (4.1) 47 (95.9)	.002
Ethnicity Not Hispanic/Latino Hispanic/Latino Prefer not to answer	71 (84.5) 11 (13.1) 2 (2.4)	27 (77.1) 6 (17.1) 2 (5.7)	44 (89.8) 5 (10.2) 0	.140
Race Black White Other/Multiracial Prefer not to answer	12 (14.3) 62 (73.8) 8 (9.5) 2 (2.4)	3 (8.6) 27 (77.1) 3 (8.6) 2 (5.7)	9 (18.4) 35 (71.4) 5 (10.2) 0	.229
Obesity Management Medication (OMM) Use Initial Visit No use Yes use	68 (81.0) 16 (19)	27 (77.1) 8 (22.9)	41 (83.7) 8 (16.3)	.575
Time Elapsed Since Bariatric Surgery, years Median (Min-Max)			6.17 ± 6.59 5.3 (.18-40)	
Time Elapsed Initial to Follow-up Visit, days	129.6 ± 82.74	131.2 ± 92.73	128.4 ± 75.78	.881
Total Weight Loss Pounds	5.59 ± 12.4	7.22 ± 11.23	4.43 ± 13.18	.314

Statistical Analysis

Descriptive analysis was used for all participants' characteristics and separated by surgical status (non-MBS and MBS). In Statistical Package for the Social Sciences (SPSS; IBM version 28.0.1.1), a linear mixed-effects model was selected to examine changes in intuitive eating total scores and subscales 1-4 across two time points (baseline and follow-up), comparing non-MBS and MBS groups. The model included variables: age, gender, marital status, race, ethnicity, employment, BMI, exercise level, depression, sleep duration, weight loss, and OMM status (coded as medication use: yes/no). A Confidence interval of 95% was employed, and statistical significance was determined at the $p < 0.005$ level.

RESULTS

A total of 168 IEAS-2 surveys from 84 patients were included in the analyses. The only demographic variable that differed between non-MBS and MBS patients was gender [**Table 1**]. Of the 12 males who participated, two (16.7%) were in the MBS group whereas 47 (65.3%) of the 72 females were in the MBS group.

Changes in IEAS-2 total scores across time and between MBS and Non-MBS

We found a marginally significant main effect of time, $F(1, 102.82) = 3.79$, $p = .054$, suggesting that IE scores improved from baseline ($M = 9.48$, $SE = 0.55$) to follow-up ($M = 8.10$, $SE = 0.56$; see **Figure 1**). The main effect of bariatric status was not significant, $F(1, 72.03) = 1.68$, $p = .199$, nor was the Time × Bariatric Status interaction, $F(1, 78.05) = 0.17$, $p = .682$, indicating that IE change over time did not significantly differ between the MBS and non-MBS groups.

Examination of the variables revealed several significant predictors of intuitive eating. Medication use was significantly associated with lower (i.e. better) IE scores, $B = -3.11$,

Figure 1. Changes in IEAS-2 total scores across time between Non-MBS and MBS.

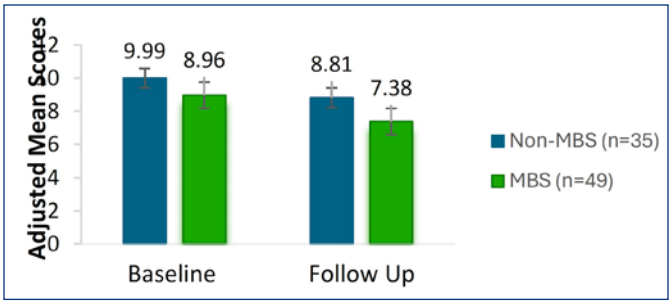
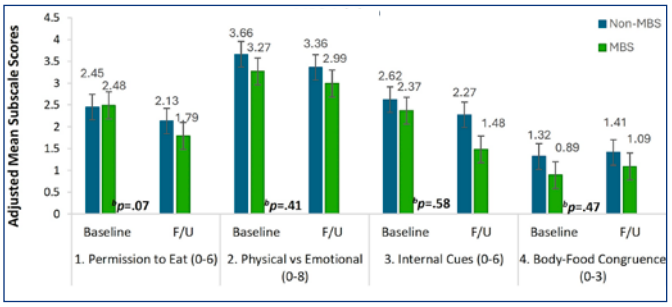


Figure 2. Changes in IEAS-2 Subscale Scores Across Time Between Non-MBS and MBS Adults[a].



a. Interaction between Time and Bariatric Status
b. P values indicate an effect of Time.
Note: Lower IEAS-2 scores = better outcomes

SE = 0.83, *t*(128.63) = -3.77, *p* < .001. Greater physical activity also predicted better IE outcomes, *B* = –1.24, *SE* = 0.52, *t*(143.88) = -2.37, *p* = .019. In contrast, depression was associated with higher (i.e., worse) IE scores, *B* = 1.40, *SE* = 0.32, *t*(134.13) = 4.44, *p* < .001, indicating poorer intuitive eating. There was a marginal effect of sleep, with longer sleep duration associated with better IE outcomes, *B* = –1.09, *SE* = 0.59, *t*(133.34) = –1.86, *p* = .065.

Changes in IEAS-2 subscale scores across time and between MBS and Non-MBS adults

Subscale 1: Unconditional Permission to Eat

There was a marginally significant main effect of Time, *F*(1, 109.64) = 3.32, *p* = .071, suggesting that Subscale 1 scores somewhat decreased (i.e., improved) from baseline (*M* = 2.47, *SE* = 0.21) to follow-up (*M* = 1.96, *SE* = 0.20). Although MBS had slightly better scores at follow-up, the main effect of Bariatric Status was not significant, *F*(1, 73.18) = 0.20, *p* = .653, with non-MBS participants (*M* = 2.29, *SE* = 0.25) showing similar Subscale 1 scores to MBS (*M* = 2.14, *SE* = .20). The interaction between Time and Bariatric Status was also not significant, *F*(1, 79.31) = 1.00, *p* = .321 (see **Figure 2** for adjusted mean score changes from baseline to follow-up separated per group).

Among all variables, OMM status was the only significant predictor, *B* = –0.67, *SE* = .32, *t*(138.08) = –2.12, *p* = .036. This indicates that OMM use was associated with lower (i.e., better) unconditional permission to eat scores, controlling for other variables.

Subscale 2: Eating for Physical Rather than Emotional Reasons

IEAS-2 subscale 2 scores improved from baseline (*M* = 3.47, *SE* = 0.29) to follow-up (*M* = 3.18, *SE* = 0.29). However, the main effect of Time did not achieve statistical significance, *F*(1, 94.56) = 0.68, *p* = .411. The main effect of Bariatric Surgery Status was also not significant, *F*(1, 70.71) = 0.53, *p* = .469, with non-MBS participants (*M* = 3.52, *SE* = 0.38) not differing from MBS participants (*M* = 3.14, *SE* = 0.32). Additionally, the Time × Bariatric Surgery Status interaction was not significant, *F*(1, 73.70) = 0.003, *p* = .958, suggesting no differential change in Subscale 2 scores over time by surgery status [**Figure 2**].

Among the obesity-related variables, depression was a significant predictor of Subscale 2 scores, *B* = .474, SE = .16, *t*(124.9) = 2.98, *p* = .003, such that depression was associated with a greater likelihood of eating for emotional rather than physical reasons. OMM use was also a significant predictor, *B* = –.818, *SE* = .41, *t* (115.3) = –1.99, *p* = .048, with OMM use being associated with lower (better) Subscale 2 scores. No other covariates reached statistical significance (*p* > .05).

Subscale 3: Reliance on Internal Hunger/Satiety Cues

There was a marginally significant main effect of Time, *F*(1, 102.19) = 3.66, *p* = .058, with mean Subscale 3 scores decreasing (i.e., improving) from Baseline (*M* = 2.50, *SE* = 0.25) to Follow-up (*M* = 1.88, *SE* = 0.24). The main effect of Bariatric Surgery Status was not significant, *F*(1, 71.61) = 1.60, *p* = .211, with non-MBS participants (*M* = 2.45, *SE* = 0.30) not differing from MBS participants (*M* = 1.93, *SE* = 0.25), nor was the Time × Bariatric Status interaction, *F*(1, 75.25) = 1.41, *p* = .238, suggesting no differential change in reliance on internal cues scores over time by surgery status [**Figure 2**].

Among all variables, less reliance on hunger and satiety cues was associated with marital status (*B* = 0.066, *SE* = 0.030, *t*(113.35) = 2.22, *p* = .028) and depression (*B* = 0.522, *SE* = 0.142, *t*(137.89) = 3.67, *p* < .001). On the contrary, exercise level (*B* = -0.526, *SE* = 0.232, *t*(144.32) = –2.26, *p* = .025) and OMM use (*B* = –0.830, *SE* = 0.375, *t*(132.98) = –2.21, *p* = .029) were associated with better outcomes.

Subscale 4: Body-Food-Choice Congruence

The main effect of Time was not significant, *F*(1, 104.93) = 0.53, *p* = .469, indicating no major change in Subscale 4 scores from Baseline (*M* = 1.11, *SE* = 0.16) to Follow-Up (*M* = 1.26, *SE* = 0.14). The main effect of Bariatric Surgery Status was also non-significant, *F*(1, 72.71) = 2.37, *p* = .128, with non-MBS participants (*M* = 1.37, SE = 0.18) not differing from MBS (*M* = .99, *SE* = 0.15). Time × Bariatric Status interaction was non-significant, *F*(1, 76.90) = 0.16, *p* = .687, suggesting

no differential change in body-food-congruence scores over time by surgery status [**Figure 2**].

Regarding all variables, exercise level was associated with lower (i.e., better) body-food-congruence, $B = –0.35$, $SE = 0.14$, $t(143.36) = –2.51$, $p = .013$. Sleep duration and OMM use also predicted lower scores ($B = –0.32$, $SE = 0.16$, $t(137.67) = –2.01$, $p = .047$, and $B = –.66$, $SE = 0.23$, $t(136.36) = –2.89$, $p = .004$, respectively). Depression was linked to higher (i.e., worse) scores, B = 0.35, SE = 0.09, $t(141.19) = 3.99$, $p < .001$. All other covariates were non-significant ($p > .05$).

DISCUSSION

This study examined changes in intuitive eating behaviors among patients in an obesity management clinic, comparing those who had undergone MBS to those who had not. Overall, IEAS-2 scores showed marginal improvement over time, irrespective of MBS status, suggesting some progression in participants' intuitive eating. However, no significant bariatric status or Time × Bariatric Status interaction was observed, indicating that surgery status alone did not significantly influence IE outcomes.

Modest improvement in IE over time

The modest improvement observed in intuitive eating may reflect the gradual and non-linear nature of behavior change and habit formation.[30] Improvements may be related to the care and information provided at the clinical, but more research is needed to elucidate this relationship. The marginal effect of time could be partially explained by the relatively short interval between baseline and follow up (mean of 130 days), as behavioral change typically evolves gradually and unfolds overtime.[31,32] Additionally, adopting IE may present challenges in weight management context, as IE is not inherently designed for weight loss.[23] Furthermore, the variability in follow-up timing may have diluted potential time-related effects, as participants had differing durations in which potential change could occur. These factors should be considered when interpreting the observed time effects and in planning future longitudinal assessments.

MBS and IE

MBS participants showed numerically greater improvements than their non-MBS counterparts, though this difference was not statistically significant. This trend may reflect patterns observed in prior research, which suggests that initial behavioral changes following MBS diminishes over time without structured follow-up.[33] While individuals who undergo MBS typically receive nutrition education during their pre- and post-operative process, their eating behaviors may be similar to those of non-MBS patients over time, potentially mirroring pre-surgery dieting behaviors.[34] This underscores the importance of sustained support, and IE may offer an opportunity for patients to reconnect with the skills they learned around time of surgery. This will ensure more meaningful, lasting changes, especially when combined with other therapeutical strategies, such as OMM, and lifestyle interventions.[35]

OMM and IE

A beneficial relationship was observed between the use of OMM and the IEAS-2 scores, both in the total score and across all four subscales. This may suggest a potential link between OMM and a healthier relationship with food and eating behaviors. OMM use emerged as a consistent predictor of improved IE scores, potentially due to its role in modulating physiological pathways that regulate appetite and satiety signaling,[14] thereby supporting engagement with eating behavior changes.[30]

Part of this effect may be explained by OMM's ability to regulate reward-seeking behaviors,[36] which may reduce what has been colloquially referred to as "food noise" – a constant preoccupation with food.[36] In the absence of persistent food thoughts and hunger, it is plausible to think that individuals may be less inclined to consciously engage in restrictive eating patterns (Subscale 1), fostering a more intuitive relationship with food that relies less on externally imposed rules. Furthermore, OMM may also support more attuned decisions regarding food, mind, and body (Subscales 2–4). Individuals may become more likely to eat in response to physical hunger rather than emotional cues, to consider how certain foods feel in their body and mind, and to choose foods that align with their body's needs. These findings suggest OMM may exert physiological and psychological influence on eating behaviors.[36]

Lifestyle (physical activity and sleep duration) and IE

Physical activity level and sleep duration were also associated with improved IE outcomes, particularly in subscales related to eating in response to internal cues (Subscale 3) and body-food congruence (Subscale 4). These findings align with existing literature suggesting that physical activity and eating behaviors are interconnected, with greater physical activity supporting more autonomous and regulated eating patterns. For example, Fernandes et al (2023) found that higher levels of physical activity are associated with more self-determined eating regulation, characterized by reduced reliance on external rules or emotional cues.[37] Our results also align with the literature that supports that sleep duration is associated with better eating patterns.[22,38] This may be due to the role that adequate sleep has in supporting regulation of appetite hormones, food intake, high-energy intake, and emotional eating.[22,39]

Depression and IE

Depressive symptoms were consistently associated with poorer IEAS-2 outcomes, especially in domains related to emotional eating. This underscores the connection between

depressive symptoms and eating behavior as supported by current literature. Research has shown that depressive symptoms are closely associated to disordered eating patterns, including loss of appetite, overeating, binge eating, and weight gain in response to emotions, as individuals with depressive symptoms are more likely to rely on food as a coping mechanism.[40,41] These findings emphasize obesity as a somatic comorbidity in mental health,[42,43] reinforcing the importance of addressing psychological health within obesity management care.[44] The integration of holistic strategies – such as mindfulness-based interventions like intuitive eating – may support emotional well-being and reduce emotional eating among individuals undergoing weight management.[35,44]

Considering these findings collectively, weight management interventions may depend not only on the treatment format itself but also on the interplay of psychological, behavioral, and physiological factors. Addressing modifiable variables such as physical activity, sleep, and depressive symptoms, along with pharmacological treatment and surgery may enhance the effectiveness of obesity management treatment.

CONCLUSION

This study offers novel insights into the role of intuitive eating within an obesity management context, particularly in relation to MBS and pharmacological treatment. While MBS status did not significantly predict changes in IE behaviors, individual-level variables – most notably OMM use, physical activity, sleep duration, and depressive symptoms – were consistently associated with IE outcomes. These findings suggest that treatment modality alone may not be sufficient to drive meaningful behavior change; rather, IE appears to hinge on a broader set of modifiable factors.

Importantly, the observed links between IE, lifestyle behaviors, and psychological factors reinforce the value of a multidimensional, patient-centered model of obesity care. Interventions that combine physiological support (e.g., OMM, MBS) with behavioral and psychological strategies (e.g., promoting physical activity, improving sleep, and addressing mental health) may enhance long-term outcomes.

Future research should explore intuitive eating trajectories over extended follow-up periods and assess the impact of tailored interventions – such as medication-assisted, surgical, and IE counseling programs – on more diverse populations across gender, race, ethnicity, and geographical location. As obesity care continues to evolve toward personalized, holistic treatment models, understanding the dynamic interplay between pharmacological, surgical, behavioral, and psychological influences will be essential to improving outcomes and eating behaviors.

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Gut Health and the Microbiome: The Hidden Drivers of Obesity

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ABSTRACT

Obesity is a complex disease that spreads globally as a pandemic which affects all human activities from basic daily functions to advanced medical conditions that transform entire communities. The core factors of dietary excess and sedentary lifestyles continue to drive obesity but scientific evidence demonstrates that the gut microbiome plays a crucial role in regulating energy balance and body fat as well as metabolic wellness. High-throughput sequencing technology has transformed our understanding of this problem while showing how gut microbial communities affect nutrient absorption and host metabolism while protecting us from increased systemic inflammation. These new discoveries are emergent and promising to help us understand how to manage this complex multifactorial condition. This review examines the developing mechanisms through which gut microbes affect obesity while assessing preclinical and human study evidence and discussing potential therapeutic approaches to modify the microbiome for obesity treatment and its related conditions.

INTRODUCTION

Obesity affects over 650 million adults globally shaping our society in ways that barely one hundred years ago we thought impossible and is now a major risk factor for type 2 diabetes, cardiovascular disease, nonalcoholic fatty liver disease, and cancer; being one of the leading causes of death.[1] Traditionally, obesity has solely and mistakenly been attributed to caloric imbalance driven by high-energy diets and decreased physical activity which caused our society to start to increasingly blaming solely patients' life style choices without considering the problem from a 360-degree point of view. In fact, this way of thinking fails to fully explain an extraordinary interindividual variability in what medical providers see on a daily basis in weight gain, response to diet, or the persistence of obesity after caloric restriction.[2]

One of the most compelling developments in the last two decades is the recognition that the microorganisms colonizing the human gastrointestinal tract are in fact integral regulators of metabolism, immune function, and even behavior. This opened up a whole new field in bio-medicine driven to find more answers given the dramatic interindividual variability. Variations in the composition and diversity of the microbiome have been linked to several disease processes that afflict patients nowadays, from cancer, to obesity and several metabolic dysfunctions in both animal models and humans.[3] These observations have sparked a paradigm shift in the core views of many medical diseases: from viewing obesity solely because of lack of effort in the desire of being healthy which lead in our society to patient blaming and even at times shaming, to appreciating the role of host-microbe interactions potentially helping us to change the way we treat medical issues and patients as a whole.

This article reviews current evidence on the gut microbiome's role in obesity, highlighting key mechanistic insights, clinical observations, and translational approaches targeting the microbiome.

THE GUT MICROBIOME: AN OVERVIEW

The human gut microbiome is and extremely complex ecosystem that could be considered its own micro-universe, which includes bacteria, archaea, viruses, fungi, and protozoa, with bacteria being the most studied and with the highest potential for future research. The dominant bacterial phyla in the gut are Firmicutes and Bacteroidetes, followed by Actinobacteria and Proteobacteria.[4]

The microbiome of the human gut plays a key role for normal human well-being in general and in fact encodes functions critical for digestion of indigestible carbohydrates, production of short-chain fatty acids (SCFAs), vitamin synthesis, bile acid metabolism, and modulation of the immune system.[5] In recent years there have been advances in metagenomic sequencing both for DNA and RNA that enabled researchers to characterize the microbial communities and their metabolic capabilities in unprecedented detail, this opened the scientific world to an enormous amount of information much of which still needs to be understood to be able to be utilized clinically in a meaningful way.

EVIDENCE LINKING THE MICROBIOME TO OBESITY

Preclinical Studies

A lot of work has involved the creation of models that could be utilized to explore the microverse of microbiome interaction; specifically for obesity, germ-free (GF) mouse

models have been instrumental in demonstrating that the gut microbiome contributes to host adiposity. The hypothesis that sparked the creation of such a model is the idea of assessing how the presence of bacteria influences tissue adiposity and its metabolism. In a landmark study, Bäckhed et al showed that GF mice colonized with microbiota from conventionally raised animals exhibited a 60% increase in body fat despite reduced food intake, suggesting enhanced energy harvest by the microbiota and a key role in determining body weight.[6] This effect was further supported by Turnbaugh et al, who transplanted microbiota from genetically obese (ob/ob) mice into GF mice, which then developed significantly greater fat mass than mice colonized with microbiota from lean controls suggesting the key role of gut bacteria yet again.[3]

Subsequent animal models have identified specific microbial metabolic pathways that link gut bacteria to host energy balance; this was seen as a step forward by not looking at the specific bacteria, but how the product of its metabolism affected weight metabolism. One of the main mechanisms was found to involve the fermentation of non-digestible carbohydrates into short-chain fatty acids (SCFAs): primarily acetate, propionate, and butyrate, that were produced for the most part in the colon. SCFAs were found to serve as both nutrients and interestingly also as signaling molecules, which were hypothesized to have a role in regulating host appetite with promising clinical implications, lipid metabolism, as well as insulin sensitivity.[12–14]

Surprisingly though, certain studies have shown that even obese mice do exhibit increased levels of SCFAs in feces, which challenged the idea that they serve as protective factors, since other authors found that SCFAs were associated with having possible beneficial metabolic effects in lean animals. The different results from these studies suggested that obesity caused SCFA absorption dysfunction while altering the fermentation processes in the colon, which was confirmed by studies in both mice and humans.[23]

Leaning deeper in this metabolic pathway given its promising potential, SCFAs are found to act through receptors such as free fatty acid receptor 2 (FFAR2), which has been shown to mediate appetite-regulating hormones like GLP-1 and peptide YY (PYY). To sustain this pathway, other studies appreciated how FFAR2 knockout mice do in fact become obese, while on the other side overexpression in adipose tissue leads to more lean phenotypes. In addition, these seemingly potent metabolic effects disappear under germ-free conditions, highlighting the critical role of the microbiota in this pathway.[23]

Additional animal models have also shown that microbial metabolites such as SCFAs activate AMPK (or AMP-activated protein kinase) in liver and muscle tissues, which is a crucial enzyme that acts as a sensor of cellular energy status. AMPK is activated by conditions that lower cellular energy levels, and its activation triggers metabolic changes that promote energy production and inhibit energy-consuming processes which makes it a key player in maintaining cellular energy balance and has implications for various metabolic disorders and diseases; specifically for our purposes it improves lipid and glucose metabolism.[24]

On the other side, other studies focused on gut dysbiosis that may lead to impaired secretion of GLP-1 and PYY, resulting in increase in hunger. Mice lacking PYY exhibit in fact increased food intake and obesity, while mice with elevated PYY are resistant to diet-induced weight gain.[25]

Inflammation is another key player for weight metabolism; additional authors have found that mice with dysbiosis show elevated systemic levels of lipopolysaccharide (LPS), a pro-inflammatory endotoxin derived from gram-negative bacteria that binds to TLR4 on macrophages, triggering inflammatory cascades via NF-κB and contributing to insulin resistance and β-cell dysfunction; in fact, infusion of LPS into lean mice induces weight gain and metabolic syndrome-like features, suggesting a causal role of this molecule.[16]

These murine models not only establish causality but also offer potential targets for future therapies, including modulation of SCFA signaling pathways.

Human Observational Studies

Multiple studies in humans have associated obesity with reduced microbial diversity and altered relative abundances of bacterial taxa, and, specifically, several reports have identified imbalances in the relationship of Firmicutes-to-Bacteroidetes ratio in obese individuals compared to lean controls[8,9], suggesting a potential correlation of this potential imbalance. Important to remember that these two strains are in fact the most dominant bacterial phyla in the human gut making a large portion of the microbiome. These bacteria are respectively Gram positives and Gram negative and play a role in breaking down complex carbohydrates (Firmicutes) and fibers (Bacteroidetes) producing SCFAs. Bacteroidetes are often associated with leaner body mass and a healthier gut, as they are less efficient at extracting calories from food compared to Firmicutes. However, this observation is not universal across all cohorts; in fact there are several differences when looking at patients' geographic, dietary, and other characteristics.[10]

Inflammation also plays an important role in altering metabolic pathways and impacting SCFAs, and in many studies patients with obesity have in fact been found to have higher levels of pro-inflammatory endotoxins contributing to dysbiosis and alterations in said metabolic pathways.[11]

MECHANISMS LINKING THE MICROBIOME TO OBESITY

Enhanced Energy Harvest

The first proposed mechanism involves the microbiome's capability to enhance the extraction of calories from

indigestible polysaccharides which affects appetite and satiety and absorption; in fact, microbial fermentation generates SCFAs such as acetate, propionate, and butyrate, which can be absorbed by the host and could even contribute up to 10% of daily caloric requirements and they also function as signaling molecules affecting lipid and glucose metabolism via G-protein coupled receptors (e.g., GPR41, GPR43).[12,13]

Regulation of Lipogenesis

Acetate, the most abundant SCFA, has been implicated in promoting lipogenesis in the liver, so microbial metabolites modulate expression of genes such as acetyl-CoA carboxylase and fatty acid synthase, enhancing triglyceride accumulation contributing to weight gain.[14]

Modulation of Satiety and Appetite

The gut microbiota helps controlling satiety through SCFA production and enteroendocrine cell regulation which results in butyrate and propionate stimulating PYY and GLP-1 hormone secretion that suppress appetite and enhance insulin sensitivity.[15] In a state of dysbiosis these signals may be attenuated, favoring increase in appetite and calorie intake.

Metabolic Endotoxemia

Certain Gram-negative bacteria in the human gut produce lipopolysaccharide (LPS), which is a strong endotoxin that can lead to increased gut permeability during dysbiosis, allowing translocation of LPS into circulation, which will trigger low-grade inflammation and insulin resistance.[16] This endotoxemia has been proposed as a one of the drivers of obesity-related inflammation, activating other metabolic cascades.

Bile Acid Metabolism

Bile is an important factor in GI metabolism and absorption, and is well regulated by several hormones and stimuli. The microbiome interacts with bile acids in a continuous manner through a vital connection where gut bacteria convert primary bile acids into secondary bile acids which activate nuclear enteric cell receptors including farnesoid X receptor (FXR) and G protein-coupled bile acid receptor 1 (TGR5) to control lipid metabolism and glucose homeostasis and energy expenditure.[17]

THERAPEUTIC MODULATION OF THE MICROBIOME IN OBESITY

Given the microbiome's role in obesity, interventions aiming to restore eubiosis have attracted considerable interest, interventions range from dietary changes and the constant search of the "perfect diet" to medical treatments that have pushed the medical industry into creating a billion-dollar market with thousands of over-the-counter remedies to "restore" the microbiome.

Diet

Diet remains the most powerful modulator of the gut microbiome with the highest chance of impact, specifically high-fiber diets rich in complex carbohydrates promote SCFA-producing bacteria and microbial diversity carrying along several health benefits[18]; on the other side, Western diets high in fat and refined sugar drive dysbiosis and possibly metabolic derangements that over the years can lead not only to obesity but also to other several disease processes; many studies have in fact shown that dietary interventions can rapidly shift microbiome composition within days, emphasizing this important role.[19]

Probiotics

Probiotics are live microorganisms that are hypothesized to confer health benefits and have been historically very well tested in obesity management, especially strains including Lactobacillus and Bifidobacterium species, but unfortunately several meta-analyses suggest that probiotic supplementation modestly reduces body weight and BMI, though results are heterogeneous and strain-specific.[20]

Prebiotics

Prebiotics, such as Inulin and fructooligosaccharides, are nondigestible substrates that promote the growth of beneficial microbes which then increase SCFA production; this has been associated in certain studies to create improved glucose regulation but unfortunately still with modest weight loss.[21]

Fecal Microbiota Transplantation (FMT)

FMT is a novel technique that involves transferring stool from healthy donors to recipients to restore microbial balance. It is based on the theory of introducing a healthy person microbiome into a patient with dysbiosis hoping to restore balance, but while FMT has shown success in treating both acute and recurrent *Clostridioides difficile* infections at times resistant to antibiotic therapy, its application in obesity remains experimental. A landmark study demonstrated that FMT from lean donors improved insulin sensitivity in obese recipients, but effects on weight were inconsistent.[22]

LIMITATIONS AND FUTURE DIRECTIONS

While the association between the microbiome and obesity is compelling, several challenges remain:

- **Causality vs. Correlation:** Many studies are observational and cannot establish causality.
- **Interindividual Variability:** Microbiome composition is influenced by genetics, diet, geography, and medications.
- **Translational Gaps:** Findings in animal models may not fully translate to humans.

- **Durability of Interventions:** Microbiome shifts often revert after discontinuation of dietary or probiotic interventions.

Future research integrating multi-omics (metagenomics, metabolomics, transcriptomics) with longitudinal cohorts may clarify causal pathways and enable personalized microbiome-targeted therapies.

CONCLUSION

The gut microbiome functions as a vital system which controls host metabolic processes, inflammatory responses and energy equilibrium. While eubiosis remains the desired hallmark of a healthy gut, dysbiosis has been proven to contribute to the pathogenesis of obesity through increased energy harvest, altered gut hormone signaling, endotoxemia, and alterations of bile acid pathways. Promising microbiome-directed interventions are emerging and promising, but large-scale clinical trials are still needed to define their efficacy and durability. A deeper understanding of host-microbe interactions may ultimately yield transformative strategies to prevent and treat obesity.

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Psychiatric Comorbidities and Weight Loss Recommendations in Bariatric Surgery Patients

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ABSTRACT

Metabolic and bariatric surgery is increasingly utilized as a treatment for obesity worldwide. Despite significant weight loss, weight regain can occur long-term with bariatric surgery, with factors related to weight regain including the presence of comorbid psychiatric conditions. Psychiatric comorbidity in bariatric surgery candidates is common; although these comorbidities sometimes improve in the short-term, they may worsen in the long-term or new problems may emerge post-surgically. Many patients may continue to take psychotropic medications after surgery to maintain behavioral health, yet some medications are associated with weight gain or may pose certain risks due to changes in pharmacokinetics following surgery. The research on psychiatric comorbidity in bariatric surgery patients is presented, along with a review of psychotropic medications that may pose risks of weight gain post-surgically. Clinical recommendations are provided based on existing evidence with respect to managing psychiatric comorbidity in patients in ways that can optimize behavioral health outcomes while also ensuring positive outcomes with bariatric surgery.

KEYWORDS: Psychiatric Comorbidity, Medication, Psychotherapy, Bariatric Surgery

INTRODUCTION

Metabolic and bariatric surgery is increasingly utilized as a treatment for obesity worldwide,[1] with the most common procedures being Roux-en-Y gastric bypass (RYGB) and sleeve gastrectomy (SG). Maximum weight loss is achieved in the first one-two years post-surgery,[2] with additional long-term benefits.[3] Despite significant weight loss, weight regain can occur long-term with bariatric surgery, with factors related to weight regain including the presence of comorbid psychiatric conditions and challenges in adjusting to the new social demands after weight loss surgery.[4,5] The following review will focus on psychiatric comorbidity in bariatric surgery patients, its impacts on surgical outcomes, and evidence-based clinical recommendations for managing this comorbidity pattern in bariatric surgery candidates.

OBESITY-PSYCHIATRIC COMORBIDITY IN BARIATRIC SURGERY CANDIDATES

Psychiatric comorbidity in bariatric surgery candidates tends to be higher compared to the general population and those experiencing obesity but who are non-treatment seeking.[6] Individuals seeking medical interventions for obesity are more likely to have medical comorbidities, including diabetes, obstructive sleep apnea, and cardiovascular disease, and these severe medical conditions are associated with high levels of psychiatric conditions such as depression.[7]

As many as 81% of bariatric surgery patients have met criteria for at least one lifetime psychiatric disorder at the pre-surgical evaluation, with mood and anxiety disorders being the most common.[8] The most common lifetime disorders are affective disorders (e.g., major depression), while the most common current disorders are anxiety disorders.[6] One study of over 1,000 bariatric surgery candidates found that specific phobia was the most prevalent current disorder (9.0%), followed by social anxiety disorder (7.9%).[9] However, some studies have found that eating disorders were the most common current diagnosis, and other studies have demonstrated a high prevalence of posttraumatic stress disorder (PTSD) in bariatric surgery candidates.[6] Even in the absence of PTSD, rates of childhood trauma (particularly childhood sexual trauma) tend to be higher in this population.[6] In addition to being associated with PTSD, childhood trauma is associated with problematic eating behaviors and obesity.[6]

Rates of substance use disorders are low in presurgical candidates relative to other disorders (e.g., 7.6% in the Longitudinal Assessment of Bariatric Surgery [LABS-2] study),[10] yet overall use of substances pre-surgically may be high and may confer certain risks after surgery. Alcohol use has been as high as nearly 75% in bariatric surgery patients, with high-risk drinking in 17% of pre-surgical candidates.[11] Although alcohol use decreases following surgery, a percentage of patients experience the emergence of new-onset alcohol use problems or disorder post-surgically, particularly for those receiving the RYGB procedure.[11] Similar findings have occurred with other substances.[12]

IMPACT OF PSYCHIATRIC COMORBIDITY AND CORRELATES ON SURGICAL OUTCOMES

Psychiatric comorbidities tend to improve in the short-term, particularly one-two years post-surgery.[8] However, results from longer-term follow-up studies indicate that a decline in behavioral health tends to occur as many as 10 years after surgery.[13,14] A nine-year follow-up study showed there was a 32% increase in mood and eating disorders over the follow-up period compared to the pre-surgery period, with peak prevalence occurring at 72–96 months post-surgery.[8]

Findings are mixed as to whether psychiatric disorders are related to insufficient weight loss or weight regain after bariatric surgery. For example, mood, anxiety, and binge-eating disorders are associated with poorer weight loss outcomes up to 50 months after surgery.[15] Conversely, seven years after surgery there is an inconsistent relationship between the presence of presurgical psychiatric disorders and weight loss outcomes.[4] Although one recent study showed that the prevalence of psychiatric disorders increased over the post-surgical period, they also found that psychiatric disorders were not associated with percent excess weight loss over the post-surgical period.[8]

These mixed findings could be due to the variability in how psychiatric disorders were assessed. When using semi-structured diagnostic interviews, different types of instruments can be used, and prevalence rates may differ based on the assessment instrument.[6] Other studies have used unstructured clinical interviews, which often underdiagnose psychiatric conditions.[16] The degree to which the assessment process was independent of the presurgical approval process may also impact prevalence rates. When the assessment is a formal part of the surgical clearance process, symptoms may be underreported by patients due to fears of not being cleared.[6] Furthermore, mixed findings could be due to the range of disorders that are assessed; some studies have examined only single disorders, while other studies have assessed a range of psychiatric disorders.[8]

One correlate of psychiatric conditions, emotional eating, has been found to affect surgical outcomes. Emotional eating is defined as eating with the intended function of reducing stress or emotional upset. It has been shown to occur in 24–40% of bariatric surgery candidates, even in those with no lifetime psychiatric disorder.[9,17] Pre-surgical emotional eating severity is significantly associated with poorer weight loss following RYGB, laparoscopic adjustable gastric band, and biliopancreatic diversion,[18] although one study found that it was associated with increased odds of postsurgical weight loss success.[19] It is also significantly associated with higher levels of anxiety and depression in bariatric surgery candidates.[17,20]

Perhaps psychiatric conditions have an indirect, rather than direct, effect on weight loss outcomes. Psychological factors such as mindfulness (e.g., nonjudgmental stance towards emotions and thoughts) have mediated the relationship between depression symptoms and emotional eating presurgically, such that higher levels of depression symptoms were associated with greater emotional eating through higher levels of judgment towards thoughts and feelings.[21] Other studies showed that higher levels of mindfulness skills were associated with lower engagement in problematic eating behaviors, including emotional eating.[22] Emotion regulation skills may also be an important psychological factor to address, as it has been associated with problematic eating behaviors such as emotional eating in bariatric surgery candidates.[23]

WEIGHT GAIN AND PSYCHOTROPIC MEDICATIONS

In the LABS study,[24] 40% of 4500 presurgical candidates were taking an antidepressant medication (AD). ADs are the most prescribed psychotropic medications and are often continued during the post-surgical period, unlike medications for medical comorbidities. Overall, 65% of patients taking ADs report a side effect of weight gain, with 21% having a higher risk of greater than 5% weight gain compared to those not taking ADs. Across all ADs, tricyclics, MAOIs, and mirtazapine have the highest risk for weight gain.[25]

A recent review[25] showed that within selective serotonin reuptake inhibitors (SSRIs), paroxetine and citalopram have the highest risk of weight gain, while fluoxetine and sertraline are generally weight-neutral but may cause weight gain with long-term use. Compared with sertraline, escitalopram, paroxetine, and citalopram were associated with greater weight gain at six months, while fluoxetine was weight-neutral and bupropion was associated with weight loss. Serotonin norepinephrine uptake inhibitors (SNRIs) can cause weight gain, but the effect is less pronounced than with some other AD classes. Short-term studies show weight neutrality or even slight weight loss with SNRIs, but weight gain risk becomes higher with longer-term use. The risk of weight gain with SNRIs is lower than with tricyclic antidepressants or mirtazapine, but higher than with bupropion.[25] Tricyclic antidepressants (TCAs) can cause significant weight gain, with amitriptyline being the most potent TCA for inducing weight gain. The Endocrine Society recommends that clinicians consider the risk of weight gain when selecting AD therapy, especially for patients at risk for obesity or metabolic complications.[26]

For mood stabilizers, lithium, valproic acid derivatives, and gabapentin are associated with significant weight gain, while carbamazepine has a low risk of weight gain. Lamotrigine and topiramate are associated with weight loss or are weight-neutral.[26] A systematic review showed that valproate is associated with weight gain in up to 50% of users, often detectable within two–three months of initiation, while carbamazepine carries a lower but present risk.[25]

Second-generation antipsychotics are associated with

significant weight gain and other metabolic side effects (e.g., glucose dysregulation). Clozapine and olanzapine have the highest risk for weight gain among atypical antipsychotic medications, followed by quetiapine, risperidone, and paliperidone. The lowest risk for weight gain in antipsychotic medications is with aripiprazole and ziprasidone. This pattern is consistent across adult and pediatric populations, and the risk is particularly pronounced in antipsychotic-naive patients. Newer antipsychotic medications lurasidone and cariprazine are associated with some weight gain, but the magnitude is generally lower than many other second-generation antipsychotics. Both drugs are considered to have a favorable metabolic profile regarding weight gain, but monitoring is still recommended as part of standard care for all atypical antipsychotics.[27]

EARLY SURGICAL RISKS OF PSYCHOTROPIC MEDICATIONS AND IMPACTS ON SURGICAL OUTCOMES

Some research suggests that a possible risk with lithium is lithium toxicity immediately following surgery. For the SSRIs, some research has shown that they are associated with upper GI bleeding. Due to disruptions in taking medications immediately post-surgery, or due to early changes in pharmacokinetics, problems such as SSRI discontinuation syndrome or withdrawal symptoms may occur. There may be a higher risk with this related to venlafaxine because of its short half-life.[25]

Research on changes in pharmacokinetics has been more well-established for RYGB than for sleeve gastrectomy, due to changes in the surface area of the small intestine that impacts medication absorption, changes in pH levels, changes in gastric emptying times, changes in gastric motility, and changes in drug metabolism. Sertraline exposure was 40% of that in non-surgical matched controls, and maximal plasma concentration was lower than matched controls one year after RYGB.[28] Duloxetine exposure was approximately 60% of that in non-surgical matched controls, and there was a shorter time to maximal plasma concentration compared to matched controls.[29] However, there was no difference in pharmacokinetics related to lisdexamfetamine compared to matched non-surgical controls.[30] Other studies have found reduced bioavailability for various SSRIs and SNRIs at one month post-surgery,[31] reduced serum concentrations post-RYGB with escitalopram,[32] and reduced drug absorption post-RYGB for haloperidol, lithium, risperidone, valproate, lurasidone, and paliperidone long-acting injection.[25] For the treatment of addictive disorders, changes in methadone or buprenorphine absorption may occur, which could lead to issues such as respiratory depression or opioid use disorder relapse.[25]

Some individuals treated with ADs after surgery have experienced worsened outcomes one year post-surgery. However, there have been mixed findings with the association between AD use and weight loss outcomes in bariatric surgery. Some studies have indicated lower percent total weight loss in those taking ADs 24 months after RYGB surgery, compared to those not taking ADs.[33] Other studies have shown no association between AD use and weight loss outcomes in bariatric surgery.[34]

TREATMENT APPROACHES FOR MITIGATING MEDICATION-RELATED WEIGHT GAIN

Medication Approaches

Because of the prevalent use of psychotropic medications in this population, it is important to optimize psychiatric outcomes and minimize weight gain that can occur from these medications to facilitate surgical success. For patients who need to continue with psychotropic medications after surgery, it is recommended to consider decreasing the dose to the lowest therapeutic level possible while monitoring symptoms, or switching to medications with more weight-neutral properties. Add-on medications could be considered, when appropriate, that would assist in reducing weight gain with these medications. Such medications may include topiramate, metformin, or liraglutide.[35,36]

Metformin is the most evidence-based adjunct for both prevention and treatment of psychotropic-induced weight gain and is recommended as first-line adjunctive therapy when lifestyle interventions are insufficient and switching agents is not feasible. Metformin may be co-commenced with psychotropic drugs that have weight gain liability (e.g., olanzapine: OLZ-MET) if an alternative agent with lower weight gain liability is not an option.[37] OLZ-MET has been shown to decrease weight gain in both obese and non-obese populations. Olanzapine-samidorphan (OLZ-SAM) is a newly approved option for the treatment of schizophrenia and bipolar I disorder, which has demonstrated reduced weight gain in a non-obese population.[38] GLP-1 receptor agonists, although less studied than Metformin, have shown promise in mitigating psychotropic-induced weight gain. The overall weight loss attributed to GLP-1 receptor agonists is significantly greater than any other class of bariatric medicine, although long-term safety and efficacy data are still accruing.[37]

Topiramate is an off-label option for managing psychotropic-induced weight gain, particularly when first-line strategies are inadequate, but requires individualized risk-benefit assessment and monitoring for adverse effects. Cognitive dysfunction, paresthesia, and fatigue are dose-dependent and may lead to discontinuation in a subset of patients; careful monitoring is recommended.[35] For lithium, levels should be closely monitored before and after surgery; for other medications with defined therapeutic ranges, serum concentration levels should be closely monitored. For medications with short half-lives, it is important to provide education on SSRI

discontinuation symptoms that may occur post-surgery due to changes in pharmacokinetics. Should these symptoms occur, a possible recommendation is to increase the AD dose after surgery to address these symptoms. For patients who are stable on medication type and dosage pre-surgery but there is a concern of relapse, trough serum levels could be obtained to allow for comparison with post-surgery levels to monitor symptoms.[25] Overall, it is recommended that measurement-based care be used to monitor symptoms pre- and post-surgery, to allow for efficient adjustments in the treatment plan. Furthermore, collaboration between the surgical team, the pharmacotherapy specialist, and primary care provider is essential in maintaining stability of comorbid psychiatric conditions and ensuring surgical success.

Psychosocial Approaches

As a first step, it is of critical importance to conduct a comprehensive pre-surgical behavioral health evaluation. This has now become the standard of care and is recommended as part of the multidisciplinary screening process prior to bariatric surgery.[39] Such evaluations should include the use of semi-structured interviews and psychometric testing as a part of evidence-based evaluation.[39] In addition to identifying the presence of psychiatric conditions and correlates that could negatively impact surgical outcomes, these evaluations provide other benefits such as enhancing readiness for surgery, increasing knowledge about post-operative recommendations, addressing possible barriers to surgical success, and providing a positive connection with a behavioral health specialist to support treatment engagement in the future should the patient need it.[39]

Presurgical psychosocial interventions can provide an important opportunity to strengthen coping skills and healthy habits to ensure post-surgical success. Cognitive behavioral therapy (CBT) is recommended as a first-line psychosocial treatment to address depression, anxiety, and eating disorders. Studies have found that CBT provided pre-surgically resulted in improvements in dysfunctional eating/binge eating, depression, and anxiety post-intervention,[40] and significant weight loss at six and 12 months post-surgery.[41] Post-surgical psychosocial interventions and support groups also have resulted in greater weight loss,[42] and can improve problematic eating behaviors, depression, and weight outcomes in those who have experienced weight regain following RYGB.[43,44]

CONCLUSION

Psychiatric comorbidity is prevalent in bariatric surgery candidates. Findings thus far have been mixed concerning the impact of these comorbidities on surgical outcomes, but many individuals continue to experience psychiatric comorbidities post-surgery or develop new ones post-surgically. For those who continue to experience psychiatric comorbidities, it is important to consider ongoing management of these conditions post-surgically in ways that reduce the risk of weight gain (e.g., weight-neutral medications and psychosocial interventions). Other correlates are present even in the absence of psychiatric conditions that can negatively affect surgical outcomes, such as problematic eating behaviors. Comprehensive pre-surgical behavioral health assessments are crucial to identifying psychiatric conditions or correlates to determine appropriate treatment plans to ensure that patients receive adequate care and positive bariatric surgical outcomes.

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The Role of Bariatric Surgery in the Era of GLP-1 Receptor Agonists

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ABSTRACT

Obesity continues to be a significant public health issue resulting in morbidity, premature mortality, and substantial costs to the healthcare system. Effective treatments for obesity and its associated co-morbidities exist. Bariatric surgery has been well studied and shown to be safe and effective. Glucagon-like peptide receptor agonists (GLP-1 RAs) are relatively newer but have also been shown to result in substantial weight loss. We reviewed the current literature on both bariatric surgery and GLP-1 RAs and will present the pros and cons of each as well as a discussion of the roles they play in treating obesity. Our goal was to provide a comprehensive reference that can be used by all providers treating obesity to have educated discussions about the current state of treatment options with their patients.

KEYWORDS: Obesity, Bariatric Surgery, GLP-1 Receptor Agonists

INTRODUCTION

Obesity is a widely prevalent medical condition affecting 40% of Americans and 30% of Rhode Islanders.[1,2] The pathophysiology of obesity is still not completely understood and involves a complicated interplay between a variety of hormones and neural pathways as well as the influence of an individual's genetic makeup, environment, socioeconomic status and comorbidities.[1,3] Obesity is associated with increased risk of cardiovascular disease, type II diabetes mellitus (DM), obstructive sleep apnea (OSA), cancer, osteoarthritis, and premature death and results in hundreds of billions of dollars in direct medical costs annually.[1,4,5] The mainstay of treatment for obesity is behavioral change including adopting a healthy diet and increased physical activity; however, this results in insufficient weight loss in a significant number of patients.[6] Since its advent in the 1950s, bariatric surgery has emerged as an increasingly safe and effective option.[6] More recently, anti-obesity medications, specifically glucagon-like peptide receptor agonists (GLP-1 RAs), have become increasingly popular with their use for obesity treatment doubling between 2022 and 2023, while the rates of bariatric surgery during that time decreased by 8.7%.[7] This review will highlight the pros and cons of GLP-1 receptor agonists, compare them to bariatric surgery, and show how the two modalities each have roles both as adjunctive and independent treatments for obesity.

BARIATRIC SURGERY

Long-term data has shown that bariatric surgery is a safe and effective means of achieving significant weight loss. Undergoing bariatric surgery alters more than just a patient's anatomy. It shifts their metabolic setpoint affecting hypothalamic gene expression and changing fat and hormone levels, including increasing GLP-1 secretion, which contributes to changes in caloric intake and energy expenditure.[3,8,9] Currently, bariatric surgery is recommended in patients with a BMI of ≥35 or 30–34.9 with obesity-related co-morbidities such as hypertension, DM, hyperlipidemia, and OSA. The two most common procedures are the sleeve gastrectomy, which accounted for 58.2% of all bariatric procedures in 2023 and the Roux en Y gastric bypass (RYGB), which made up 23.4% of bariatric procedures in 2023.[10] Patients lose, on average, 57% of their excess weight after sleeve gastrectomy and 67% of excess weight after RYGB.[11] Bariatric surgery also effectively treats comorbidities such as DM and cardiovascular disease and has been shown to reduce mortality in studies with long-term follow-up.[1,11-14] A Cochrane review of 22 trials found that, regardless of the procedure, bariatric surgery was more effective than any non-surgical option for achieving weight loss and improvement in associated co-morbidities.[15] There have also been many studies showing that bariatric surgery is cost effective despite the relatively high up-front price tag.[16-19] However, some patients do experience insufficient weight loss or weight regain in addition to post-operative complications, which are procedure dependent but include stenosis (1–19%), leak (.6–7%), internal hernia and marginal ulcer (2.5–5%), nutritional deficiencies, and dumping syndrome in addition to standard peri-procedural risks.[8,20]

GLUCAGON-LIKE PEPTIDE 1 RECEPTOR AGONISTS

GLP-1 RAs are relatively newer in the world of obesity medicine. They were initially developed to treat diabetes mellitus but were found to result in significant weight loss. Two

GLP-1 RAs, liraglutide and semaglutide, are now FDA-approved to treat obesity and have been shown to result in loss of as much as 20% of excess body weight.[6] Current guidelines support the use of anti-obesity medications in non-pregnant patients with BMI ≥30 or BMI ≥27 with associated co-morbidities who have had an inadequate response to lifestyle changes.[3,21] GLP-1 RAs mimic the action of the hormone glucagon-like peptide acting on the hypothalamus and leading to appetite suppression as well as delayed gastric emptying, increased insulin release, decreased glucagon secretion and increased growth of pancreatic beta cells.[1,8] Treatment with semaglutide, a weekly injectable GLP-1 RA, results in an average of 15% change in body weight at 68 weeks.[12,22] Liraglutide, which is injected daily, results in weight loss of 8% of total body weight at 56 weeks.[23] These medications also help address co-morbidities associated with obesity.[12] The SELECT study included 17,604 patients with obesity and cardiovascular disease and found that 2.4mg of semaglutide weekly decreased the incidence of a composite outcome of death due to cardiovascular events, non-fatal myocardial infarction, or non-fatal cerebrovascular accident (HR 0.80 95%CI 0.72–0.90).[24] However, there are some concerns surrounding the use of these medications. They do have notable side effects including nausea, constipation, diarrhea, headaches, fatigue, pancreatitis, and gastroparesis.[3,25] They also require continued use to maintain their effect. An extension of the STEP 1 trial found that cessation of semaglutide after 68 weeks of treatment was associated with significant weight regain and worsening of cardiometabolic risk factors in the following year.[22] The medications are also expensive and not uniformly covered by insurance. In 2022 Medicare did not cover even FDA-approved anti-obesity medications for the treatment of obesity alone.[1] An analysis by Atlas et al found that, at their current price, neither semaglutide or liraglutide are cost effective.[26] There is also limited availability of these medications and more data on long-term outcomes and the risks of use for the treatment of obesity are needed.[1]

DISCUSSION

Both GLP-1 RAs and bariatric surgery are effective for many users; however, in direct comparison, bariatric surgery has been shown to lead to greater weight loss with at least similar improvement in co-morbidities. In 2022 Sarma and Palcu published a systematic review and meta-analysis comparing weight loss in obese adults treated with GLP-1 RAs versus bariatric surgery.[8] Pooled analysis of 332 patients found significantly greater weight reduction in those who underwent bariatric surgery as compared to those treated with GLP-1 RAs.[8] Their analysis also found equivalent improvement in glycemic control between the two groups, as measured by change in HbA1c at the end of the study period.[8] However, a matched cohort study that looked specifically at patients with obesity and type II DM and compared those who had undergone bariatric surgery with those being treated with GLP-1 RAs actually found that, at two-year follow-up, the surgery patients had a lower risk of major adverse cardiovascular events, significantly higher rates of dyslipidemia remission, and higher rates of cessation of anti-hypertensives compared to patients treated with GLP-1 RAs.[27] Additionally, data show that, in the long run, bariatric surgery is more cost effective than the use of anti-obesity medication.[16] Despite high up-front costs, bariatric surgery has been shown to be cost effective due to its associated reduction in emergency room visits, medication use, and decrease in all cause morality.[16-19,28] GLP-1 RAs, however require ongoing use for continued effect. An analysis by Docimo et al found that, at current medication prices, a sleeve gastrectomy becomes more cost effective than medications after approximately a year of GLP-1 RA use and a RYGB is more cost-effective after 14 months of medication use.[16] Despite the seeming ease of a medication to treat obesity and the growing popularity of GLP-1 RAs, bariatric surgery still results in more significant weight loss at a better medium- to long-term value.

Some surgeons have seen the rise of GLP-1 RAs not as a threat to bariatric surgery but as a useful adjunct. The medications can be used both pre- and post-operatively to augment the results of surgery. Pre-operatively, GLP-1 RAs have been used in very high BMI patients to prepare them for their operations. Higher pre-operative BMI (≥50) is associated with both higher rates of weight regain after surgery and increased peri-operative risk.[3,12,29] A retrospective review of high BMI patients undergoing bariatric surgery found that those who were prescribed GLP-1 RAs pre-operatively lost significantly more weight while awaiting surgery compared to those who did not. There was no delay in time to surgery and no GLP-1 related complications prior to surgery.[29] The group who used GLP-1 RAs had a significantly higher BMI at the start of the study than those who were not taking pre-op medications, 60.7 ± 6.6 kg/m2 versus 54.7 ± 3.8 (p = 0.003); however, there was no difference in peri-operative surgical complication rates and one third of the GLP-1 RA group were able to attain BMIs <50 by the time of surgery.[29] Several other large studies have shown that pre-operative weight loss improves perioperative mortality and these data show that this can be safely achieved through treatment with GLP-1 receptor agonists.[30,31]

GLP-1 RAs can also be used after bariatric surgery to address insufficient weight loss or weight regain. In long-term follow-up, approximately 20–30% of patients experience inadequate weight loss and up to 50% have some weight regain after undergoing bariatric procedures.[32,33] Similarly, a meta-analysis by Yu et al found that 37% of patients will continue to have diabetes after RYGB and long-term data show a 30% risk of relapse in the 63% who do experience initial remission.[34] The etiology of this phenomenon is multifactorial, stemming from environmental, metabolic,

anatomic, psychosocial and nutritional influences.[3] Patients with an anatomic reason for sub-optimal post-operative results often require revisional surgery but alternative treatment modalities may be needed for others in this population.

GLP-1 RAs, specifically liraglutide, have been shown to be an effective treatment for recurrent weight gain. The BARI-OPTIMISE trial investigated liraglutide as an adjunctive treatment to bariatric surgery. The study authors cite prior research showing that patients with poor post-surgical weight loss had lower circulating levels of GLP-1 compared to those with good weight loss after bariatric surgery and hypothesized that treatment with a GLP-1 RA would result in additional weight loss.[35] They performed a double-blind RCT including patients with sub-optimal nutrient-stimulated GLP-1 response and poor weight loss at least 12 months after sleeve gastrectomy or RYGB. Patients were treated with either 3.0 mg of liraglutide daily or a placebo in addition to recommended lifestyle interventions.[36] At 24 weeks, the group treated with liraglutide had significantly greater percent reduction in body weight, reduced fat mass, improved HR-QOL, and favorable changes in fasting glucose, HgbA1c, BP, cholesterol and HDL compared to the placebo group.[36] Another study looked at all patients with weight regain after bariatric surgery and found that, regardless of the procedure, patients who were treated post-operatively with 3.0 mg of daily liraglutide had an average of 5.5% total bodyweight loss over the 7.6 months of treatment.[37] The medication was fairly well tolerated with the most common side effects being nausea (37%), constipation (14.1%) and diarrhea (8.7%).[37] More patients discontinued the medication due to cost (35%) than adverse effects (15%).[37] A similar prospective study looked at all patients with weight regain after RYGB and treated them with 3.0 mg of liraglutide or a placebo. They found that 76% of the liraglutide group lost at least 5% of their body weight at 56 weeks as compared to 17% of patients in the placebo arm.[38] A systematic review and meta-analysis looking at three RCTs, involving 130 patients, found that treatment with liraglutide after bariatric surgery was associated with a significant decrease in BMI and body weight at six months.[39]

The GRAVITAS trial looked specifically at treating diabetes after bariatric surgery. This was a double-blind, randomized controlled trial that included patients with persistent or recurrent type 2 diabetes after bariatric surgery.[40] They found that, when combined with a calorie-restricted diet and increased physical activity, patients treated with 1.8mg of liraglutide daily had significantly better glycemic control and significantly greater weight loss at 26 weeks than those treated with a placebo. By the end of the study period, 46% of patients treated with liraglutide lost 5% or more of their baseline bodyweight compared to only 9% of patients in the placebo group. Additionally, 42% of patients in the medication group had HbA1c levels lower than 48mmol/mol as compared to only 13% of patients treated with a placebo.[40] These results were independent of the type of bariatric surgery and the liraglutide was well tolerated with no difference in adverse events between the intervention and placebo groups.[40]

CONCLUSION

Treating obesity is not simple and we are fortunate to have multiple options to offer patients. GLP-1 RAs are effective at producing weight loss up to 20% of excess bodyweight (EBW) and treating associated cardiometabolic co-morbidities. However, they are costly and require continued use for ongoing effect and long-term data on risks and outcomes are sparse. Bariatric surgery is a significant upfront commitment both in terms of cost and risk; however, it is very effective, producing an average excess body weight loss of 60%, reducing severity and even leading to remission of many comorbidities, and has long-term data showing that it is safe and confers a mortality benefit. Obesity treatment needs to be individualized and both interventions can, and undoubtedly do, have a significant role to play in this field. Despite its track record of safety and efficacy, for some patients, bariatric surgery will just not be the right option. They may have prohibitive co-morbidities, inadequate BMI, or only need short-term weight loss, in which case GLP-1 RAs are a good alternative. In many patients, the answer may be using a combination of the medications and surgery, in addition to lifestyle changes. Pre-operative use of GLP-1 RAs can lower a patient's surgical risk and increase their chances of long-term success. Post-operatively, medications can be used to augment the effects of the operation if desired results are not achieved. Ultimately, the treatment of obesity is multi-disciplinary, and the onus is on all physicians who treat affected patients to be able to effectively educate and counsel their patients about all their options.

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Pediatric Obesity: Practical Recommendations for Management

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SUMMARY

The long-term negative effects of pediatric obesity necessitate a search for effective and durable treatment modalities applicable in pediatric and adolescent patients. While no unifying algorithm exists, several sophisticated management options are available. This review summarizes ways to apply available data to aid in the initial evaluation and management of pediatric and adolescent obesity.

INTRODUCTION

Pediatric and adolescent obesity remains a serious concern, affecting over 8% of children worldwide.[1] In the US, nearly 20%, or close to 15 million pediatric and adolescent patients are affected by obesity, disproportionately in low-income and minority-ethnic groups.[2] Stigmatized for obesity, especially from their relatives and healthcare providers, pediatric patients suffer negative effects on development and are more likely to maintain obesity in adulthood.[3] Given the increasing prevalence of obesity in the pediatric population, the American Academy of Pediatrics (AAP) recently made robust recommendations for the evaluation and treatment of obesity.[4] However, precise treatment algorithms for the escalation of care are harder to attain. Here, we examine the challenges and barriers to creating such algorithms, as well as updated data to inform practical recommendations for the treatment of pediatric obesity.

BARRIERS

One of the obstacles preventing the development of broad treatment guidelines stems from the multifactorial causes of obesity in childhood and adolescence. Genetic, social, and environmental factors are well documented and extend beyond the known genetic and syndromic causes of obesity, such as Melanocortin 4 receptor (MC4R) deficiency and Prader-Willi Syndrome.[5] Recent advances in the understanding of underlying genetic factors and pharmacological targets have paved the way for more sophisticated treatment strategies for a small subset of patients.[6] Nevertheless, the treatment of obesity in the adolescent population at large is associated with a unique set of challenges and nuances.[7,8]

A growing body of evidence suggests that earlier intervention in pediatric obesity results in improved long-term health benefits.[9-12] Despite evidence of the negative longitudinal health effects of childhood obesity, there is often a reluctance by pediatric providers to treat it with the necessary urgency. This phenomenon appears to stem from lack of familiarity with available resources and treatment options.[13] We have previously examined the importance of pediatric providers in directing adolescent patients to consider surgical treatment as a treatment of obesity.[14] However, even direct recommendations from pediatric providers appear to lead to only a small portion of patients following those recommendations.[15] Nevertheless, successful treatment begins with a proactive approach and recognition that inaction or the lack of aggressive action represents a true threat to the long-term health of this population.

APPROACH TO PEDIATRIC PATIENTS

Pediatric and adolescent obesity management traditionally begins in the primary provider's office, but can also be initiated by subspecialists. Sturgiss et al propose and detail a Circular 5A model (Ask, Assess, Advise, Agree, Arrange/Assist) to allow a longitudinal person-centered approach to supporting a patient's behavior change.[16] Examining the patient's own motivation can be useful, but it often reveals a tangled web of parental and peer interactions, juxtaposed onto an evolving self-view during formative years. Wading into this territory can intimidate healthcare providers and prevent opportunities to bring obesity into the foreground of the visit. However, establishing realistic and congruent expectations among patients, their families and providers regardless of modality employed is the core of obesity treatment. When presented with treatment discussions involving metabolic and bariatric surgery, adolescents and their families face pivotal decisions. Allicock et al examined the barriers and motivations of adolescents which can be useful for providers to help address the patient-specific patients' concerns. The authors noted that patients were driven by a desire to improve their physical health, mental health, and pain-free mobility. Complementing these factors were external motivators, such as involved and supportive parents, who provided the necessary environment for successful maintenance of diet and exercise. The importance of behavior modeling was essential for navigating the peri-operative process. Fears of failure of surgery and the general risk of

undergoing a procedure were noted to be common barriers.[17]

However, getting a more specific assessment is challenging. When Carroll et al examined what matters to the adolescents considering surgery, they found great variability in patient perception of the right age for surgery. The patients also often viewed surgery as the last resort.[18] While these observations were related to surgery, it is possible that similar themes would surround the application of pharmacotherapy, albeit to a lesser degree. Orn et al examined the views of adult patients who underwent metabolic bariatric surgery (MBS) as adolescents to inform the decision-making process. Among their experiences, emphasis was placed on the "importance of being aware that behaviors and problems related to obesity may persist after MBS." They reinforced the need for realistic expectations regarding weight loss, recognizing the essential role of new routines, and understanding that the surgery itself would not "fix everything" in their lives. Similarly, they noted a great variability in the perception of the "right time" for surgery with some advocating for early adolescence and others wishing they had waited until their late 20s. These findings underscore the difficulty of a generalized approach and demonstrate the need for individual consideration of these patients' journeys. They stress the importance of longitudinal family and provider support in the decision-making process.[19] For instance, while a common component of initial evaluation for surgical readiness, patient education must emphasize the continued importance of mental health care, as significant mental health problems are generally not improved by surgery and weight loss.[20]

SELECTION OF TREATMENT DECISIONS

Once the provider, patient, and family have achieved alignment regarding the need for obesity intervention, they are faced with the daunting task of selecting appropriate treatment. These decisions are best handled with a multidisciplinary approach. This is often achievable through formalized adolescent weight management programs whose providers are specifically trained and versed in discussions with adolescents and their families regarding reasonable expectations from treatment.

The traditional first approach to obesity treatment involving diet and behavior modification along with counseling yields limited results (BMI reduction ~3% over 1 year)[5,21] Closer examination of these strategies reveals a modest effect as a stand-alone strategy. The need for extensive in-person contact, easy accessibility of appropriate dietary and exercise programs, as well as qualified behavioral specialists unfortunately makes this a relatively ineffective approach. This is even more true in adolescents with severe obesity.[22] Furthermore, these programs continue to be plagued by high rates of recidivism and challenges in sustainability.[23]

It is no surprise that patients and providers search for more definitive and effective measures, such as pharmacotherapy and surgery. One of the criticisms of aggressive measures in adolescence has traditionally been the lack of long-term data on the sustainability of health benefits. However, resolution of comorbidities appears to persist in available long-term surgical studies. Indeed, the long-term data is heterogeneous in the surgery groups (involving older and younger adolescents, as well as predominantly gastric sleeves or Roux-en-Y bypass procedures). However, even with those constraints, sustained weight loss in excess of 25% with meaningful and durable improvements in comorbidities are generally observed.[24-27]

Approved traditional pharmaceutical agents in younger patients, such as orlistat and metformin are few in number and generally limited in effect, even when combined with lifestyle interventions.[28,29] However, the rapid integration of new classes of anti-obesity medications (AOMs) into the paradigm of obesity and Type 2 DM treatment in adults has predictably extended into pediatric treatment models. Not unlike adult prescribers, pediatric providers are blazing this trail without algorithms validated by long-term data. The available short-term and early data often guide the decision to start medications, as well as the perception that (especially older) adolescents respond to treatment in ways similar to adults.[30,31]

Newer anti-obesity medications may provide a sought-after compromise between delay of treatment and surgery. The reversibility and substantial weight loss effects of the medications often satisfy the reluctance to acknowledge and address the need for early treatment. In fact, a recent NEJM study reported on the potential beneficial use of these medications in pre-adolescent patients.[32] However, the trends in treatment modalities remain unclear. A recent analysis of MBS utilization before and after the approval of glucagon-like peptide-1 receptor agonists (GLP1-RAs) demonstrated a decrease in MBS in adults in the years 2022–2023, but an increase in adolescents in the same time period. Importantly, there was significant heterogeneity in trends among different ethnic groups, with MBS utilization increasing in the Hispanic population. The suggested explanation involves a combination of updated AAP recommendations and the improvement in MBS insurance coverage compared to that of GLP1-RAs in the studied time period.[33] The sustainability of pharmaceutical management remains uncertain. In adult literature, up to 65% of patients stop taking GLP-1RAs, which may be due to financial constraints, side-effects, or both.[8,34] While it is yet unknown if a similar trend would be observed in adolescents, it stands to reason that over a longer time period, these medications could become one component of multipronged obesity treatment, rather than a stand-alone treatment.

SURGERY AND AOMS

The role of post-operative GLP-1 levels in creating a variable post-operative result has been suggested.[35,36] Recently, Vidmar et al reported on the observations of post-MBS adolescents who restarted AOMs as early as three-four weeks after surgery. No significant differences in adverse events were observed and those patients who restarted their medications reported reduced hunger and emotional overeating, among other behavioral factors. Importantly, this strategy resulted in greater reduction in BMI at earlier time-points, suggesting a synergistic effect of surgery and pharmacotherapy on GLP-1 axis.[37]

In summary, practical approaches to pediatric and adolescent obesity treatment remain a critical objective. In general, providers should focus on a sophisticated and patient-centered approach to align realistic goals and expectations with available treatments. While the treatment arsenal has become more sophisticated in recent years due to improvement in surgical and pharmaceutical approaches, a unifying algorithm for the treatment of pediatric and adolescent obesity does not yet exist. Newer anti-obesity medications will have a number of specific and off target effects, many of which could be beneficial for the treatment of obesity, addiction, and potentially mental health disorders.[38] Combined with surgical approaches, these treatments will likely become a mainstay of earlier intervention in adolescent obesity.

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Bariatric Surgery for Primary Care: When to Refer and How to Support Patients Pre- and Post-Surgery

ANDREW R. LUHRS, MD

ABSTRACT

OBJECTIVE: To review the primary care provider's (PCP's) role in the management of obese patients who may be candidates for metabolic and bariatric surgery, including early identification and referral, preoperative preparation, risk assessment, and long-term postoperative care. He we synthesize current guidelines and evidence to equip PCPs with practical strategies for management of metabolic and bariatric surgery patients.

KEYWORDS: Primary Care, Referral, Metabolic and Bariatric Surgery, Obesity Management

INTRODUCTION

The obesity epidemic is well documented and the rates of obesity have steadily been rising for the last several decades. According to the World Health Organization, globally obesity has nearly tripled since 1975 and one in eight people are classified as obese.[1] In the United States, the Centers for Disease Control and Prevention reports that the prevalence of adult obesity was 41.9% in 2020.[2] It is not surprising that with increasing prevalence of obesity that metabolic and bariatric surgery (MBS) is an increasingly utilized option for weight management and comorbidity reduction. In the United States, greater than 250,000 MBS procedures are performed annually.[3] Thankfully with the advent of minimally invasive techniques and improvements in perioperative care the safety and efficacy of MBS has improved over the past two decades. In the modern era perioperative morbidity and mortality from MBS has decreased to levels comparable with other common surgeries. In fact, large-scale analyses estimate 30-day mortality rates as low as 0.1–0.3% for primary procedures, a figure that is likely to continue to improve.[4] Beyond safety, controlled trials confirm the most superior long-term metabolic outcomes, superior to medical management alone. As compared to medical management and dieting, MBS consistently has demonstrated the greatest degree of weight loss, the most durable results, superior remission rates of obesity-related comorbidities, and improvements in all-cause mortality.[5-7]

Despite the demonstrated efficacy of MBS, patients are often under referred by PCPs. Some studies have reported as few as 1% of eligible patients are referred for MBS.[8] The reasons for this are likely multifactorial and may represent a number of issues regarding access and patient-related factors. However, introspection is necessary to ensure referral patterns are not affected by implicit weight bias or misconceptions about surgery's risks and long-term outcomes, as surveys continue to reveal higher rates of weight biases and poor understanding of MBS complication rates among referring providers.[9,10] However, with better education we may mitigate this bias and improve equitable access to care. Regardless, it remains a fact that the PCP plays a pivotal role in the early identification of patients who may benefit from bariatric surgery and will remain a vital member of the patients healthcare team throughout the weight loss journey. Additionally, lifelong support is needed to mitigate the risk of unique complications. This article aims to equip physicians with tools to manage this growing population and reviews the PCP's responsibilities in referral, preoperative preparation, risk assessment, and long-term care.

IDENTIFYING CANDIDATES FOR BARIATRIC SURGERY

BMI Criteria for Metabolic and Bariatric Surgery

MBS is currently the most effective evidence-based treatment for obesity across all body-mass index (BMI) classes. Historically, eligibility for MBS followed the 1991 National Institutes of Health (NIH) Consensus Guidelines. However, these criteria have recently been updated in response to the growing body of evidence that improvements in metabolic health can occur in patients with lower BMI after MBS.[11] It is important for the referring provider to understand that these shifts not only broaden eligibility to patients with lower BMIs, but also have specific considerations for Asians populations. This is due to the fact that these patients have higher cardiometabolic risk at lower BMI thresholds [**Table 1**]. Despite the fact that these guidelines are evidence-based, insurance coverage remains variably aligned with these newer BMI thresholds. We encourage referring providers to adhere to the more modern BMI thresholds when referring to weight loss centers.

Early Identification and Referral

Due to the high prevalence of obesity, we recommend systematic obesity screening protocols to ensure that PCPs can

Table1. Updated ASMBS/IFSO Indications for Metabolic and Bariatric Surgery

1991 NIH Consensus Guidelines	2022 ASMBS/IFSO Guidelines
BMI ≥40 kg/m² with or without associated comorbidities.	BMI ≥35 kg/m² with or without associated comorbidities.
BMI ≥35 kg/m² with associated obesity-related comorbidity ‡.	BMI ≥30 kg/m² with associated obesity-related comorbidity.‡
	Asian populations: BMI ≥27.5 kg/m²

‡ Type 2 diabetes mellitus, Hypertension, Dyslipidemia, Obstructive sleep apnea, Non-alcoholic fatty liver disease (NAFLD), Gastroesophageal reflux disease (GERD), Osteoarthritis

identify all eligible patients and ensure they are informed about all evidence-based obesity treatment options.[9] Essential to delivering high quality, equitable, patient-centered care is recognizing obesity as a chronic, relapsing, neurobehavioral disease.[12] Longitudinally measuring BMI and waist circumference, and a thorough assessment of obesity- related comorbidities, is crucial for early identification of those who may benefit from intervention.[13] When patients are identified, PCPs should initiate compassionate and nonjudgmental conversations about weight and provide the patient with education of the metabolic health benefits of the various available interventions and their impact on long-term survival.[14] Emphasis should be on the fact that obesity is a chronic disease and reviewing effective treatment options, such as intensive lifestyle changes, medications, and metabolic and bariatric surgery. Structured tools may support this approach. For example, integrating the Edmonton Obesity Staging System (EOSS) and a standardized quality-of-life questionnaire into annual physicals may help stratify patients obesity and metabolic health and flag high-risk patients whose comorbidities or impaired quality of life may warrant a more prompt referral to a bariatric center.[15,16] When patients are identified as candidates for medical or surgical weight loss they should be promptly referred to a weight loss specialist.

Psychosocial and Behavioral Readiness

Beyond lifestyle changes, successful weight loss requires a foundation of psychological stability. A routine psychological examination is generally performed by the bariatric team; however, integrating behavioral health support early in the process will enhances patient readiness, safety, and the overall appropriateness of surgical candidacy. Moreover, untreated psychiatric illness may increase postoperative complication risk and reduce adherence to care plans. For these reasons, the PCP should aim to identify patients with complicating psychosocial factors. This is best done by routine screening of mental health histories, including screening for mood disorders, post-traumatic stress disorder (PTSD), eating disorders, and prior suicide attempts. Furthermore, substance use history is equally critical and candidates for bariatric surgery should be screened using validated tools such as AUDIT-C or the Drug Abuse Screening Test (DAST).

Contraindications to Bariatric Surgery

Not all patients will be candidates for metabolic and bariatric surgery. While there are no absolute contraindications, relative contraindications include: severe heart or lung disease, active cancer treatment, uncontrolled substance abuse, major psychiatric disorders, impaired intellectual capacity, pregnancy, Crohn's disease, multiple suicide attempts or suicidal ideation, poor adherence to preprocedural instructions, inability to manage self-care, and lack of a support system.[17] We would encourage PCPs to proactively identify and address modifiable risk factors through coordinated management with weight loss specialists and other relevant clinicians to optimize surgical eligibility.

PREOPERATIVE WEIGHT LOSS

The referring provider plays a critical role in preparing patients for MBS. One of the most impactful interventions during the period between referral and the bariatric surgery evaluation is supporting preoperative weight loss. Often it can take weeks to months for the initial visit with a surgeon to occur and this offers an ideal opportunity to begin documented counseling on weight reduction goals and strategies. Moreover, many insurance providers require a number of months of documented weight loss discussions either in the PCPs office or in the bariatric surgeons office. Starting this process sooner helps set realistic expectations, reinforces the importance of lifestyle change, and ensures more rapid progression through the evaluation for MBS.

Additionally, preoperative weight loss can improve perioperative and postoperative outcomes, as it has been shown that decreasing liver volume and visceral fat, facilitates laparoscopic access and reduces operative time and conversion to open rates.[18,19] Additionally, while not required in most centers, preoperative weight loss may also serve as a practical test of patient compliance and readiness.[20] Primary care providers can support these goals through evidence-based interventions such as high protein, low carbohydrate diets, pharmacotherapy with GLP-1 receptor agonists such as semaglutide or tirzepatide, and structured behavioral counseling. Proactively addressing weight loss in primary care also ensures patients feel supported throughout the preoperative process and lays the groundwork for lifelong behavioral change.

POSTOPERATIVE AND LONG-TERM FOLLOW-UP CARE

Immediate Postoperative Phase

The first six months following bariatric surgery represent

a critical period and requires coordinated care between the bariatric surgeon and the PCP. Patients are going through rapid physiological change in addition to recovering from surgery. The primary goal in this phase is to monitor for early postoperative complications; such as, anastomotic leaks, thromboembolic events, bleeding, or infections. Beyond monitoring for surgical complications, nutrition management involves a protocolized dietary progression. Patients are generally advanced from a clear liquid diet to purees, soft solids, and eventually regular textured foods. Dietary counseling should include education on portion control and hydration. Patients should be advised to avoid high-sugar foods to prevent dumping syndrome. Finally, careful attention to patients' medication regimen is vital. With substantial weight loss and metabolic improvements, it is frequently necessary to adjust or discontinue of medications for obesity-related comorbidities. While patients will be closely monitored by the bariatric surgery team, close communication enhances safety during this period.

Nutritional Surveillance and Management

Although bariatric centers typically conduct intensive follow-up during the first one to two years postoperatively, responsibility for ongoing micronutrient surveillance often transitions to the primary care provider thereafter. Lifelong supplementation with a bariatric-specific multivitamins and routine annual vitamin and micronutrient labs are mandatory [**Table 2**]. Guidelines recommend routine assessment of key nutrients annually, given the persistent risk of deficiencies even years after surgery.[17] Primary care physicians should be familiar with these monitoring protocols and ensure adherence to lifelong supplementation regimens to prevent serious complications such as anemia, neuropathy, osteoporosis, and neurologic syndromes.

Table 2. Recommended Long-Term Micronutrient Screening After Bariatric Surgery

Nutrient	Monitoring	Common Deficiency Symptoms
Thiamine (B1)	Every 6–12 months	Wernicke's encephalopathy (confusion, ataxia, ophthalmoplegia)
Vitamin B12	Every 6–12 months	Fatigue, neuropathy, glossitis
Iron	Every 6–12 months	Anemia, pica
Calcium/Vitamin D	Annually	Osteopenia, secondary hyperparathyroidism, fractures
Folate	Annually	Anemia, neural tube defects in pregnancy
Protein	Annually	Edema, weakness, muscle wasting
Vitamin A	Annually	Night blindness, xerophthalmia, impaired immunity
Vitamin E	As indicated	Neuropathy, ataxia, hemolytic anemia
Vitamin K	As indicated	Easy bruising, bleeding diathesis
Copper	Annually	Anemia, neutropenia, neuropathy, myelopathy
Zinc	Annually	Dermatitis, alopecia, impaired wound healing, taste changes

Weight Regain: Detection and Management

Despite the substantial and sustained weight loss achieved by most patients after bariatric surgery, up to 30% may experience clinically significant weight regain.[17,21] Patients with a history of MBS should be screened annually to identify early signs of weight regain and implement interventions. Contributing factors include poor dietary habits, sedentary behavior, and anatomical changes over time, such as dilation of the gastric sleeve or the formation of a gastro-gastric fistula. Typically, management begins reinforcement of nutritional and behavioral strategies. If unsuccessful, pharmacologic therapies such as GLP-1 receptor agonists and other anti-obesity medications can be considered; however, for patients with significant regain, referral back to the bariatric surgeon is required to rule out an anatomical reason for weight recidivism and to discuss surgical if revision is indicated.

Psychosocial Considerations

The psychosocial dimension of bariatric surgery is critical to long-term management of these patients. Patients often face profound identity changes, emotional volatility, and risk for disordered eating, including binge eating or "transfer addiction" to substances such as alcohol or drugs.[22,23] Therefore, it is recommended that routine screening for depression, anxiety, and maladaptive eating behaviors be performed annually to ensure early detection and intervention. Additionally, PCPs should facilitate access to support groups (often available through the bariatric surgery center), behavioral health professionals, and specialized counseling services that can provide coping strategies and reinforce the patient's commitment to lifestyle changes. Regular motivational counseling in the primary care setting can help sustain behavioral modifications, prevent relapse into unhealthy patterns, and promote emotional resilience.

Special Populations

Certain patient groups require tailored counseling and management to ensure safe and effective outcomes after bariatric surgery. Women of childbearing age should be advised to delay pregnancy for 12–18 months postoperatively to avoid pregnancy complications derived from nutrient deficiencies or rapid weight loss.[24] For those planning pregnancy after surgery, prenatal care must include micronutrient surveillance with particular attention to iron, folate, vitamin B12, calcium, and fat-soluble vitamins. In older adults, bariatric surgery can improve metabolic health and functional status but requires careful risk–benefit assessment due to higher perioperative risks, sarcopenia concerns, and the

potential for nutritional deficiencies exacerbated by age-related changes in absorption and bone health.

CONCLUSION

Bariatric surgery is a proven, effective intervention for the management of severe obesity and its associated comorbidities, offering patients meaningful and sustained weight loss, improved metabolic health, and reduced mortality. However, it is not a stand-alone cure, but rather one component of a lifelong, multidisciplinary treatment plan that requires ongoing commitment from patients and providers alike. PCPs play a central role in this continuum of care from early identification and referral of appropriate candidates, to preoperative optimization, to vigilant long-term monitoring for nutritional deficiencies, weight regain, and psychosocial challenges. By adopting structured screening protocols, fostering empathetic, stigma-free discussions about obesity as a chronic disease, and collaborating closely with surgical, nutritional, and behavioral health teams, PCPs can help ensure that patients derive the full benefits of bariatric surgery while minimizing risks.

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Endoscopic Therapeutics for the Management of Obesity

EMILY ORTEGA GODDARD, MD

ABSTRACT

BACKGROUND: Obesity is a chronic, multifactorial disease associated with significant comorbidities and rising global prevalence. Lifestyle interventions alone often fail to achieve sufficient or durable weight loss, while pharmacologic and surgical therapies face limitations in cost, access, or patient acceptance.

OBJECTIVE: To review the role of endoscopic bariatric and metabolic therapies (EBMTs) in the management of obesity, highlighting efficacy, safety, and clinical applications.

METHODS: A narrative review of current EBMTs, including intragastric balloons (IGBs), endoscopic sleeve gastroplasty (ESG), duodenal mucosal resurfacing (DMR), and duodenal-jejunal bypass liners, with emphasis on FDA-approved and investigational devices.

RESULTS: IGBs achieve 7–14% total body weight loss but are temporary and limited by tolerability. ESG provides 15–25% weight loss as a durable, minimally invasive alternative to surgery, with some metabolic benefits. DMR improves glycemic control in type 2 diabetes with modest weight loss effects. Duodenal-jejunal bypass liners demonstrate weight loss and HbA1c reduction but remain investigational due to device migration and safety concerns.

CONCLUSIONS: EBMTs bridge the treatment gap between lifestyle, pharmacologic, and surgical options. They offer safe, minimally invasive, and effective strategies for weight loss and metabolic improvement, expanding access to obesity care.

KEYWORDS: Obesity, Endoscopic bariatric and metabolic therapies, Intragastric balloon, Endoscopic sleeve gastroplasty, Duodenal mucosal resurfacing, Duodenal-jejunal bypass liner

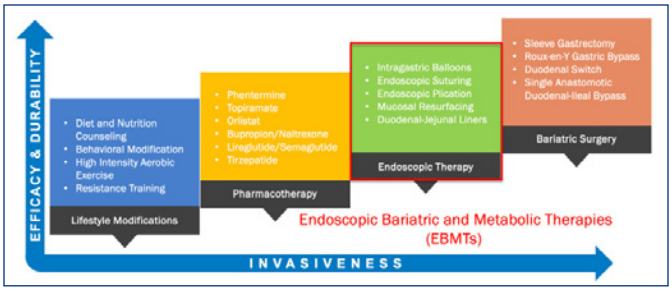
INTRODUCTION

Obesity rates continue to rise worldwide. According to the World Health Organization (WHO), as of 2022, one in eight adults were living with obesity – a rate that has more than doubled since 1990.[1] The disease of obesity is associated with a host of other diseases including hypertension, hyperlipidemia, diabetes, coronary artery disease, and obstructive sleep apnea, which can lead to further cardiac disease.[2] When defined by a BMI greater than or equal to 30, the prevalence of obesity among adults in the United States was 40.3%.[3] While diet and increased activity are the backbone of any successful weight-loss regimen, they alone are often not enough to lose a significant amount of weight and keep it off in the long-term. In a meta-analysis of 29 long-term weight loss studies, most of the weight lost was regained within two years.[4] Diet and exercise do work, but often they are not powerful enough for advanced stages of obesity. A patient with a BMI of 40 would need to lose 15 BMI points to be within the health BMI range (18.5–24.9). This 15 point weight loss would be 37.5% weight loss, which is a very large number. Many studies illustrate success with diet and exercise are losing far less weight than many truly need, around 3–10%.

To really combat the disease of obesity and the plethora of harmful risks that come along with it, we need to increase the amount of weight loss patients achieve and increase the durability of that weight loss. There are now many tools to amplify weight loss and treat obesity, including pharmacotherapies, endoscopic therapies, and surgical therapies. We have seen enormous success seen with the glucagon-life peptide 1 and dual GLP-1/glucose-dependent insulinotropic polypeptide (GIP) receptor agonists; however, their success is limited due to expense, uncertain reimbursement rates, and weight regain with cessation of the medications. On the flip side, many patients may perceive weight loss surgery as dangerous. To bridge this gap, endoscopic therapies for the treatment of obesity have become more popular due to their success and safety profiles. Endoscopy is performed through the mouth and the complication rates are very low. This category of therapies is procedure-based and ultra-minimally invasive, allowing us to reach more patients in a less invasive way.[5]

Endoscopic bariatrics and metabolic therapies (EBMTs) can be the primary treatment option for patients with obesity or may serve as a treatment option for weight regain after bariatric surgery.[6] There are many types of endoscopic procedures for weight loss worldwide, with a handful being approved by the US Food and Drug Administration (FDA). The main categories of endoscopic therapies for weight loss

Figure 1. Obesity treatments in order of advanced invasiveness and durability.



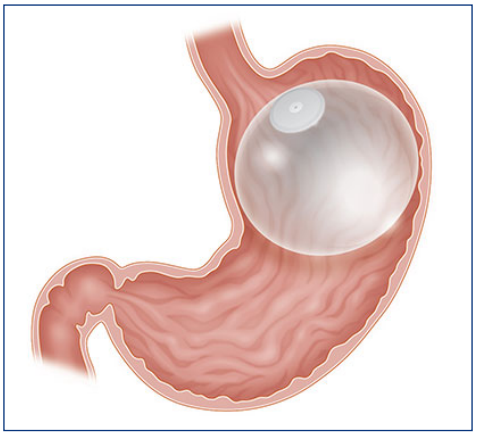
Allencherril, R. P., & McCarty, T. R. (2025). Strategies to Manage Obesity: Endoscopic Bariatric and Metabolic Therapies. Methodist DeBakey cardiovascular journal, 21(2), 74–83. https://doi.org/10.14797/mdcvj.1518

management are Intragastric Balloons (IGBs), endoscopic suturing techniques such as endoscopic sleeve gastrectomy (ESGs), duodenal mucosal resurfacing, and duodenal-jejunal bypass liner (endobarrier). All these therapies can be used as a primary treatment in patients with Class 1 obesity (BMI >30) or higher, who do not wish to undergo bariatric surgery, who are poor surgical candidates, or who do not wish to use pharmacotherapy for a long duration of time [**Figure 1**].

Intragastric Balloons (IGBs)

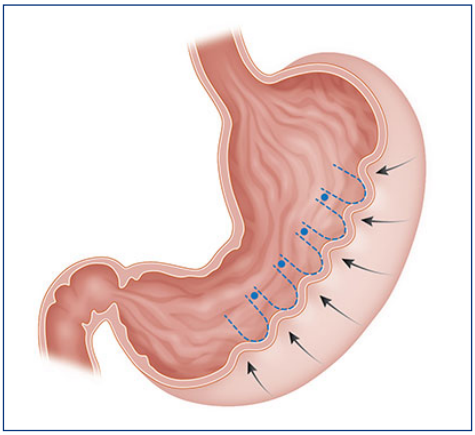
Intragastric balloons (IGBs) are endoscopically placed devices that occupy space within the stomach [**Figure 2**]. They work by limiting the volume of food that can occupy the stomach and are generally categorized as restrictive in their function by reducing oral intake. IGBs lead to early feelings of fullness or early satiety, and staying full for longer, also known as delayed gastric emptying. They can be placed as an outpatient endoscopic procedure, meaning the patient comes in, undergoes the endoscopic placement, and goes home the same day. There are multiple types of IGBs on the market, but only a few approved in the US by the FDA. Most of the current balloons are inserted into the stomach and then insufflated with sterile water, saline, or air. The volume of fluid placed within the balloons varies by manufacturing and by patient – how well they tolerate the volume, their symptoms, and their weight loss goals. The balloon is left in place within the stomach for 4–12 months. The benefits of this procedure are that it can be easily placed and removed, can lead to 7–14% total weight loss,[7] and can be widely adopted. Disadvantages include how well it is tolerated – some patients report significant nausea or other related unwanted symptoms, durability as it is temporary and must be removed, and side effects such as the balloons popping and migrating. This endoscopic weight loss modality is only currently recommended as a primary treatment and not in patients who have had previous foregut or bariatric surgery. Compared with lifestyle modifications alone such as diet and exercise, these IGBs are more effective at short-term weight loss, with some studies illustrating 25% excess well loss (EWL).[8] All in all, this is a great option for patients who want more powerful weight loss and improvement in comorbidities than weight loss and exercise alone, with a short duration in therapy.

Figure 2. Intragastric balloon weight loss procedure – Brigham and Women's Hospital.



https://www.brighamandwomens.org/cwmw/intragastric-balloon-weight-loss-procedure

Figure 3. Endoscopic Sleeve Gastroplasty – Brigham and Women's Hospital.



https://www.brighamandwomens.org/cwmw/endoscopic-sleeve-gastroplasty

Endoscopic Sleeve Gastrectomy

This is a procedure that uses endoscopic suturing to plicate the stomach from the inside, meaning sewing it from the inside down into a smaller pouch. Using a special endoscopic instrument, the apollo overstitch, circumferential bites of stomach lining or gastric mucosa are taken and synched down [**Figure 3**]. This works as a weight loss tool in a similar way to the balloons – the suturing of the stomach from the inside makes the stomach much smaller, limiting the amount of food one can eat at a given time and increasing the sensation of fullness. As most of the other endoscopic procedures, this is often a same-day procedure, where the patient can come into the endoscopy suite or operating room, has the endoscopic sleeve created, and go home the same day. An ESG is considered semi-permanent with restriction effects that can last, and a version of this technique can be performed in patients who've had previous foregut or bariatric surgery. However, some of the sutures can open overtime, leading to an increase in size of the stomach again, so it is surely not as permanent or durable as its sister surgical option, the sleeve gastrectomy.

Total weight loss has been measured from 15–25% in literature when performed as a primary procedure. The MERIT trial illustrated great efficacy of ESG compared to lifestyle modifications and these results were durable.[9] At 52 weeks, 80% of patients who underwent an ESG has improvement in one or more of their comorbidities. At two years, 68% maintained 25% of more of their EWL. Another study illustrated 17.6% and 20.9% total weight loss at 12 and 24 months after the ESG,[10] proving it to be a pretty powerful and semi-durable treatment tool. Besides not being completely permanent, it also is a relatively complex procedure, more so than balloon placement, so that does limit the ESGs overall availability and widespread use. Despite the hefty learning curve, endoscopic suturing is by far the most widely used endoscopic bariatric and metabolic therapy in the United States. As a primary, stand-alone procedure, the ESG can provide significant weight loss and improvement in comorbidities such as diabetes, blood pressure, and hypertriglycerides.[10]

Endoscopic suturing may also be used to achieve weight loss after previous surgery has already been performed, such as after a laparoscopic sleeve or bypass. Multiple post-surgical anatomic findings have been linked to weight regain after bariatric surgery, such as retained fundus or stretching of the sleeve after a sleeve gastrectomy, or an enlarged gastric pouch or enlarged gastrojejunal anastomosis after surgical gastric bypass. In all of these scenarios, endoscopic suturing may be used to suture the spaces from the inside, making them smaller and more restrictive, leading to decreased intake and weigh loss. Studies have demonstrated, however, that primary endoscopic procedures have more successful weight loss than revisional procedures, with a TWL of 8–12% seen with revisional procedures.[6]

Duodenal Mucosal Resurfacing (DMR)

This procedure is not yet FDA-approved but is being performed at some large centers throughout the country and even here in the New England area. In this procedure, the first part of the small intestine, the duodenum, is the target of therapy. The inner lining of the duodenum, or the mucosa, is ablated to improve insulin sensitivity and aid in weight loss [**Figure 4**]. This procedure is performed as a one-time treatment, with some centers performing it same day and others requiring a brief post-procedure stay. Although still under investigation, early results indicate promising outcomes, with several studies illustrating improved glycemic control and insulin sensitivity. Hba1c was reported to have improved by 1.2%.[11,12] This procedure is mostly focused on the obesity-related comorbidity of diabetes, seeking to improve the condition in poorly controlled diabetes, and not so much a tool for weight loss. The reported weight loss is 2–8% total weight loss and considered modest, aligning with changes see with lifestyle modifications alone. Overall, DMR may be a useful tool for diabetes management, but more data is needed to better understand the durability and efficacy of the treatment.

Figure 4. Duodenal mucosal resurfacing.

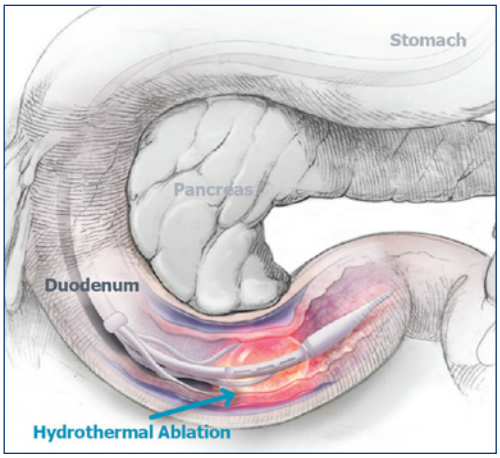


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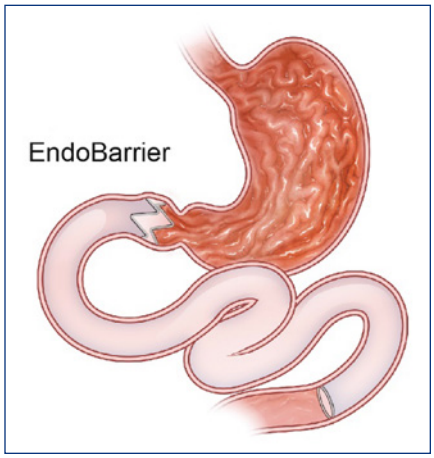
Figure 5. EndoBarrier.



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Duodenal-jejunal Bypass Liner (RESET or EndoBarrier)

This device is another investigational device that acts as an endoscopic bypass. The device is a 60cm long fluoropolymer liner that lines the intestines and blocks them from absorbing nutrients, leading to improved glycemic control and weight loss [**Figure 5**]. The liner is placed endoscopically under direct vision and with the aid of fluoroscopy with the hopes that it stays in place for one year. Early studies have illustrated improvement in HbA1c.[13] In a study from Bringham and Women's, the bypass liner was found to demonstrate an average decrease in BMI by about four points, and 18.9 % total body weight loss.[14] The intestines are designed to push food forward, eventually ending in the large intestine, the colon, and leaving the body in the form of stool. In these studies, the bypass liner device did sometimes do just that – it migrated downstream, and needing to be removed early in some patients. All things considered, this device requires more studies and data before it becomes approved and readily available as a weight loss and commodity management tool.

CONCLUSION

Many endoscopic therapies are out there for the treatment of obesity and its related comorbidities. These options have demonstrated success in both treatment naïve patient and those with a history of previous foregut or weight loss surgery. All of these endoscopic procedures provide longer lasting weight loss and, in some cases, more durable glycemic control than medications or lifestyle medications alone.

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Preoperative Aprepitant Decreases Postoperative Nausea After Laparoscopic Sleeve Gastrectomy

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ABSTRACT

BACKGROUND: Postoperative nausea is common following bariatric surgery despite the use of enhanced recovery protocols for perioperative care.

OBJECTIVES:

- To determine the prevalence of postoperative nausea in our sleeve gastrectomy population.
- To administer preoperative aprepitant and track postoperative nausea after laparoscopic sleeve gastrectomy.

METHODS: Beginning in September 2022, a retrospective cohort study was conducted. We added 80 mg of oral aprepitant to a standard prophylactic antiemetic regimen, which included scopolamine, dexamethasone, and ondansetron. Utilizing an existing database at our institution, we reviewed the records of patients who underwent laparoscopic sleeve gastrectomy before and after the addition of aprepitant to the standard prophylactic antiemetic regimen. We assessed the severity and frequency of postoperative nausea and vomiting qualitatively (endorsed in postoperative-day-one house-staff note) and quantitatively (number of postoperative antiemetic doses administered beyond standard protocol).

RESULTS: One hundred thirty-four (134) laparoscopic sleeve gastrectomies were performed between March and November 2022. Sixty-four patients (64) received aprepitant preoperatively, while 70 did not. Groups were similar in age, BMI, and ASA class. In the aprepitant group, we noted a 41.60% reduction in nausea reported on postoperative-day-one (29.20% vs 50.00%, P=0.013) and a 30.5% reduction in absolute number of additional antiemetic doses (2.98 vs 4.29, P= 0.013). Additional antiemetics included ondansetron, metoclopramide, prochlorperazine, diphenhydramine, haloperidol, and lorazepam. Length of stay was not significantly different.

CONCLUSIONS: The addition of preoperative aprepitant to a multimodal protocol can reduce nausea after laparoscopic sleeve gastrectomy.

KEYWORDS: Aprepitant, Postoperative Nausea and Vomiting (PONV), Bariatric Surgery, Enhanced Recovery After Surgery (ERAS)

INTRODUCTION

Postoperative nausea and vomiting (PONV) is a major cause of patient dissatisfaction with perioperative care.[1-3] It contributes to a variety of postoperative problems, including delayed oral intake, dehydration, electrolyte abnormalities, aspiration, and increased length of hospital stay.[3-5,9] The incidence of PONV is common following bariatric surgery.[3,5,8,9]

To decrease the risk of PONV among bariatric patients, our institution's enhanced recovery protocols for surgery (ERAS) includes a standard prophylactic antiemetic regimen for every patient. While our ERAS protocol has been effective in reducing PONV among laparoscopic gastric bypass patients, we observed many laparoscopic sleeve gastrectomy patients continued to experience significant PONV. To better define and address this problem, our surgical team partnered with anesthesiology to refine our ERAS protocol for laparoscopic sleeve gastrectomy patients.

Based on existing data demonstrating the efficacy of aprepitant as an antiemetic, we added the medication to our ERAS regimen. Aprepitant is a long-acting neurokinin-1 (NK-1) receptor antagonist without sedative effect or risk of tardive dyskinesia and has been approved by the FDA for the prophylaxis of chemotherapy-related nausea and PONV.[6] Several studies and meta-analyses have demonstrated its efficacy as a prophylactic agent to reduce PONV, though none have focused specifically on laparoscopic sleeve gastrectomy.[3,5,7]

In our study, we assess the efficacy of adding prophylactic aprepitant to an existing ERAS protocol for the prevention of PONV after laparoscopic sleeve gastrectomy.

METHODS

With appropriate Institutional Research Board (IRB) approval, a retrospective cohort study was conducted, including all patients who underwent laparoscopic sleeve gastrectomy from March 2022 to November 2022 at our institution. All patients received a pre-existing, standardized prophylactic antiemetic regimen, which included preoperative scopolamine patch placed the day prior to surgery, a single dose of intra-operative dexamethasone, and 24 hours of standing postoperative ondansetron. Beginning September 2022, 80 mg oral aprepitant administered three hours prior to induction of anesthesia was added to the standard prophylactic antiemetic regimen.

Utilizing a pre-existing, quality improvement database within the Center for Bariatric Surgery, the records of all patients who underwent laparoscopic sleeve gastrectomy between March 2022 and November 2022 were reviewed. Variables already included in the pre-existing database included medical record number (MRN), patient age, body mass index (BMI), American Society of Anesthesiologists Physical Status Classification (ASA I-VI), date of surgery, discharge date, and length of stay (LOS) as measured in days. Additional variables collected from the electronic medical record of each patient included documentation of preoperative scopolamine patch application, time of aprepitant administration, number of postoperative antiemetic doses administered in addition to the standard prophylactic regimen, and documentation of nausea as subjectively reported on postoperative-day one (POD#1).

To determine whether a scopolamine patch was applied preoperatively, each patient's medication dispense report was queried and peri-anesthesia nursing notes reviewed. Patients who received a prescription for scopolamine prior to surgery, or those who had a scopolamine patch applied in preoperative holding, were considered to have received the medication unless nursing notes documented otherwise. The application of a scopolamine patch at any time on the day of surgery, regardless of whether the patient had applied one previously, was not considered an additional antiemetic dose.

Time of aprepitant administration as documented in a patient's medication administration record (MAR) was used to determine if a patient received aprepitant preoperatively, postoperatively, or both. Patients who received aprepitant preoperatively were included in the aprepitant group, while those who did not were included in the control group. Postoperative administration of aprepitant was considered an additional antiemetic dose, regardless of whether the patient received aprepitant preoperatively or not.

The total number of antiemetic doses administered beyond the standard prophylactic regimen was determined by reviewing each patient's MAR. Any postoperative antiemetic administered, other than 24 hours of standing ondansetron as included in the standard prophylactic regimen, was considered an additional dose, whether it was ordered as needed or as a one-time dose. A medication was considered to be an antiemetic if it was ordered with an indication of nausea or vomiting. Any medication commonly used to treat postoperative nausea, unless ordered with a different specified indication, was also included. Antiemetics included ondansetron, metoclopramide, prochlorperazine, diphenhydramine, haloperidol, and lorazepam.

Reported postoperative nausea was determined by reviewing POD#1 notes from resident and attending physicians, nutritionists, and nurses. Any documented complaint of nausea or emesis, including those noted to be "minimal," "controlled," "improving," or "resolved," was considered to represent clinically significant postoperative nausea. If there was no mention of nausea or emesis in any notes, the patient was considered not to have clinically significant postoperative nausea.

Statistical Analysis

Statistical analysis was performed using STATA Version 15 (StataCorp. 2017. *Stata Statistical Software: Release 15*. College Station, TX: StataCorp LLC). Two groups were compared – those who received preoperative aprepitant (aprepitant group) and those who did not (control group). Demographic data between groups was compared using Student's two-sample *t*-test (age, BMI) and Pearson's chi-squared test (ASA). Wilcoxan rank sum test was used to compare LOS and number of additional antiemetic doses, while Person's chi-squared test was used to compare rates of reported POD#1 nausea between groups.

RESULTS

One hundred thirty-four (134) laparoscopic sleeve gastrectomies were performed between March and November 2022. Sixty-four (64) patients received aprepitant preoperatively (aprepitant group), while 70 did not (control group). Other than one 17-year-old patient (BMI 50 kg/m^2), all patients were adults ages 18-69 years old with a mean BMI of 43.6 kg/m^2 [34–64 kg/m^2]. On statistical analysis, groups were similar in age, BMI, and ASA class [**Table 1**].

Clinically significant nausea was reported on POD#1 by 29.2% (19/64) of patients who received aprepitant, and 50.0% (35/70) of those who did not (p=0.013). This represented a 41.60% relative reduction in reported PONV on POD#1 in the aprepitant group. The mean number of antiemetic doses required in addition to the standard prophylactic regimen was 2.98 [1–20] in those who received aprepitant preoperatively, compared to 4.29 [1–28] in those who did not (p= 0.0027). This represented a 30.5% relative reduction in unplanned postoperative antiemetic doses in the aprepitant group. There was no significant difference in length of stay between groups, which both had a median LOS of 1 day

Table 1. Demographics, Reported Nausea, and Number of Additional Antiemetic Doses

	Control (n=70)	Aprepitant (n=64)	P-value
Age (years)	39.31	41.59	0.2506
BMI (kg/m^2)	43.89	43.27	0.5708
Median ASA	3	3	0.410
Median LOS	1	1	0.6348
POD#1 nausea	50.00%	29.20%	0.013
Antiemetic doses	4.29	2.98	0.0027

BMI=body mass index. ASA=American Society of Anesthesiologists Physical Status Classification. LOS=length of stay. POD#1=postoperative day 1. Antiemetic doses= unplanned doses of antiemetics beyond standard prophylactic regimen.

(p=0.6348). LOS ranged from one to three days in the aprepitant group, and one to four days in the control group.

Of the 70 patients who did not receive aprepitant preoperatively, 15 received the medication postoperatively. This subset of control group patients required more antiemetic doses than either the aprepitant group or the remainer of the control groups, with a mean of 9.8 [4–28] additional antiemetic doses. Two patients in the aprepitant group received a second dose of aprepitant on POD#1, which was included as an additional antiemetic dose beyond the prophylactic regimen. One of these patients required a total of three additional antiemetic doses, while the other required a total of 20.

DISCUSSION

The addition of preoperative aprepitant to an existing ERAS protocol for the prevention of PONV after laparoscopic sleeve gastrectomy proved to be effective in reducing PONV both quantitatively and qualitatively when compared to the existing ERAS protocol alone. Compared to the control group, patients who received prophylactic aprepitant required fewer additional antiemetic doses (2.98 vs 4.29, p=0.0027) and reported less nausea/vomiting on POD#1 (29.2% vs 40.0%, p=0.013). While these results are consistent with previous studies demonstrating the efficacy of aprepitant as a prophylactic antiemetic for patients undergoing bariatric surgery, they suggest the medication's efficacy is more pronounced following laparoscopic sleeve gastrectomy as opposed to other types of bariatric surgery.

Two prior studies have demonstrated aprepitant's prophylactic efficacy in reducing emesis after bariatric surgery, though both studies included predominantly gastric bypass patients, and neither study demonstrated a reduction in patient-reported nausea.[3,5] Sinha et al performed a double-blind, placebo-controlled study of 125 participants undergoing bariatric surgery, 98 (79%) of whom underwent a bypass procedure, while the remaining 26 underwent gastric banding. Compared to the placebo group, those who received prophylactic aprepitant had a significantly lower rate of emesis at 72 hours (3.1% vs 15.0 %, p=0.021), though verbal rating scores of nausea were no different between groups (p=0.675).[3] Therneau et al performed a retrospective analysis of 338 patients undergoing bariatric surgery, 257 (76%) of whom underwent malabsorptive procedures, while 62 underwent sleeve gastrectomy and 19 underwent gastric banding. Compared to the control group, there was a lower cumulative incidence of emesis in the aprepitant group over 48 hours (6% vs 13%, p=0.04), though there was no difference in reported nausea or additional antiemetics required.[5]

While we did not quantify cumulative episodes of emesis, our study demonstrated a significant reduction in both patient-reported nausea/vomiting and antiemetic doses required. This finding suggests that laparoscopic sleeve gastrectomy patients benefit from prophylactic aprepitant for the prevention of PONV more than those undergoing other types of bariatric surgery. Following completion of our project, these findings have been replicated in a randomized controlled trial performed by Ortiz et al.[10] This group demonstrated improvement in PONV over the first 24 hours postoperatively after laparoscopic sleeve gastrectomy using a validated assessment scale.

There are several proposed mechanisms for why sleeve gastrectomy patients have increased rates of PONV. This may be due to anatomy, with the pylorus remaining intact and the stomach unable to distend after sleeve gastrectomy is performed, leading to overdistension with smaller amounts of intraluminal contents. Removal of the gastric fundus and its stretch receptors may temporarily slow gastric emptying immediately after surgery. It is also known that enterochromaffin cells release 5-hydroxytryptamine in response to gastric surgery. This hormone and is associated with nausea and vomiting and appears to have a greater effect on the obese population.[8]

Limitations

It is important to note that our assessment of subjective nausea was restrained by the limitations of a retrospective study design – no standardized or validated tool was used to assess nausea. Rather, we relied on documentation from various providers in the electronic medical record of each patient. While this heterogeneity lends some degree of uncertainty to our findings, the relative reduction in reported nausea/vomiting (41.6% RRR) and antiemetic dose requirement (30.5% RRR) were similar. Because antiemetics were ordered as PRN or one-time doses with an indication of nausea, a patient's antiemetic requirement can be assumed to be a reasonable proxy for subjective nausea, and our data adequately reliable.

CONCLUSION

PONV is a prevalent problem after laparoscopic sleeve gastrectomy. The addition of preoperative aprepitant to an existing ERAS protocol is effective in reducing PONV. Patients undergoing this procedure appear to benefit more from the prophylactic antiemetic effects of aprepitant than those undergoing other bariatric surgeries (e.g., gastric bypass) based on comparison with previous studies.[3,5,10] Our results were limited by heterogenous documentation of subjective nausea, though appear to be reliable based on concordance between reported nausea/vomiting and number of antiemetic doses required. Future research should work on treatment options for non-responders, those patients with persistent nausea despite use of our current protocols.

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Contained Leak Following Laparoscopic Sleeve Gastrectomy: Successful Management with Endoscopic Wound Vacuum Therapy and Stenting

CODY NESS, MD; MARCOANDREA GIORGI, MD; ANDREW R. LUHRS, MD

ABSTRACT

We report the case of a 32-year-old male with a history of hypertension and obesity who developed perigastric abscess and staple line dehiscence two weeks after undergoing laparoscopic sleeve gastrectomy, consistent with a contained staple line leak. The patient presented with fever, abdominal pain, and imaging-confirmed abscess at the gastric cardia. Management included multiple endoscopic wound vacuum exchanges, eventual esophagogastric stent placement, and nutritional support. The case demonstrates a multidisciplinary approach to a complex post-bariatric surgery complication, highlighting the role of advanced endoscopic therapies in avoiding open surgical re-intervention.

INTRODUCTION

Laparoscopic sleeve gastrectomy is a widely used bariatric procedure with generally favorable outcomes. However, staple line leaks remain one of its most serious complications. Traditional management has included surgical drainage or re-operation, but endoscopic therapies, such as endoluminal wound vacuum systems and stenting, are increasingly employed to achieve source control and promote healing in carefully selected patients.

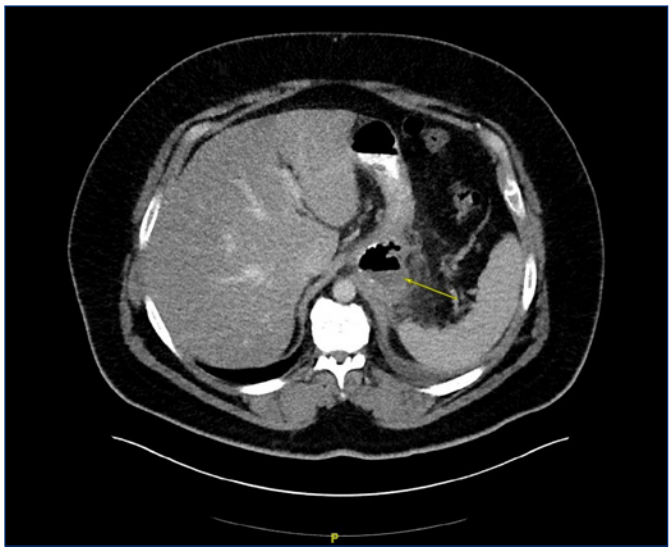
CASE PRESENTATION

A 32-year-old male with a medical history of hypertension and morbid obesity presented with three days of worsening epigastric pain, fever, chills, and decreased appetite approximately 14 days after undergoing an uncomplicated laparoscopic sleeve gastrectomy at an outside hospital. On presentation, the patient was awake, alert, and in no acute distress. Vital signs were notable for a temperature of 100.8 °F, heart rate of 108 beats per minute, blood pressure of 148/88 mm Hg, respiratory rate of 16 breaths per minute, and oxygen saturation of 97% on room air. The abdominal examination revealed a soft but tender abdomen, with tenderness localized to the epigastric region and lower quadrants, without guarding, rebound, or other peritoneal signs. The remainder of the physical examination – including HEENT, pulmonary, cardiovascular, extremities, and neurologic systems – was unremarkable.

Laboratory evaluation demonstrated leukocytosis with a white blood cell count of 15.9 × 10^9/L and neutrophil predominance (80.4%). Serum potassium was decreased at 3.1 mEq/L. The anion gap was mildly elevated at 17. Renal and hepatic function tests were within normal limits.

A computed tomography angiography (CTA) of the chest, abdomen, and pelvis with intravenous contrast was performed. The study was non-diagnostic for pulmonary embolism but revealed a small reactive left pleural effusion with associated atelectasis. Importantly, imaging demonstrated gastric staple line dehiscence at the level of the cardia/fundus, associated with a 4.7 cm perigastric abscess and adjacent inflammatory fat stranding [**Figure 1**].

Figure 1. Axial CT scan demonstrating staple line dehiscence and a contained extraluminal fluid collection.



HOSPITAL COURSE

Upon admission, the patient was made NPO, started on lactated ringers intravenous fluids (125 mL/hr), intravenous antibiotics and antifungals (piperacillin-tazobactam and fluconazole). Discussions were had with interventional radiology to determine whether an image-guided percutaneous drain could be placed within the abscess cavity; however, this was determined to not be possible due to lack of a safe window.

Figure 2. Initial endoscopic evaluation demonstrating the true lumen (green arrow) and the abscess cavity and staple line dehiscence (blue arrow).

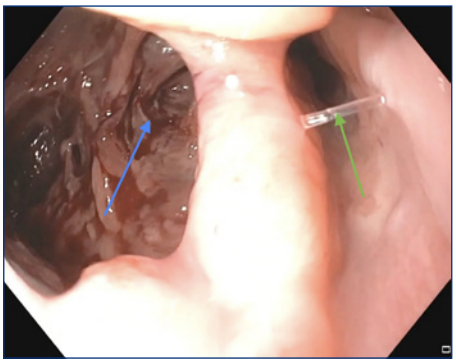


Figure 3. Endoluminal vacuum exchange on hospital day 7 showing formation of granulation tissue in the wound bed.

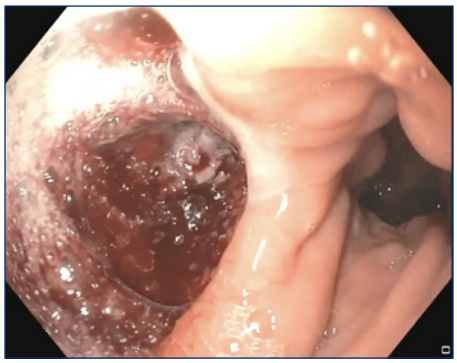
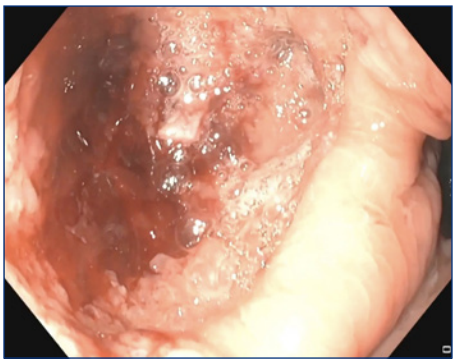


Figure 4. Endoluminal vacuum exchange on hospital day 21 showing significant reduction in size.



An upper gastrointestinal series on hospital day (HD) 2 demonstrated contrast extravasation consistent with a contained staple line leak. Total parenteral nutrition (TPN) was initiated via newly placed peripherally inserted central catheter.

ENDOSCOPIC MANAGEMENT

On HD 2, the patient underwent endoscopic evaluation and washout. There did not appear to be a narrowing at the incisura nor a twist in the sleeve formation. There was a clear staple line disruption at the GE junction, most likely due to a technical failure from stapling too close to the GE junction. Given the lack of technical issues which would require a surgical revision, we elected to place an endoluminal wound vacuum sponge into an approximately 5 cm abscess cavity at the site of staple line dehiscence. The patient was placed on TPN and intravenous fluid support. Serial endoscopic wound vacuum exchanges were performed on HD 7, HD 14, and HD 21, each demonstrating progressive granulation tissue formation and reduction in cavity size [**Figures 2–4].**

On HD 28, an additional wound vacuum exchange revealed a 1.5 × 0.5 cm granulating cavity and the endoluminal wound vac continued to output high volumes of seropurulent material. On HD 35 he underwent upper endoscopy, at that time it was noted that the cavity had resolved and there was a shallow ulcer in its place. Given the dramatic improvement in the appearance of the staple line dehiscence and the fact that the patient was eager to be discharged after a prolonged hospital stay, an esophagogastric stent under fluoroscopic guidance was inserted. This was done to allow the patient to eat and while minimizing the risk of recurrent abscess collection [**Figure 5**]. After stent placement, he was able to tolerate clear and full liquid diets, TPN was discontinued, the peripherally inserted central catheter was removed, and intravenous antibiotic therapy was stopped. He was discharged on a bariatric full liquid diet.

Figure 5. Fluoroscopy showing satisfactory stent placement.

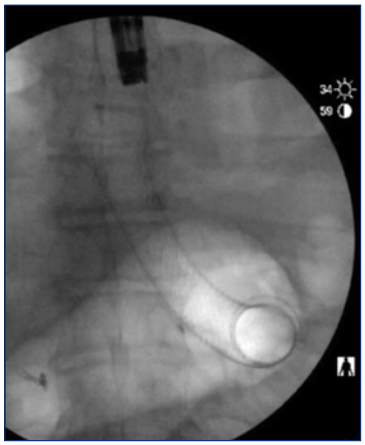
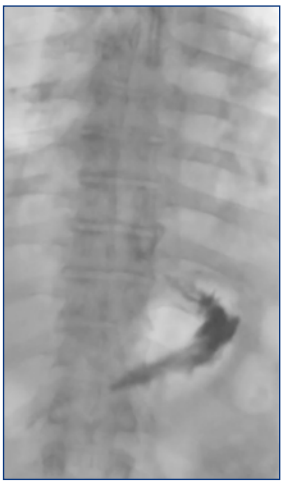


Figure 6. Barium swallow performed after stent removal demonstrating resolution of staple line dehiscence.



Four weeks later, the patient was readmitted for planned stent removal. On stent removal, the previous cavity appeared to have resolved with no further mucosal defect noted. Barium swallow was performed and was without evidence of leak **[Figure 6**]. He was subsequently discharged on a clear liquid diet and gradually advanced his diet to a solid post-bariatric diet. On follow-up months later, he was doing well with no lasting complications.

DISCUSSION

Staple line leaks after sleeve gastrectomy remain a feared complication with incidences reported between 1% and 3%. Early diagnosis with cross-sectional imaging is critical. Management strategies have evolved from open surgical drainage to minimally invasive techniques. This case illustrates the successful use of endoscopic wound vacuum therapy combined with esophagogastric stenting to manage a challenging

proximal staple line leak. These endoscopic interventions, along with others, have been reported as successful strategies for the management of sleeve gastrectomy leaks.[1]

Endoscopic wound vacuum therapy involves placing a sponge connected to a nasogastric tube which is then placed to negative pressure inside the leak cavity. The negative pressure promotes healing through granulation tissue formation and serves as an effective method of source control through removal of wound debris. Endoscopic wound vacuum therapy is highly effective in managing sleeve gastrectomy leaks with success rates ranging between 84–100%.[1,2] However, one drawback is the need for frequent endoscopic sessions during which time the patient is hospitalized. Most centers perform endoluminal vacuum exchanges every three-five days; however, most patients find the frequent sedation very taxing and for this reason our center has extended exchanges to every five-seven days. Additionally, endoluminal wound vac placement does not address anatomical issues with the sleeve itself, which may lead to persistent leak. Narrowing at the incisura or twisting of the sleeve need to be addressed with serial dilations or even a surgical revision in order for endoluminal therapy to be successful.

Endoscopic stent placement with covered self-expanding metal stents is a commonly used method in the management of foregut leaks, including sleeve gastrectomy leaks. The stent acts as a barrier to exclude the leak site, preventing ongoing leaking/contamination. It is imperative to remember endoscopic stents may need to be combined with an additional drainage procedure to obtain adequate source control. Reported success rates are variable between 65–95% with higher success rates noted in leaks recognized earlier.[1,3,4] Endoscopic stents allow early enteral nutrition but have been known to migrate.

Endoscopic internal drainage using a double-pigtail plastic stent is an effective method that drains collections internally into the stomach. Similarly to the endoscopic wound vacuum therapy, internal drainage acts as a method of source control, usually abating the need for other procedures. It has a high success rate of 85% when used as the initial modality and 78% when used as a rescue therapy after other methods have failed.[5] It can be used in delayed presentations/chronic leaks with good efficacy.

Endoscopic clipping with a through-the-scope (TTSC) or over-the-scope (OTSC) method have been described as well. The TTSC are used to close small (<1 cm) defects while the OTSC method can be used on defects up to 3 cm in size. Both TTSC and OTSC have higher success rates when used in early leaks and have an overall successful closure rate of 67%.[6] The efficacy diminishes in chronic or larger defects and, like stenting, may need additional procedures to achieve adequate source control.

Endoscopic suturing and other adjunctive therapies such as fibrin glue/tissue sealants have been used with variable success. Endoscopic suturing alone had a low success rate of 27% in one retrospective review.[7] Furthermore, these methods are more effective with acute, small leaks as outcomes significantly dropped off if suturing was used in delayed leaks (>30 days). The real utility of these adjuncts seems to be in combination with other endoscopic interventions listed previously.

CONCLUSION

This case underscores the role of advanced endoscopic therapies in managing sleeve gastrectomy staple line leaks. Endoscopic wound vacuum systems and esophagogastric stenting can provide effective, minimally invasive alternatives to traditional surgical re-intervention, supporting healing while minimizing morbidity compared to classic surgical revisions.

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Disclosures

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Positional Tremors

JOSEPH H. FRIEDMAN, MD

Positional tremors have not attracted much attention, as reflected by the scant number of publications in PubMed. Either they are uncommon, or not commented on, or included under the syndrome, "postural tremor." "Positional tremors arise when a patient's tremor is brought on during specific positioning of the involved body part. They can be distinguished from postural tremor, wherein a patient's tremor is elicited in any posture."[1]

The videos show the absence of tremor at rest and action but a mild tremor with posture [**Video 1**] and a pronounced tremor of the thumbs or the forearm with particular postures of the hand or the forearm [**Video 2**]. The patient has mild essential tremor.

Why the tremor changes in different positions is unknown. Less common than tremors which develop in certain positions are "task specific" tremors, which occur only when performing a particular maneuver, such as writing, but not holding a utensil or using a screwdriver.[2]

(Note: The patient is the author. Video courtesy of S. Emond.)

Click images to view videos on Vimeo

Video 1. https://vimeo.com/1128905392 (0.16)

Video 2. https://vimeo.com/1128905099 (0.16)

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Adult Cannabis Use in Rhode Island: Changes in Demographic Characteristics Among Self-Reported Cannabis Users from 2017 to 2024

MADISON K. RIVARD, MPH; BENJAMIN D. HALLOWELL, PhD, MPH; KRISTEN ST. JOHN, MPH

INTRODUCTION

Rhode Island (RI) legalized medical use cannabis in 2006 and adult use cannabis in 2022. Adult use sales, sometimes referred to as recreational or non-medical use, began in December 2022. Adult use cannabis is only legal for purchase at state-licensed dispensaries for those 21 years of age or older; however, medical cannabis patients with qualifying medical conditions can be younger than 21. RI cannabis use trends have followed a pattern seen nationally after state legalization; youth cannabis use has either maintained or decreased, while adult use has increased.[1,2]

The RI Behavioral Risk Factor Surveillance System (BRFSS) is the only survey in RI that measures self-reported cannabis use by adults that is representative of the entire RI population. The BRFSS survey is administered annually by the Rhode Island Department of Health (RIDOH) with support from the Centers for Disease Control and Prevention (CDC) through a phone survey of RI residents. In 2017, the RI BRFSS survey included cannabis use questions for the first time, and from 2017 to 2024, self-reported cannabis use among RI adults nearly doubled. To inform prevention efforts, this study aims to identify population groups reporting increased cannabis use.

METHODS

We obtained weighted data from the RI BRFSS from 2017 to 2024 which surveys RI residents ages 18 years and older. Survey results were weighted to represent the adult population of RI. We identified current cannabis users as people who self-reported using cannabis one or more days within the past 30 days. These results were reported stratified by demographic information, including: sex, age, race/ethnicity, sexual orientation/gender identity, and education level. In line with the US Census, race/ethnicity was defined as: White Non-Hispanic, Hispanic, Multiracial and Other Race Non-Hispanic (Asian, American Indian/Alaska Native, Native Hawaiian/Other Pacific Islander, and Other Race) and Black Non-Hispanic. Sexual orientation/gender identity was defined as: LGBTQ+ (lesbian, gay, bisexual, transgender or other) or straight, cisgender. Education levels included less than high school, high school graduate, some college or technical school, and college graduate. The prevalence of current cannabis use was calculated from all RI BRFSS respondents within that demographic category to evaluate changes in prevalence by sociodemographic characteristics.

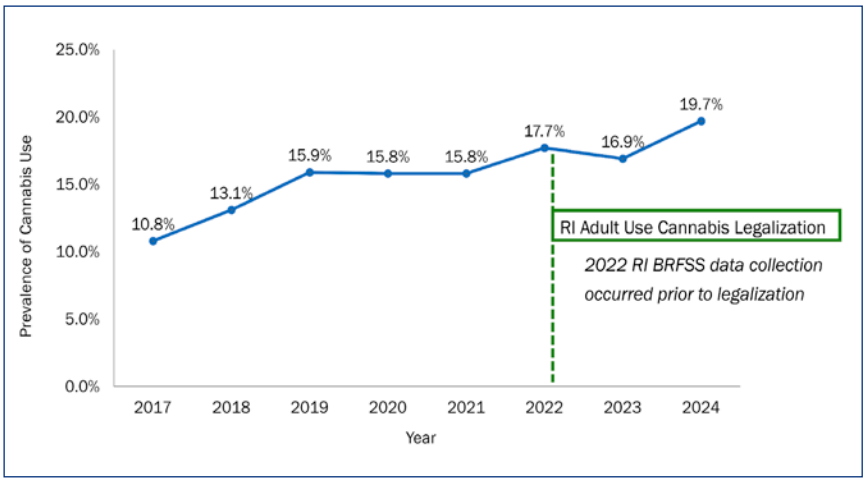
All weighted frequencies were reported. The percent change was calculated using the row prevalence percentages. All analyses were performed in SAS [Version 9.4].

RESULTS

From 2017 to 2024, self-reported cannabis use in the past 30 days increased 82.4% among RI adults, from 10.8% to 19.7% [**Figure 1**; **Table 1**]. In 2024, an estimated 143,898 adults in RI used cannabis in the past 30 days.

While more males than females reported using cannabis in both 2017 and 2024 (14.7% vs. 7.1%; 23.3% vs. 16.4%), the percent change of females reporting current cannabis use increased by 131.0% from 2017 to 2024 compared to a 58.5% increase in males. By age, older age groups saw larger increases in current cannabis use from 2017 to 2024. Adults

Figure 1. Current Cannabis Use Among Adults ages 18 Years and Older, Rhode Island 2017–2024



Data Source: Rhode Island Behavioral Risk Factor Surveillance System, 2017–2024

Table 1. Demographics of Rhode Island Residents Ages 18 Years and Older who Used Cannabis in 2017 and 2024 with the Percent Change Between Years

	2017 Cannabis Use in Past 30 Days		2024 Cannabis Use in Past 30 Days		Percent change in Current Cannabis Use
	Yes n (%)	No n (%)	Yes n (%)	No n (%)	
Total	76,206 (10.8%)	628,487 (89.2%)	143,898 (19.7%)	584,845 (80.3%)	82.4%
Sex					
Female	26,937 (7.1%)	350,016 (92.9%)	61,159 (16.4%)	311,787 (83.6%)	131.0%
Male	47,942 (14.7%)	278,057 (85.3%)	82,739 (23.3%)	273,058 (76.7%)	58.5%
Age (years)					
18–20	5,804 (20.3%)	22,736 (79.7%)	9,411 (24.1%)	29,636 (75.9%)	18.7%
21–24	12,099 (22.3%)	42,102 (77.7%)	15,487 (31.0%)	34,428 (69.0%)	39.0%
25–34	23,271 (21.2%)	86,304 (78.8%)	36,783 (31.2%)	81,230 (68.8%)	47.2%
35–44	11,851 (11.5%)	91,489 (88.5%)	29,108 (25.8%)	83,502 (74.2%)	124.3%
45–54	8,132 (6.9%)	110,138 (93.1%)	18,811 (18.4%)	83,290 (81.6%)	166.7%
55–64	12,431 (9.5%)	118,009 (90.5%)	19,225 (16.2%)	99,297 (83.8%)	70.5%
65 and older	2,617 (1.6%)	157,711 (98.4%)	15,071 (8.0%)	173,462 (92.0%)	400.0%
Race/Ethnicity					
White, Non-Hispanic	58,433 (11.0%)	473,175 (89.0%)	110,939 (22.0%)	392,204 (78.0%)	100.0%
Hispanic	7,349 (8.5%)	78,653 (91.5%)	14,142 (12.7%)	97,068 (87.3%)	49.4%
Multiracial and Other Race, Non-Hispanic±	4,620 (10.7%)	38,723 (89.3%)	7,775 (14.0%)	47,834 (86.0%)	30.8%
Black, Non-Hispanic	5,254 (16.3%)	27,033 (83.7%)	7,395 (19.3%)	30,875 (80.7%)	18.4%
Sexual Orientation & Gender Identity					
LGBTQ+*	9,083 (23.0%)	30,376 (77.0%)	27,822 (33.7%)	54,660 (66.3%)	46.5%
Straight, cisgender	66,945 (10.4%)	577,770 (89.6%)	115,684 (18.1%)	524,448 (81.9%)	74.0%
Education					
Less than high school	12,024 (13.5%)	77,167 (86.5%)	7,870 (10.9%)	64,013 (89.1%)	-19.3%
High school graduate	23,645 (12.3%)	168,027 (87.7%)	41,448 (20.7%)	158,945 (79.3%)	68.3%
Some college or technical school	27,011 (13.0%)	181,204 (87.0%)	47,688 (23.5%)	155,197 (76.5%)	80.8%
College graduate	13,491 (6.3%)	199,869 (93.7%)	46,893 (18.7%)	203,275 (81.3%)	196.8%

Note: Percentages will not add to 100% as this analysis is the percent of current cannabis users out of the overall demographic category.
±Multiracial and Other Race Non-Hispanic includes Asian, American Indian/Alaska Native, Native Hawaiian/Other Pacific Islander, and Other Race.
*LGBTQ+ includes lesbian, gay, bisexual, transgender, queer and other.

65 years and older saw a 400.0% increase, followed by a 166.7% increase in 45-to-54-year-olds, and 124.3% increase among 35-to-44-year-olds. The 18-to-20-year-old age group, a subpopulation not able to legally purchase adult use cannabis, saw the smallest percent increase of 18.7% from 2017 to 2024.

Among racial and ethnicity groups, white non-Hispanic adults saw the largest change with a 100% increase in cannabis use from 2017 to 2024. Among respondents who self-identified as LGBTQ+, there were higher rates of current cannabis use compared to the straight cisgender population in both 2017 and 2024 (23.0% vs. 10.4%, 33.7% vs. 18.1%). However, when analyzing the percent change from 2017 to 2024, the prevalence of cannabis use among straight cisgender adults increased by 74.0% compared to 46.5% among LGBTQ+ adults. When broken down by educational attainment, RI adults who had less than a high school education saw a decrease (–19.3%) in prevalence of current cannabis use, while RI adults with a college degree saw a 196.8% increase.

DISCUSSION

Cannabis use among RI adults ages 18 and older increased by 82% from 2017 to 2024. While current cannabis use increased in most populations, some demographic groups saw larger increases, including females and individuals ages 35 to 54 and ages 65 years and older. This is concerning as cannabis use has been tied to several short- and long-term negative health effects including: impairing coordination,

reaction times and problem-solving skills; causing anxiety, psychosis, delusions, hallucinations, or schizophrenia; and damaging the respiratory and cardiovascular system. Individuals can also develop cannabis use disorder, which can further negatively impact their physical, mental, and social well-being.[3]

While more men than women report using cannabis, both in RI and in other research,[4] a greater increase in cannabis use was seen among female individuals in recent years. This is a concern for adults of child-bearing age as one in three pregnancies in RI are unplanned and in addition to harms to the parent, prenatal cannabis use can result in adverse pregnancy outcomes.[5,6] Prior to legalization, 25% of mothers reported preconception cannabis use, which has likely increased with increasing cannabis use among females in recent years.[7] Counseling from a healthcare provider for people who are pregnant or may become pregnant can provide education on the harms of cannabis use and preconception or prenatal exposure.[8] Unfortunately, from 2021–2023, 50% of mothers did not receive preconception counseling.[6]

Older adults ages 65 years and older had the biggest increase in cannabis use. This increase is important to monitor as many older adults have comorbidities, such as cardiovascular or respiratory health conditions, that may put them at higher risk of negative health outcomes from cannabis use.[9] Older adults may be taking pharmaceutical medications, such as anticoagulants, antiepileptics, benzodiazepines or opioids, that could interact negatively with cannabis, whether they take cannabis medicinally or for recreational use.[10] Recent cannabis use can also affect mental health and cognitive functioning including memory, attention, coordination and movement, which can impact driving or fall risk.[11] Due to the medicinal nature of cannabis, it is possible that more older adults are using cannabis to help with medical conditions such as chronic pain or cancer treatment. It is strongly advised that adults with any medical conditions talk with a medical professional before using cannabis for recreational or medicinal use purposes. Further, adults who are using cannabis now may be unprepared as the psychoactive component in cannabis that causes the high, Delta-9-tetrahydrocannabinol (THC), has exponentially increased in the past 30 years.[12] Research has shown that high concentration THC (anything over 15%) can result in worse health outcomes, yet most cannabis sold in dispensaries is above 20% THC.[13]

There are many interventions and funding streams that focus on education, outreach, and prevention for adolescents and young adults; however, this analysis shows a need for specific messaging directed to older adults and female individuals who are looking to become pregnant, as these are both high-risk demographic groups and have seen an increase in self-reported cannabis use from 2017 to 2024.

There are many different factors that may have led to these increases, including but not limited to legalization of adult use cannabis in Massachusetts, Connecticut, and Rhode Island in 2017, 2021, and 2022, respectively. Connecticut saw a similar increase in current cannabis use in adults ages 18 and older, with adults ages 55 years and older having the largest increase in use from 2017 to 2022.[15] Comparable data were not available for Massachusetts. Attitudes and stigma towards cannabis has been shifting over time as well, leading to increasing rates of adults using cannabis across the United States (U.S.).[4] In contradiction to the increase in cannabis use among the older populations, the age groups of 18-to-20-year-olds, 21-to-24-year-olds and 25-to-34-year-olds saw increases in use yet at much smaller rates than the older age groups. Despite concerns, cannabis legalization has not been shown to cause significant increases in youth and young adults using cannabis.[14] Possible factors that may be affecting this include restricted access to cannabis through regulations and existing prevention efforts focused on the younger populations.

Limitations include potential underreporting of cannabis use due to biases present in self-reporting, and/or higher self-reported cannabis use in 2024 as legalization may have changed attitudes and willingness to report cannabis use. Unfortunately, we cannot identify if respondents are medical marijuana patients, using cannabis to treat a medical condition, or are using cannabis recreationally.

Similar to trends across the U.S., RI is seeing increasing use of cannabis among adults post-legalization. This analysis shows the importance of funding cannabis survey questions to continue data collection and public health monitoring trends of cannabis use, as this is the only data source capable of monitoring cannabis use in the general RI population. Future analyses will evaluate more details about current cannabis users, such as frequency, routes, and intentions of use. Efforts and funding for education and harm reduction messaging should focus on adult populations as cannabis use has increased among individuals 18 years and older.

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Rhode Island Monthly Vital Statistics Report
Provisional Occurrence Data from the Division of Vital Records

VITAL EVENTS	REPORTING PERIOD		
	APRIL 2025	12 MONTHS ENDING WITH APRIL 1025	
	Number	Number	Rates
Live Births	846	10,829	10.2*
Deaths	786	10,754	10.2*
Infant Deaths	4	41	3.8#
Neonatal Deaths	2	30	2.8#
Marriages	402	6,959	6.6*
Divorces	186	2,550	2.4*

* Rates per 1,000 estimated population
# Rates per 1,000 live births

Underlying Cause of Death Category	REPORTING PERIOD			
	OCTOBER 2024	12 MONTHS ENDING WITH OCTOBER 2024		
	Number (a)	Number (a)	Rates (b)	YPLL (c)
Diseases of the Heart	216	2,392	218.0	3,072.5
Malignant Neoplasms	176	2,181	198.7	4,309.5
Cerebrovascular Disease	28	435	39.6	462.0
Injuries (Accident/Suicide/Homicide)	80	950	90.1	10,755.5
COPD	42	4833	44.0	494.5

(a) Cause of death statistics were derived from the underlying cause of death reported by physicians on death certificates.
(b) Rates per 100,000 estimated population of 1,097,379 for 2020 (www.census.gov)
(c) Years of Potential Life Lost (YPLL).

NOTE: Totals represent vital events, which occurred in Rhode Island for the reporting periods listed above.
Monthly provisional totals should be analyzed with caution because the numbers may be small and subject to seasonal variation.

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Reference: 1. Chung DC, Gray DM II, Singh H, et al. A cell free DNA blood based test for colorectal cancer screening. *N Engl J Med.* 2024;390(11):973-983. doi:10.1056/NEJMoa2304714

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Why join RIMS?

The Rhode Island Medical Society is your voice at the State House and in the community. In 2025, we secured wins on prior authorization, clinician wellness, and primary care funding – but this work depends on physician support. Without membership, RIMS cannot continue to advocate, educate, and protect the profession. Join or renew today – and consider getting involved in one of our committees. Together, we are stronger. The Rhode Island Medical Society is the only organization dedicated solely to advocating for physicians and their patients in our state.

In 2025, RIMS members helped

- Eliminate prior auth for PCP-ordered services (3-year Medicaid pilot)
- Secure fair Medicaid rates – up to 100% of Medicare starting Oct. 2025
- Protect physician wellness with the Clinician Wellness & Support Act

We're not stopping here

RIMS is fighting for the future of telemedicine, tackling workforce shortages, and reducing administrative burdens.

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https://rhodeislandmedicalsociety.wildapricot.org/Join-us/

Wins for providers

RIMS worked to secure and support key budget investments.

Medicaid primary care rate increase

Up to 100% of medicare rates
Starting October 2025

Medicaid prior authorization pilot

Eliminates prior authorization for Medicaid for three years
Starting October 2025

Physician loan repayment funding

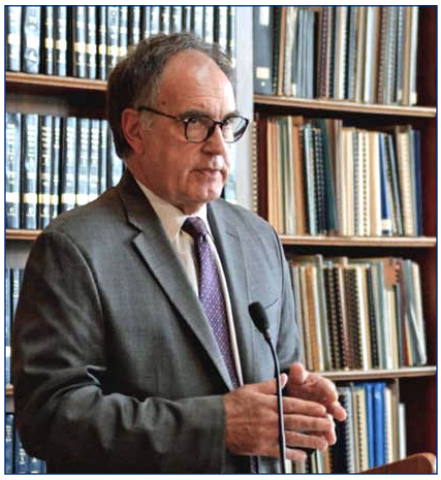
Includes $200,000 in funding to recruit and retain clinicians

Health center funding

Sustained investments in FQHCs and community health

Health services funding assessment

$30Mannually for primary care and other critical programs



Our priorities

RIMS focused on strengthening Rhode Island's healthcare system, protecting physicians' well-being, reducing administrative burdens, and improving access to care. Together with members, specialty societies, and partner organizations, we made significant progress on our top priorities.

The Rhode Island Prior Authorization Reform Act (SB 168/HB 5120)

Eliminates prior authorization for admissions, services, and procedures ordered by in-network primary care physicians in a three-year pilot.
Effective: October 1, 2025.
Status: Passed and signed
Sponsored by: Rep. Brandon Potter; Sen. Melissa Murray

The Rhode Island Clinician Wellness and Support Act (SB 695/HB 6036)

Recognizes RIMS' Physician Health Program in statute, strengthens confidentiality protections, and updates licensing language to encourage clinicians to seek care without fear.
Status: Passed and signed
Sponsored by: Rep. John "Jay" Edwards; Sen. Bridget Valverde

"I'm Sorry" Bill (H6210/S66)

Although not yet enacted, RIMS made significant progress this session on legislation to allow physicians to express sympathy or apologize after an adverse outcome without it being used as evidence of liability. We met twice with the Rhode Island Association for Justice (trial lawyers) and reviewed their suggested language – which we ultimately could not support –laying important groundwork for next session.
Sponsored by: Rep. Teresa Tanzi; Sen. Pamela Lauria

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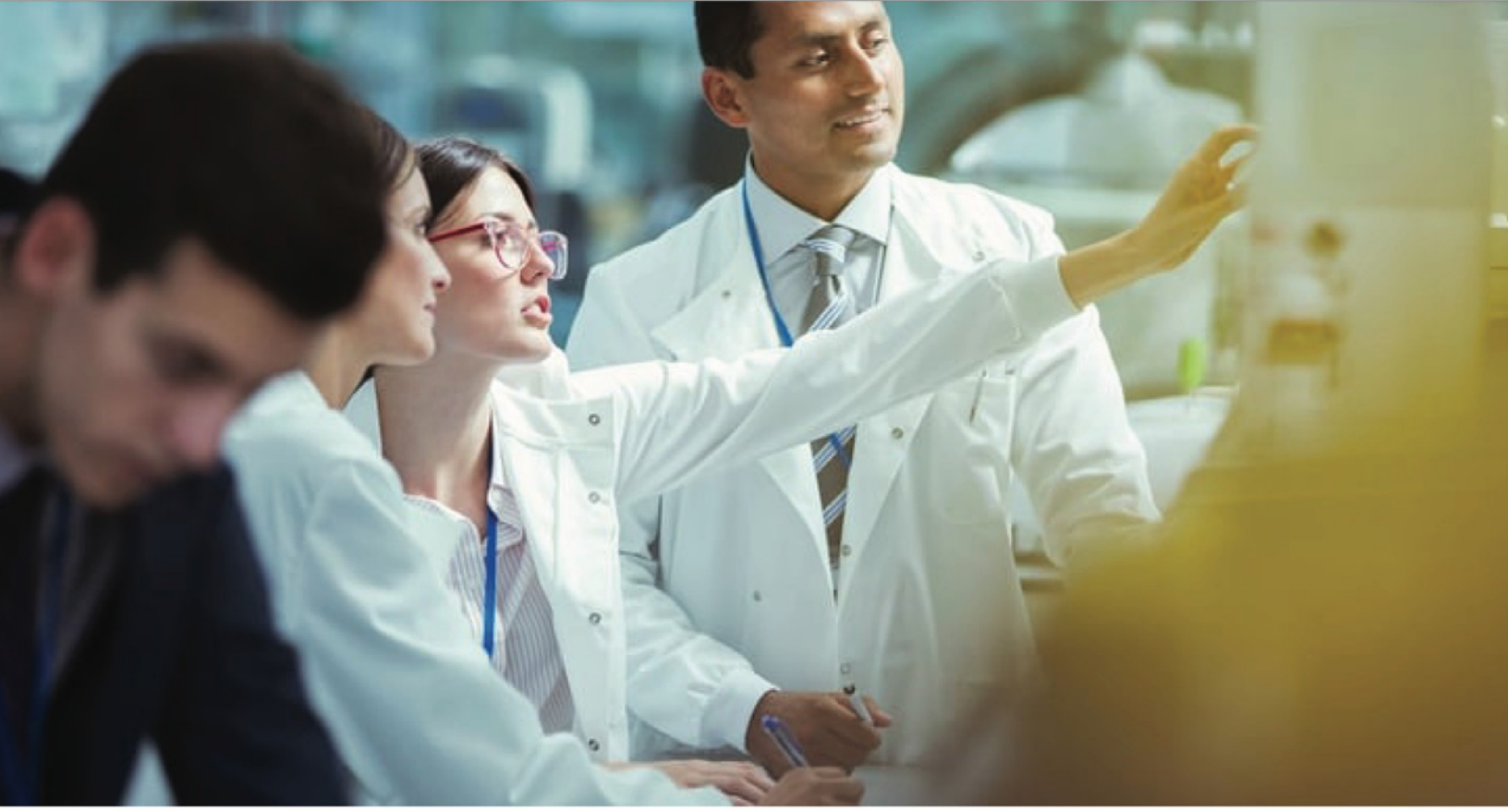

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Thanks to RIMJ's Guest Editors of 2025

This issue marks the completion of 108 years of the *Rhode Island Medical Journal* (RIMJ), which transitioned to an online-only journal in 2013, available at rimedj.org.

RIMJ's mission remains the same as it has for more than a century – to be the medical journal of record for the state and now regionally, offering diversity of content with a wide variety of article types which have implications for current clinical practice.

As RIMJ is about to enter its 109th year, we thank the guest editors and contributors of this year and over the decades. Without them and the support of its publisher, the Rhode Island Medical Society (RIMS), and the RIMJ Editorial Advisory Board, the ongoing success of the Journal for more than a century would not be possible. ❖

FEBRUARY 2025

CARDIAC IMAGING

EDWARD HULTEN, MD, MPH; BRIAN G. ABBOTT, MD
GUEST EDITORS

A Renaissance in Cardiology in 2025
EDWARD HULTEN, MD, MPH;
BRIAN G. ABBOTT, MD

Update in Cardiovascular Prevention: From Risk Scores to Imaging
THOMAS NUBONG, MD;
CHAN WOO KIM, MD;
VISHAL KHETPAL, MD, MSc;
EDWARD HULTEN, MD, MPH;
VERITY RAMIREZ, MD

Which Test is Best for Pain in the Chest?
DAVIS B. JONES, MD;
BRIAN G. ABBOTT, MD

Advances in Coronary CT Angiography: Applications and Implications for Coronary Artery Disease
ANSHUL B. PARULKAR, MD;
JOHN SCARINGI, MD;
JESSICA LOWENHAAR, MD;
TIFFANY NETTO, MD'27;
YASH PATEL, MD;
BRIAN G. ABBOTT, MD;
EDWARD HULTEN, MD, MPH

Diagnostic Feasibility and Accuracy of Cardiac Positron Emission Tomography (PET) in the Evaluation of Ischemic Heart Disease
YASMEEN MOHAMMAD, MD, MPH;
MUHAMMAD BAIG, MD, MPH;
BRIAN G. ABBOTT, MD;
EDWARD HULTEN, MD, MPH

Diagnostic Feasibility of Cardiac PET CT in the Evaluation of Inflammatory, Infectious, and Malignant Heart Disease
YASMEEN MOHAMMAD, MD, MPH;
MUHAMMAD BAIG, MD, MPH;
DON YOO, MD;
EDWARD HULTEN, MD, MPH

Go Red For Women: Gender-Related Differences in Cardiovascular Diseases
TIFFANY HO, MD;
EDWARD HULTEN, MD, MPH

Cardiac MRI Evaluation of Heart Failure and Cardiomyopathies
JEAN-CLAUDE ASAKER, MD;
YASH PATEL, MD;
EDWARD HULTEN, MD, MPH

Investigating Cardiac Amyloidosis: A Primer for Clinicians
SYED BUKHARI, MD;
ZUBAIR BASHIR, MD;
NISHANT SHAH, MD;
YASH PATEL, MD;
EDWARD HULTEN, MD, MPH

Structural Heart Interventional Cardiology Planning and Procedures – The Heart Team Approach
VISHNU KADIYALA, MD;
ERIC DING, MD, PhD;
RAFAEL JEDLINSKI, MD;
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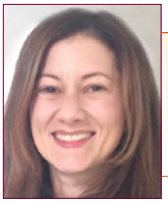



MARCH 2025

WELL-BEING IN MEDICINE

LAUREN ALLISTER, MD; KELLY D. HOLDER, PhD
GUEST EDITOR

Before We Begin
BRITTANY STAR HAMPTON, MD;
KELLY D. HOLDER, PhD

From Why to How in Physician Well-Being: Aligning Strategies for Sustainable Cultural Change in Healthcare
AL'AI ALVAREZ, MD;
MAIA WINKEL, MD;
MIA L. KARAMATSU, MD

Med-Peds PROuD: A Pilot Study of Targeted Professional Development to Promote Well-being Among Internal Medicine-Pediatrics Residents
AMANDA V. HARDY, MD;
JESSICA A. GOLD, MD, MS;
DESIREE BURROUGHS-RAY, MD, MPH

Operationalizing Well-Being Using Work Determinants of Well-Being: Building a Well-Being Analytics Approach
GAURAVA AGARWAL, MD;
MAHESH VAIDYANATHAN, MD, MBA;
ELLIOTT BRANDON;
RINAD S. BEIDAS, PhD

Pathways to Wellness: A Pilot Empowerment Program
STEPHANIE CATANESE, MD, FACP

Collaborative Wellness Initiatives: Involving Physicians to Address Burnout in Healthcare
JUDSON BREWER, MD, PhD;
LIA ANTICO, PhD

Truly Attending: Cultivating Attention, Presence and Self-Awareness Through Narrative Medicine Workshops
MARIAH STUMP, MD, MPH;
MARION MULL McCRARY, MD, FACP;
FARIHA SHAFI, MD, FACP

What Well-Being in Medicine Means to Me: A Letter From a Future Physician
DEEYA PRAKASH;
LAUREN ALLISTER, MD

From Why to How: Practical Pathways to Healthcare Well-Being
LAUREN ALLISTER, MD;
KELLY D. HOLDER, PhD

MAY 2025

DEMENTIA

JOSEPH H. FRIEDMAN, MD
GUEST EDITOR

Introduction to the Dementia Issue
JOSEPH H. FRIEDMAN, MD

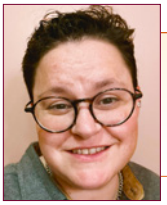
The Alzheimer's Disease Continuum – A New Diagnostic Approach
JONATHAN DRAKE, MD;
SCOTT WARREN, MD, PhD;
CHUANG-KUO WU, MD, PhD

Dementia with Lewy Bodies and the Lewy Body Dementias: 2/1
JOSEPH H. FRIEDMAN, MD

The Diagnostic Landscape of Behavioral Variant Frontotemporal Dementia
MEGAN S. BARKER, PhD;
MASOOD MANOOCHEHRI, BA;
EDWARD D. HUEY, MD

Neuropsychology in Aging: Best Practices for Cognitive Screening, When to Refer, and What to Expect From a Comprehensive Evaluation
SARAH PRIETO, PhD;
LOUISA THOMPSON, PhD

From Acute Confusion to Chronic Decline: The Cognitive Impact of Delirium in Older Adults
FATIMAH HAMEED, MD, MSc;
VICTORIA SANBORN, PhD;
CAROLINE NESTER, PhD;
LORI A. DAIELLO, PHARMD, ScM



JUNE 2025

2024 RHODE ISLAND YOUNG ADULT SURVEY

SAMANTHA R. ROSENTHAL, PhD, MPH
GUEST EDITOR

Young Adult Male Health and Restrictive Masculinity Norms
SAMANTHA R. ROSENTHAL, PhD

Associations Between Restrictive Masculinity and Depression Across Sexual and Gender Identities
JONATHAN K. NOEL, PhD, MPH;
ABIGAIL G. NOSAL;
KELSEY A. GATELY, OTD, OTR/L;
SAMANTHA R. ROSENTHAL, PhD, MPH

Insomnia and Pornography Addiction in Rhode Island Young Adults
JONATHAN K. NOEL, PhD, MPH;
STEVE JACOB;
SHERIYAH L. HICKS;
KELSEY A. GATELY, OTD, OTR/L;
SAMANTHA R. ROSENTHAL, PhD, MPH

Restrictive Masculinity Norms and Past-Year Checkup Among Young Adult Males and Females
SAMANTHA R. ROSENTHAL, PhD, MPH;
MADISON A. MORAIS;
KELSEY A. GATELY, OTD, OTR/L

Brain Injury and Problem Gambling Among Rhode Island Young Adults
JONATHAN K. NOEL, PHD, MPH;
KELSEY A. GATELY, OTD, OTR/L;
CIERRA B. BRADFORD;
HAYLEE A. CANADAS;
SAMANTHA R. ROSENTHAL, PhD, MPH

Restrictive Masculinity Norms and Eating Disorder Risk in Young Adult Females
SAMANTHA R. ROSENTHAL, PhD, MPH;
JADYN N. TORRES;
MADALYN E. LYONS;
KELSEY A. GATELY, OTD, OTR/L

The Behavioral Health Harms of Youth Exposure to Gun Violence: A Rhode Island Example
SAMANTHA R. ROSENTHAL, PhD, MPH;
LILLY A. OLIVIERA;
ANDREA Y. AVILA, BS;
KELSEY A. GATELY, OTD, OTR/L;
JONATHAN BARKLEY, MPH;
JOLAYEMI AHAMIOJIE, MPH;
JONATHAN K. NOEL, PhD, MPH

JULY 2025

UPDATES IN SURGICAL ONCOLOGY

STEVE KWON, MD, MPH, MBA, FACS, FSSO
GUEST EDITOR

Introduction: Updates in Surgical Oncology
STEVE KWON, MD, MPH, MBA, FACS, FSSO

Regional Hepatic Therapies for Colorectal Hepatic Metastases
ANDREW B. CROCKER, MD;
MUNYA H. TALUKDER, MD;
MOHAMMAD S. ALI, MD;
ABDUL SAIED CALVINO, MD, MPH;
PONNANDAI SOMASUNDAR, MD, FACS;
N. JOSEPH ESPAT, MD, MS, FSSO, FACS

Current Applications of Intraperitoneal Chemotherapy
JENNA WILSON, DO;
AISHWARYA AYYAPPAN, DO;
ANDREW B. CROCKER, MD;
STEVE KWON, MD

Minimally Invasive Liver Surgery for Primary and Secondary Liver Malignancies
MUNYA H. TALUKDER, MD;
JENNA WILSON, DO;
ANDREW B. CROCKER, MD;
ALI AHMAD, MD, FACS;
PONNANDAI SOMASUNDAR, MD, MPH, FACS

Emerging Technologies for Pancreas Resection
JENNA WILSON, DO;
MUNYA H. TALUKDER, MD;
PONNANDAI SOMASUNDAR, MD, MPH;
ALI AHMAD, MD, FACS

Management of Benign Symptomatic Thyroid Nodules in Rhode Island Using Radiofrequency Ablation
NAN S. LI, PhD;
SONIA GIYANANI, DO;
DAEHEE KIM, MD;
STEVE KWON, MD, MPH;
JOHN LEE, MD

Cholangiocarcinoma in Rhode Island: Incidence Trends and Risk Profile Over the Last Decade
SASHA LIGHTFOOT, DO;
SURAJ RAM, MD;
ABDUL SAIED CALVINO, MD

AUGUST 2025

TRAUMATIC BRAIN INJURY REHABILITATION

JON A. MUKAND, MD, PhD
GUEST EDITOR

The Complexities of Traumatic Brain Injuries
JON A. MUKAND, MD, PhD

Traumatic Brain Injury – A Neurologist's Approach
BRUNO MOURAO-PACHECO, MD;
ANNA WHITHAM, MD;
JONATHAN F. CAHILL, MD

Common Sequelae of Severe Traumatic Brain Injury: A Case Report
STEPHAN P. PIRNIE, MD, PhD

Rehabilitation Strategies for Traumatic Brain Injury: Insights and Innovations
ALEXIOS G. CARAYANNOPOULOS, DO, MPH, DABPMR, FFSMB, FAAOE;
STEPHAN P. PIRNIE, MD, PhD;
ALEXANDRA I. GUNDERSEN, MD;
CLAUDIA HENTSCHEL, MD

Restoring Function After TBI: Physical Therapy Strategies for Balance, Gait, and Dual-Task Recovery: A Narrative Review
KENNETH VINACCO, PT, DPT, NCS;
NICOLE RAWNSLEY, PT, DPT, NCS;
ELIZABETH KOLATOR, PT, DPT, GCS, CLT;
JON A. MUKAND, MD, PhD

Cognitive-Communication Rehabilitation after Brain Injuries
JOAN M. JORDAN, DHA, CCC-SLP;
JON A. MUKAND, MD, PhD

Current Concepts in Neurogenic Heterotopic Ossification
JONATHAN LIU, MD;
NOAH GILREATH, BA;
SYDNEY ROZENFELD, MD;
SANDI CAUS, MD;
SARAH CRIDDLE, MD;
EDWARD J. TESTA, MD;
ANDREW EVANS, MD

An Orthopedic Perspective on the Management of Spasticity
MARY LOU, BS;
ASHLEY KNEBEL, BA;
JACOB EBERSON, BS;
CRAIG P. EBERSON, MD

DECEMBER 2025

OBESITY AND RELATED DISEASES

AURORA PRYOR, MD; ANDREW R. LUHRS, MD
GUEST EDITORS

Obesity: Management Strategies for Patients with Obesity and Related Diseases
AURORA PRYOR, MD;
ANDREW R. LUHRS, MD

Examining Intuitive Eating Behavior Across Metabolic and Bariatric Surgery and Non-Surgical Patients
VIVIANE FORNASARO-DONAHUE, MS, RD, LDN;
CEREN GUNSOY, PhD;
KATHLEEN J MELANSON, PhD;
LUCIA LARSON, MD

Gut Health and the Microbiome: The Hidden Drivers of Obesity
MARCOANDREA GIORGI, MD

Psychiatric Comorbidities and Weight Loss Recommendations in Bariatric Surgery Patients
KRISTY DALRYMPLE, PhD;
CRISTINA TOBA, MD

The Role of Bariatric Surgery in the Era of GLP-1 Receptor Agonists
EVA KOELLER, MD;
JOHN ROMANELLI, MD

Pediatric Obesity: Practical Recommendations for Management
ARTUR CHERNOGUZ, MD, FACS

Bariatric Surgery for Primary Care: When to Refer and How to Support Patients Pre- and Post-Surgery
ANDREW R. LUHRS, MD

Endoscopic Therapeutics for the Management of Obesity
EMILY ORTEGA GODDARD, MD

Preoperative Aprepitant Decreases Postoperative Nausea After Laparoscopic Sleeve Gastrectomy
WESLEY THORNE, MD;
DENIS SNEGOVSKIKH, MD;
MARCOANDREA GIORGI, MD;
ANDREW R. LUHRS, MD;
TODD S. STAFFORD, MD;
KELLIE ARMSTRONG, MSN, RN;
BETH A. RYDER, MD

Contained Leak Following Laparoscopic Sleeve Gastrectomy: Successful Management with Endoscopic Wound Vacuum Therapy and Stenting
CODY NESS, MD;
MARCOANDREA GIORGI, MD;
ANDREW R. LUHRS, MD

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Financial Burden of Naloxone Prescribing for Patients with Low Socioeconomic Status and Limited English Proficiency: A Case Study

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KEYWORDS: naloxone, harm reduction, clinical decision support, Medicare, insurance coverage

INTRODUCTION

Drug overdoses are a leading cause of injury-related death in the United States and have increased markedly over the past two decades. In 2023, there were 105,007 overdose deaths, an age-adjusted rate of 31.3 per 100,000,[1] with opioids contributing to approximately 76% of cases.[2] Rates rose from 8.9 per 100,000 in 2003 to 32.6 in 2022, before declining slightly in 2023.[1] Rhode Island reflects these national patterns, with opioids involved in 69% of overdose deaths in 2024, including fentanyl in 57%.[3] The state reported an opioid dispensing rate of 30.5 prescriptions per 100 persons[4] and a naloxone dispensing rate of 1.4 per 100 persons in 2023.[5]

CASE STUDY

A 74-year-old non-English speaking female with no history of prior substance use disorder presented to the emergency department after having sustained a right subtrochanteric femur fracture. She was admitted and underwent open reduction and internal fixation by orthopedics. Her post-operative course was uncomplicated, and she was discharged on post-operative day two with home physical therapy. Upon discharge, she was prescribed baby aspirin, acetaminophen, oxycodone, and naloxone. Arriving home, her pain was well controlled with just acetaminophen alone. Her husband, with limited English proficiency, went to pick up her medications at the pharmacy. Without understanding the indication or reason behind the naloxone prescription, he paid $75 for it because it was not covered by their Medicare plan, leading to a significant financial burden on the retired elderly couple on a fixed income.

DEVELOPMENT

Naloxone is a critical component of opioid overdose prevention strategies. Rhode Island requires prescribers to counsel patients on dependence, interactions with alcohol or benzodiazepines, driving impairment, safe storage and disposal, non-opioid alternatives, and relapse risk for those with prior opioid use disorder.[6] Naloxone must also be prescribed when opioid dosage is 50 morphine milligram equivalents (MMEs) per day or higher, when opioids are prescribed with a benzodiazepine either at the visit or within the prior 30 days, or when prescribed to patients with a history of opioid use disorder or overdose. In these cases, prescribers must document the medical necessity of opioid therapy and justify that benefits outweigh risks.[6]

The naloxone in this case was likely added to the prescriptions by an interruptive form of clinical decision support (CDS) embedded into the electronic health record. This alert occurs upon signing an opioid order that the system detects as one that potentially meets the state requirement for naloxone co-prescription. The current alert at Brown University Health fires for opioid dosage is >49 MME/day. In some scenarios the alert might trigger firing inappropriately, such as when the system is unable to calculate the MME/day, or when a patient may have an inaccurate entry of a prior benzodiazepine prescription or previous overdose. Once triggered, regardless of reason, the alert is nearly impossible to override by design, and the easiest way to continue the user's workflow is to prescribe naloxone. As a result, there is overwhelming pressure from the system to co-prescribe naloxone, even if the patient is low risk or does not meet requirements.

It is understandable that a health system would attempt to meet an unfunded state mandate with automated, cost-effective solutions to enhance patient safety. Some quasi-experimental studies have found that CDS for opioid prescriptions does indeed increase the rate of naloxone co-prescription.[7,8] However, there are several potential problems with this approach. First, interruptive alerts have multiple negative impacts on physician well-being.[9] Automated prompts to prescribe are also not the same as a comprehensive patient education and counseling about prescriptions.

Persistent barriers to access to and affordability of naloxone also contributed to the case outcome. Naloxone is available at no cost through community outreach programs and Medicaid.[10] However, previously available only by prescription, naloxone was reclassified to over the counter (OTC) status in September 2023,[11] a change that expanded public availability but altered insurance coverage. In the case presented, the patient was insured through Medicare, which had previously provided naloxone at no out-of-pocket

cost. Following the transition to over-the-counter status, Medicare Part D no longer covered naloxone, resulting in a substantial copay.

The combination of a system-based push to broadly co-prescribe naloxone even in low-risk situations and gaps in Medicare insurance coverage created unintended harm for patients with limited financial resources for whom even modest copays represent a meaningful burden. Others, particularly those with limited health literacy, may not fully understand the rationale for the prescription and assume it is an essential part of their treatment, leading them to purchase it unnecessarily at retail cost. Language barriers can amplify this effect, as patients may equate a physician's prescription with clinical necessity regardless of their actual risk. In these cases, the healthcare system unintentionally shifts the cost and responsibility to optimize public health onto patients least equipped to navigate the complexities of the healthcare system.

To address this gap, the authors propose two approaches.

First, ongoing advocacy is warranted to ensure that Medicare beneficiaries maintain affordable access to naloxone following its transition to over-the-counter status, which has introduced new out-of-pocket costs. Although Rhode Island law requires insurance coverage of at least one prescription formulation of naloxone, no active state initiatives currently extend this protection to OTC products, leaving some patients without adequate coverage. H.R. 5120, the "Hospitals as Naloxone Distribution Sites Act" (HANDS Act), was introduced in the U.S. House on September 3, 2025. The bill would amend the Social Security Act to ensure Medicare, Medicaid, and TRICARE cover naloxone provided in hospital settings at no cost to patients, beginning in 2026. Its goal is to reduce financial barriers by allowing hospitals to distribute overdose reversal medication directly to at-risk patients at discharge. The bill has been referred to multiple committees but has not yet been passed into law. Supporters, including the American Hospital Association, have urged Congress to advance it.[12] Ongoing efforts to support coverage on a state and national level is required.

Second, prescribing practices should remain patient-centered, with decisions guided by individual risk profiles whenever possible. Patient-centered prescribing emphasizes clinical context, patient understanding, and equitable access to care. Given the ever-increasing cognitive load from regulatory burdens placed on prescribers, digital tools will need to be part of the solution. EHR developers and their customers should make automated, customizable and individualized patient education materials a central feature, rather than an afterthought. CDS that prompt a change in prescribing behavior is no substitute for tools that engage patients via written, video, and other digital health tools to allow patients to better understand their care plan.

CONCLUSION

While naloxone distribution has clear public health benefits, broad system-driven prescribing practices based on noble, well-intended public health initiatives can have unintended consequences that impose undue burden on patients and communities who do not benefit from the medication, especially those with low socioeconomic status and limited English proficiency. We recommend continued advocacy to reduce costs of and ensure insurance coverage (including Medicare) and expanding beyond CDS alerts. EHR systems could better integrate automated, customizable, and individualized educational materials delivered through traditional and digital platforms to improve patient comprehension and engagement in their care plans. Doing both would maximize the public health benefit while optimally aligning access, cost, and clinical necessity to prevent future cases such as this from affecting our most vulnerable patients and communities.

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None exist for all authors.

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The History of Pediatric Endocrinology at Brown University and in Rhode Island

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ABSTRACT

As is the case for the discipline of pediatric endocrinology, the Division of Pediatric Endocrinology at Brown University was borne of the field of metabolic and biochemical investigation. Its establishment dates to 1967 when Dr. Mary B. Arnold came to Rhode Island. The recruitment of Dr. Robert Schwartz in 1974 brought an expertise in pediatric diabetes. The unified Division of Pediatric Endocrinology and Metabolism was established in 1987. Since its earliest days, the division has graduated 31 fellows with board certification in pediatric endocrinology. The division's history is rooted in basic and clinical research, a hallmark of which has been the description and elucidation of novel clinical cases. At present, the division provides comprehensive and multidisciplinary clinical services to children and adolescents with endocrinologic disorders, including diabetes. Providing these services is a team of eight faculty members, three fellows in training and 15 staff encompassing the disciplines of nursing, diabetes education, nutrition, psychology, pharmacy, and social work.

Mary B. Arnold, MD

INTRODUCTION

Pediatric endocrinology is a relatively new discipline. It evolved from the era of metabolic and biochemical investigation to become a defined pediatric specialty in the 1930s and 40s.[1] The origin of the Division of Pediatric Endocrinology at Brown University precedes the establishment of the modern medical school at Brown. It also precedes the establishment of a pediatric endocrinology sub-board. The division's origin dates back to 1967 when Dr. Mary B. Arnold [**Figure 1**] came to Providence. After completing a pediatric residency at New York Presbyterian Hospital-Columbia University, Dr. Arnold was a pediatric endocrinology fellow at the Massachusetts General Hospital with Dr. Jack Crawford, one of the founders of the field of pediatric endocrinology.[2]

Following her fellowship, Dr. Arnold moved to the University of North Carolina, where she came under the tutelage of Dr. Judson Van Wyk. Dr. Van Wyk had been a fellow at Johns Hopkins with another founder of the field of pediatric endocrinology, Dr. Lawson Wilkins.[3] Working with Dr. Van Wyk, Dr. Arnold was only one generation removed from the inception of pediatric endocrinology as a specialty. In Rhode Island, Dr. Arnold became chief of the pediatric service at Roger Williams General Hospital (RWGH) and a faculty member at Brown University, teaching in Brown's "Masters of Medical Science" program. She also established a pediatric endocrinology clinic at RWGH, where she was regularly joined by an endocrine colleague, Dr. Jay Orson. Dr. Orson was a member of an established pediatric practice in Providence where he provided a combination of primary care and endocrinology consultative services.

Robert Schwartz, MD

The founding of the academic Department of Pediatrics at Brown was marked by the recruitment in 1974 of Dr. Leo Stern, a neonatologist, to serve as chair of the department. Dr. Stern's charge was to develop an academic department with a robust research enterprise. To that end, he recruited a small core of established academic pediatricians. Among them were Drs. Robert Schwartz [**Figure 2**] and William Oh. Dr. Oh, a neonatologist, and Dr. Schwartz, a metabolism specialist, were established physician-scientists. As they were preparing to come to Brown, they began to consider their mutual interests for the purpose of establishing a collaborative research program. Within several years, that collaboration had resulted in their securing NIH funding for a Child Health Research Center program project grant that focused on diabetes in pregnancy.

When Dr. Schwartz came to Brown in 1974, he brought with him Dr. Ken McCormick to serve as his first fellow in pediatric metabolism. Dr. McCormick spotted a pediatric resident, Dr. Philip Gruppuso, who had an interest in metabolism. Some behind-the-scenes activities resulted in Dr. Gruppuso being recruited to Dr. Schwartz's lab for research electives during residency. Following his chief residency year in 1980-81, Dr. Gruppuso became the division's first


Philip A. Gruppuso, MD

joint pediatric metabolism-endocrinology fellow. With the benefit of additional mentoring by Dr. Oh and Dr. John Susa, a PhD biochemist in Schwartz's group, Dr. Gruppuso [**Figure 3**] was appointed the first head of a joint division of Pediatric Endocrinology and Metabolism in 1987.

The next year, the Division recruited Dr. Ian Ocrant. When Dr. Ocrant left after several years to practice pediatric endocrinology in his home state of California, Dr. Gruppuso called his by-then friend and mentor, Dr. Van Wyk, who connected Dr. Gruppuso to his graduating fellow, Dr. Charlotte Boney [**Figure 4**]. Dr. Boney came to Brown in 1994. That same year, Brown and Rhode Island Hospital's Department of Pediatrics moved into its new home, Hasbro Children's Hospital.


Charlotte Boney, MD

Other faculty members who worked in the Division of Pediatric Endocrinology over the years included Drs. Gregory Goodwin, Penny Feldman, Rebecca McEachern, Cynthia Meyers-Seifer, Bracha Goldsweig, and Shara Bialo. All are highly skilled pediatric endocrinologists who made substantial contributions to the division's tripartite mission: clinical care, research and teaching. By 1996, the division was accepting a new fellow each year. Among them was Dr. Chanika Phornphutkul, who was a fellow from 1996 to 1999. Following her fellowship, Dr. Phornphutkul moved to the NIH to train in biochemical genetics with Dr. William Gahl. She was recruited back to RI in 1999. While she maintains her appointment and activities in pediatric endocrinology, in 2011 she was appointed director of the Division of Medical Genetics, a post that she holds to the present.

In 2005, Dr. Gruppuso was appointed Associate Dean for Medical Education at Brown. The division head position was assumed by Dr. Boney, who recruited Dr. Jose Bernardo Quintos in 2007. Dr. Quintos trained at The New York Presbyterian Hospital–Weill Cornell Medicine under Dr. Maria I. New, one of the pioneers of pediatric endocrinology and a foremost expert in congenital adrenal hyperplasia. In 2013, Dr. Boney recruited Dr. Lisa Swartz Topor to the division from her position as a fellow then junior faculty member at Boston Children's Hospital. Dr. Boney remained division head until 2014 when she left to be department chair in pediatrics at Baystate Medical Center and the University of Massachusetts. Dr. Quintos [**Figure 5**] became division head upon Boney's departure, a position he holds to the present.


Jose Bernardo Q. Quintos, MD

RESEARCH

Shortly after his arrival in Rhode Island, Dr. Schwartz initiated a project aimed at testing the hypothesis that the fetopathy of diabetes in pregnancy was a direct consequence of fetal hyperinsulinism. To test this, Drs. Schwartz and Susa developed a primate model of primary fetal hyperinsulinemia. Fetal Rhesus monkeys were implanted in the latter stage of gestation with a subcutaneous osmotic minipump that secreted insulin for three weeks prior to delivery at term. In a series of papers, Schwartz's group showed that primary fetal hyperinsulinemia was associated with macrosomia, an increase in total body fat, increases in hepatic lipogenic enzymes, delayed lung maturation and erythropoietin-mediated polycythemia. In short, the model recapitulated the fetopathy of diabetes in pregnancy.[4]

While in Cleveland, Dr. Schwartz had established a collaboration with Dr. Kari Teramo, an obstetrician from the University of Helsinki. The collaboration continued at Brown, allowing studies that further supported a primary role for fetal hyperinsulinemia in the macrosomia seen in the offspring of diabetic pregnancies. Other lines of research led by Dr. Schwartz were carried out by his colleagues in neonatology – Drs. Jack Widness, Richard Cowett and William Oh – and in obstetrics – Drs. Donald Coustan, Marshall Carpenter and others. These collaborations made Brown an important center for fetal and maternal metabolic research.

Dr. Schwartz urged Dr. Gruppuso, upon completion of his fellowship, to pursue laboratory research full time. To this end, they solicited the support of Dr. John Fain, the head of Brown's Section of Biochemistry. A resulting NIH career development award allowed Dr. Gruppuso to work with a new faculty member at Brown, Dr. David Brautigan. In Dr. Brautigan's lab, Dr. Gruppuso developed expertise in signal transduction research. Melding this new interest with his background in metabolism, he embarked on a project aimed at characterizing the metabolic and growth phenotype of rat fetal hepatocytes. This proved to be a fruitful area of research, resulting in funding of an NIH R01 grant from 1989 until 2023. The work done under the auspices of this project evolved to focus on epigenetic regulation of hepatic gene expression, liver progenitor cells and their capacity to repopulate an injured liver, and liver carcinogenesis.[5-7] From the start of this project, a key researcher in the lab was Joan Boylan, who served as lab manager in the division while holding a position as research associate at Brown University. One of the graduate students who came through the

laboratory was Dr. Jennifer Sanders, who obtained her PhD in 2005. She subsequently completed a postdoctoral fellowship at Brown, then moving on to a faculty appointment in pediatrics. Dr. Sanders directed the Pediatric Endocrinology Laboratory and Brown's Pathobiology Graduate Program.

During her fellowship, Dr. Boney had done research aimed at understanding the role of the insulin-like growth factor (IGF) system in fat cell biology. Upon her arrival at Brown, she established a basic research program focused on cell signaling by IGF and insulin and their role in adipogenesis. The work, which established a primary but distinct role for both hormones,[8] had implications for the development of adipose tissue, and the factors leading to obesity and insulin resistance. Boney had the opportunity to pursue this topic in collaboration with Dr. Betty Vohr, director of the neonatal follow-up program. Together, they published a seminal paper[9] that established the link between maternal obesity, gestational diabetes and development of metabolic syndrome during childhood in the offspring.

When Dr. Phornphutkul returned to Brown, she pursued a project that also focused on mesenchymal cell differentiation. She focused on chondrogenesis, a subject that had direct relevance to childhood growth. Dr. Phornphutkul demonstrated that chondrogenesis at the growth plate involves the integration of insulin, IGF and nutrient signaling.[10] Her work contributed to our understanding of the mechanisms by which nutritional status affects long bone growth.

UNUSUAL CASES AND RESULTING SCHOLARSHIP

The Division of Pediatric Endocrinology has made meaningful contributions to scientific knowledge through careful clinical observations and related laboratory investigation. Not long after his arrival in RI, Dr. Schwartz was asked to see a 12-year-old girl who had been evaluated at another endocrine program and diagnosed with "pre-diabetes." He involved his then fellow, Dr. W. Patrick Zeller, who confirmed that the girl had impaired glucose tolerance associated with elevated levels of immunoreactive insulin. Her case, which included an evaluation of her family and a careful analysis of circulating proinsulin and proinsulin conversion intermediates, was published in the *New England Journal of Medicine* as only the third known case of hyperproinsulinemia.[11] Further evaluation for a mutation in the proinsulin gene revealed that the patient's metabolic abnormality was due to a point mutation in the region of the insulin gene that encodes the insulin B-chain, resulting in impaired proinsulin-to-insulin conversion.[12]

This case spurred further work on proinsulin carried out by Drs. Gruppuso and Schwartz in collaboration with Drs. Bruce Frank and Mary Root at Eli Lilly. Studies in pregnant Rhesus monkeys showed that proinsulin, like insulin, does not traverse the placenta, but that immunoreactive fragments of the connecting peptide released during proinsulin-to-insulin conversion, C-peptide, do cross.[13] Other studies focused on the ability of proinsulin and conversion intermediates to interact with the insulin and IGF receptors.[14] This work was important at the time because Eli Lilly was moving toward the development of proinsulin as a therapeutic agent for use in diabetes.

A second high impact case report followed several years later. Members of the division had been following a child with Albright's Hereditary Osteodystrophy pseudohypoparathyroidism. His clinical manifestations, including multi-hormone resistance, asthma and subcutaneous ossifications, were particularly severe. An endocrinologist at Johns Hopkins, Dr. Michael Levine, was working to identify the G-protein mutations that were presumed to account for this disorder. The Rhode Island patient became the first individual with a defined mutation accounting for pseudohypoparathyroidism.[15]

A third case report that had a particularly high impact within and outside our division was that of a teenager who had been followed since birth with a disorder of sexual development (DSD). At the time, the standard of care for newborns with DSDs was based on the principle that an assigned gender, appropriate to the specific disorder, would be accepted by the patient as long as there was consistency on the part of the parents. The significance of the case was that, as a teenager, the patient rejected his assigned female gender. This coincided nearly exactly with the emergence of the "John/Joan" story, which also highlighted that gender assignment was rejected by a boy with an assigned female. The RI case, published in *Pediatrics*,[16] was part of a change to a new standard of care that includes avoidance of early surgery and greater inclusion of parents and patients in decision-making. As a result of involvement in this case, Dr. Gruppuso went on to contribute to a change in the taxonomy[17] that resulted in the standard use of the DSD terminology and a move away from terms such as "pseudohermaphrodite."

A case exemplifies the impact that case reports can have on basic research. In 2013, Dr. Quintos met a 5½ year-old with the unusual clinical constellation of short stature with an advanced bone age. A genetic analysis revealed a missense mutation in the gene that encodes the intercellular matrix protein aggrecan.[18] Other kindreds had been described with similar presentations,[19] but the molecular basis for the growth abnormality had not been identified. Hypothesizing that the aggrecan mutation affected the development of growth plate chondrocytes, endocrine fellow Dr. Juanita Hodax carried out studies on chondrogenic cells made null for aggrecan production. Her studies[20] showed that aggrecan participates in the normal process of chondrocyte differentiation, a novel finding, such a role not having been attributed to this matrix protein.

Throughout the history of the division, faculty and fellows have made scholarly contributions in the form of case reports[21,22] and case series,[23-25] and original clinical research

in diabetes and endocrinology.[26] While many have focused on diagnostic and therapeutic observations, more recent reports have taken advantage of contemporary molecular analyses to define the genetics of specific disorders.[18,22,27,28]

PEDIATRIC ENDOCRINOLOGY TRAINING

A training fellowship at RI Hospital preceded the establishment of a specialty board in pediatric endocrinology. Over the 45 years since inception of the academic department, the division has graduated 31 fellows [**Table 1**]. Of these, most provide direct patient care, while others are primarily researchers or working in industry. Fellowship graduates include dozens of faculty members of academic departments across the United States, including many who have served in academic and educational leadership positions.

Among the Division's fellowship graduates, three currently reside and practice in Rhode Island. One, Dr. Gregory Fox, has made an important contribution by serving as the physician for the RI diabetes camp, Camp Surefire, and the president of its supporting foundation. Dr. Meghan Fredette, a 2019 graduate of the fellowship, is a faculty member in the Division. The third graduate of the fellowship program practicing in Rhode Island is Dr. Phornphutkul who, following training at NIH in clinical genetics, came back to Rhode Island to lead the Genetics Division in the Department of Pediatrics.

The fellowship program, directed by Dr. Lisa Swartz Topor continues to recruit and graduate one fellow per year. Of the approximately two thousand pediatric endocrinologists who have been certified by the American Board of Pediatrics since the inception of its specialty board, more than a third are over the age of sixty.[29] Brown University's fellowship program will continue to play an important role in sustaining the discipline of pediatric endocrinology

Table 1. List of Pediatric Endocrinology Fellows

Year	Fellow
1983	Philip Gruppuso, MD
1985	Vincent Nishino, MD
1987	Michael Sarris, MD
1992	Luis Aparicio, MD
1996	Suleiman Mustafa-Kutana, MD
1997	Lauren Lipeski, MD
1999	Chanika Phornphutkul, MD
2000	Penny Kadmon, MD
2001	Anil Kumar, MD
2003	Gregory Fox, MD
2004	Nikolaos Kefalas, MD
2005	Molly Harrington, MD
2006	Valerie Auyeung, MD
2007	Eda Cengiz, MD
2008	Mimi Kim, MD
2009	Katarina Gambosova, MD
2011	Otilia Neacsu, MD
2011	Mia Pingul, MD
2012	Sujana Reddy, MD
2013	Sunita Cheruvu, MD
2014	Angela Ganan Soto, MD
2015	Shara Bialo, MD
2016	Sungeeta Agrawal, MD
2017	Serife Uysal, MD
2018	Juanita Hodax, MD
2019	Meghan Fredette, MD
2020	Ugen Lhamu, MD
2021	Anna Chin, MD
2023	Avani Ganta, MD
2023	Sabitha Sasidharan Pillai, MD
2024	Sujatha Seetharaman, MD MPH (completed training at UCSF)

THE CLINICAL MISSION

Throughout the history of the Division, its core mission has been to provide clinical care to the population of pediatric patients in Rhode Island and southeastern New England with endocrine disorders. Given the nature of this population, a substantial proportion of the Division's clinical efforts have been directed to the care of pediatric patients with diabetes. Dr. Schwartz established a diabetes clinic when he came to Rhode Island. During the first several years, some eighty patients were referred to him by primary care providers. This small clinical service grew gradually over the subsequent several decades such that by 2020 the Division was caring for over 1,000 pediatric diabetes patients. With the advent of current diabetes management technologies, including insulin pumps and continuous glucose monitors, the management of type 1 diabetes involves multi-disciplinary specialty teams. These patients are being managed by a team of physicians, diabetes nurse educators, registered dieticians, and social workers.

The conditions for which patients are most commonly referred to pediatric endocrinologists include short stature, delayed pubertal maturation, and thyroid disease. The Division also cares for a population with a broad scope of rare and serious endocrine disorders. The division's expanding clinical service, which has included the establishment of four satellite clinical locations, led to the recruitment of new faculty members in recent years Dr. Monica Serrano- Gonzales who trained at Children's Hospital of Los Angeles, was recruited in 2017. Dr. Meghan Fredette joined the division as a faculty member upon the completion of her fellowship in 2019, Drs. Kate Millington and Kevin Scully joined in 2022 after completing their training at Boston Children's Hospital, and Dr. Jonathan Tatum who was recruited in 2024 after finishing fellowship at Cincinnati Children's Hospital. Among the current staff are several individuals who have been with the division for over a decade, Maryann Johnson, RN, Terri Hamm, RN, CDE and Jean Bisordi, RN, CDE. The contribution they have made to the care of our patients is incalculable.

CITIZENSHIP AND PROFESSIONAL SERVICE

Since the inception of the Division, its members have served in a variety of local and national positions. One of the earlies and most important contributions was Dr. Arnold's contribution

to the establishment of the neonatal thyroid screen in the late 1970s, work that she did through her work for the New England Regional Newborn Screening Program. Since 1989, Dr. Gruppuso has served on federal and non-federal committees and grant review panels. He was a member of the board of the RI affiliate of the American Diabetes Association from 1990 to 1996 and was its president from 1992 to 1994. His patient advocacy activities included membership on the medical advisory board of the Intersex Society of North America. He has served as a member of the editorial boards of *The Journal of Clinical Endocrinology and Metabolism* and *Pediatric Research*. Dr. Quintos serves on the endocrinology sub-board of the American Board of Pediatrics. Dr. Quintos was Chair of endocrinology sub-board of the American Board of Pediatrics from 2023–2024, a position also held by Dr. Boney while she was a member of the Division. More recently, Dr. Quintos contributed to the development of the Pediatric Endocrine Society's Task Force on Consensus Guidelines for Growth Hormone Therapy,[30] and Dr. Topor is serving as the chairperson of the Pediatric Endocrine Society Training Council from 2024–2026, working with fellowship directors across the US and Canada.

SUMMARY

The clinical field of pediatric endocrinology is one that is still relatively new. The recruitment of specialists in this discipline coincided with the founding of the medical school at Brown University and of its academic department of pediatrics. While only 45 years have lapsed since the division's inception, it has made substantial contributions to the care of infants, children and adolescents in Rhode Island, to the training of pediatricians and endocrinologists, and to scholarship related to the clinical and basic science of endocrinology. The division is committed and able to continue making these contributions for the foreseeable future.

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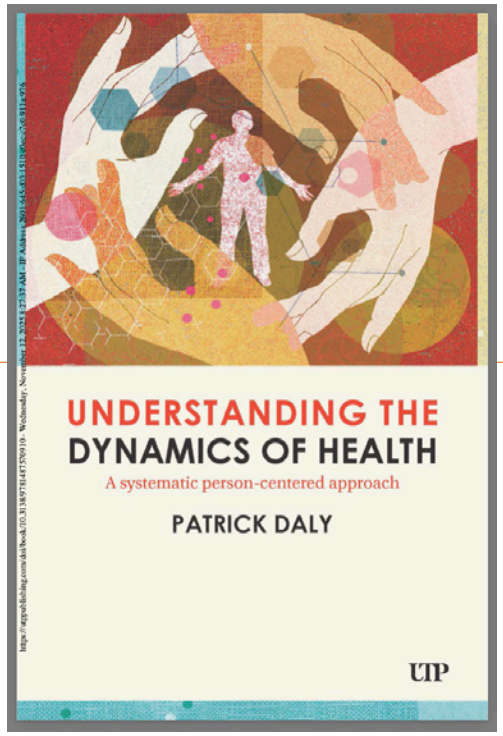
Understanding the Dynamics of Health—A Systematic Person-Centered Approach

MARY KORR
RIMJ MANAGING EDITOR

Rhode Island resident **PATRICK DALY, MD, MA**, a research associate at the Lonergan Institute at Boston College, published a book in November, *Understanding the Dynamics of Health—A Systematic Person-Centered Approach*. It is available on the publisher's website at: https://utppublishing.com/doi/book/10.3138/9781487570910.

The website describes the book as developing "a comprehensive framework for understanding health and its impairments, drawing on the work of philosopher Bernard Lonergan. Providing a systematic and critical foundation for uniting diverse health-related disciplines, from network biology and neuroscience to narrative medicine, bioethics, and public health philosophy, this book's holistic framework not only emphasizes the lived experience of the whole person but also establishes a methodological approach for integrating the ever-expanding fields of health science and healthcare."

I asked Dr. Daly to respond to a Q&A, to offer some insights into his background and the journey to publication of this book.



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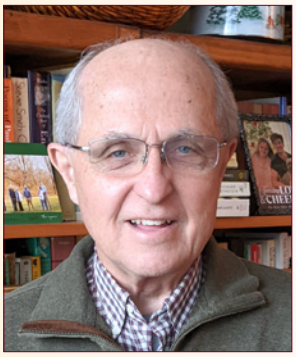

PATRICK DALY, MD, MA

- BS, Providence College, 1969
- MD, Northwestern University Medical School, 1974
- Residency, internal medicine, Washington DC VA Medical Center, 1974–1977
- Practiced primary care/internal medicine in South Kingstown and Narragansett, 1977–2000; and then from 2000–2012 in Bangor and Augusta with VA Maine, where, following subspecialty certification, became Director of Hospice and Palliative Care from 2008–2012
- MA, philosophy, Boston College, 2013
- Current: Research associate, Lonergan Institute at Boston College

Q. What led you into the field of medicine after graduation from Providence College (PC)?

A. While I was still in grammar school, when asked, I would say that I wanted to be a psychiatrist. I probably got this idea at the age of four when my father went away for psychiatric treatment, thinking if psychiatrists were going to make my father better, I wanted to become a psychiatrist. Another formative experience was when my grandfather, who lived with us, became ill and died shortly after, my parents did not answer my questions about what was obviously a serious situation or allow me the chance to say goodbye. This later fed into my interest in palliative care. At PC, I found out that I liked biology, which eventually led me to choose internal medicine and to attend to the whole person in my medical career.

Q. On Mentorship: Who influenced you the most in your burgeoning career and why is mentorship key?

A. I admired my pediatrician growing up, who encouraged me to pursue my plans to go to medical school and become a doctor. I admired his direct and careful approach to what he said and what he was doing. I would have to say during internship and residency, it was the whole atmosphere of teaching and learning at the Washington DC VA Medical Center, under the leadership of Dr. Hyman Zimmerman, that excited me and gave me a sense of what it means to be a good doctor. The noontime conferences there were a highlight of my training. When I first started to practice in South County, I benefited from the wise counsel of a senior physician there, Dr. Thomas Nestor.

Q. You practiced as an internist in South Kingston and Narragansett after your residency for decades. Can you briefly describe from your vantage the shifting sands of medical practice for the individual practitioner – the then and the now.

A. I began as a solo practitioner in Wakefield in 1977 and had a coverage arrangement with two other young internists. At that time, we submitted third-party insurance claims by snail mail. Covering the emergency room for medical admissions at South County Hospital and the resulting interruption of our office schedules was a major challenge, especially during the summer months with the influx of tourists. Since then, the medical

community in South County has grown and expanded to include medical specialists, mid-level practitioners, and hospitalists. More generally, urgent care centers have sprung up, practices have become computerized (first for billing and now for the clinical record), and the insurance, pharmaceutical, and regulatory climate have gotten dramatically and financially more complex. All of these changes, along with the educational debt that new practitioners carry, favor large group practices that have the scale to negotiate with large corporate entities. What happens to patients, financially and clinically, in our current situation remains a vexing question.

Q. The VA system provides essential/critical care for Veterans, not only here in Providence and throughout New England, where you practiced in its system, but nationwide. Its scope has expanded. How did working within the system further influence your career trajectory?

A. I left private practice to join the VA in order to concentrate more on clinical care and less on financial matters. I also valued the underlying moral understanding that Veterans are due good medical care in exchange for the service that they have rendered to the country. I think this understanding could be generalized to require one-two years of public service (military or non-military) of all citizens entering adulthood in exchange for universal healthcare. As far as my career trajectory, through the support and training that the VA provided, I became board-certified in Hospice and Palliative Medicine and helped to develop a palliative care service for Maine veterans and an inpatient hospice unit at the Togus VA Medical Center.

Q. You served as a palliative care physician. Can you relate one or two experiences that shifted your perspective on end-of-life issues.

A. As I mentioned, I was motivated to be truthful about delivering bad news by my experience of my parents being evasive about my grandfather's illness when I was twelve. But I learned that some patients, who are not in denial about their condition, still do not want to hear a sentence of death from their doctor. It is so important to learn how the patient understands what is going on and what they expect or hope for from us and to adjust what we say accordingly. For instance, to say, "I am not sure we can fix this, but here is what we can do," instead of, "You are dying and you only have three months to live." On a positive note, the relationship of caring is the most important element of palliative care and nursing assistants are often the best models of this fact.

Q. You transitioned from a medical career to philosophy to your current position at Boston College. Would the young Dr. Daly recognize the person he has become today?

A. Yes, he would. I have wanted to write since I was in my teens. I admired Anton Chekhov and William Carlos Williams for combining writing and medical careers. When I was younger, I tried my hand at poetry and playwriting. My closest encounter with success along those lines was a concert reading in Kingston and Newport, RI, of Five Needles, White Pine, an opera-musical for which I wrote the libretto and Geoffrey Gibbs wrote the music. Then things lay fallow until I discovered Bernard Lonergan's work in my fifties. He answered many questions that I had long hoped to answer. After taking an MA in philosophy at Boston College in 2013, I set out to develop a philosophy of health based on Lonergan's work because I think that he understands the relationship between science and art in a way that resonates profoundly with the relation between health science and healthcare. ❖

Book Excerpt

The following is an excerpt from the book illustrating one patient's experience.

(Chapter 9.2) The Clinical Encounter: An Illustrative Story

In *Our Malady*, Timothy Snyder tells a personal story of his encounter with modern health-care systems in Germany and the United States in late 2019 and early 2020 when he nearly died from sepsis following a delayed diagnosis and operation for appendicitis. He first presented with abdominal pain to a hospital in Munich, Germany, on December 3, 2019, where he was admitted overnight for observation and released the next morning with a diagnosis of viral gastroenteritis. Neither a computerized tomographic (CT) scan nor antibiotics were performed or recommended at that time.

After returning home to New Haven, Connecticut, his symptoms worsened. On December 15, he underwent an appendectomy for a ruptured appendix at a university hospital and was discharged home the following morning with a short course of oral antibiotics. An abdominal CT scan at that time showed a liver lesion, which did not come to the attention of his treating physicians until two weeks later.

On December 23, while visiting for the holidays with family in Florida, he developed tingling and numbness in his hands and went to a local hospital where he was evaluated neurologically, observed overnight, and released the next day without a clear diagnosis. Over the next few days, he became increasingly weak and fatigued.

On December 28, he flew back to Connecticut with his family to seek care closer to home. A friend met them at the airport in Hartford and drove him to the emergency department of the hospital in New Haven, while Snyder's wife took care of the children and the luggage. He arrived about midnight on

December 29 and lay in a cot in extremis for the next seventeen hours competing with other patients in the busy emergency department for the attention of nurses and physicians. After finally persuading them that his illness had something to do with his appendectomy at this same hospital two weeks before and getting them to review his records, they repeated his abdominal CT scan and realized that he had a liver abscess and was now septic. A catheter was placed to drain the abscess, and he was started on intravenous antibiotics. He subsequently required the placement of two more drains to fully clear the abscess. After being discharged home, he continued antibiotic treatment for several weeks and finally returned to work on a limited basis toward the end of March 2020.

Clinical Conversation

The author follows this "case report" with a "Clinical Conversation."

…Timothy Snyder lived to tell his story so, in that respect at least, he exemplifies the self-correcting nature of the cycle of figuring out what was wrong with him and what needed to be done. In the acute care setting, the initial assessment of the severity of a situation typically dictates the flow of the patient's care within the overall flow of care in that setting – what tests are done, how quickly, what treatments are started, who is consulted, whether hospitalization is indicated, and the like. This initial assessment is largely based on common sense – what this practitioner (however skilled, tired, or distracted) makes of this patient (however reserved, agitated, or clear minded). Although Snyder's findings warranted overnight observation in Munich, his stoic demeanor in concert with the doctors' cultural preference to avoid excessive exposure to radiation apparently led to the decision not to do a CT scan. Two weeks later in New Haven, the decision to operate went smoothly so far as we know, but, in retrospect, the decision to discharge him home the next morning was premature. The scene that Snyder describes in the emergency department in New Haven on December 29 was chaotic. Whether or not staffing was an issue, the staff's snap judgments – some that may have been racially prejudiced concerning the female physician and friend who accompanied him – and the piecemeal and often dismissive style of communication delayed appropriate assessment and treatment decisions for hours. Absent appropriate attentiveness, the self-correcting cycle of learning grinds to a halt, while, in cases like this one, the patient's condition continues to worsen.

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AMA adopts new public health policies

NATIONAL HARBOR, MD – The American Medical Association (AMA) gathered physician and medical student leaders from all corners of medicine at its Interim Meeting of the House of Delegates to shape guiding policies on emerging health care topics.

The new policies adopted on the final day of voting at the AMA Interim Meeting include advocating for funding to support school-based mental health, removing barriers to improve access to opioid use disorder medications, improving health care for veterans, and protecting health care professionals from ionizing radiation.

Mental Health Infrastructure in the School System

With school-based mental health grants being discontinued, the AMA House of Delegates called for sustained and stable funding to prevent disruptions in student care.

Earlier this year, the U.S. Education Department announced it would not continue funding many of the mental health grants beyond the current budget period, effectively rescinding the future funding for about $1 billion worth of awards. The grants were intended for training and placing school-based mental health professionals in K–12 settings.

The AMA will support federal legislation incorporating automatic continuity protection and retention of school-based mental health professionals, with priority given to rural and underserved communities.

"The decision to end these grants will disproportionately impact rural and underserved districts, disrupting continuity of care, decreasing access to mental health care for our children, and destabilizing the workforce pipeline for counselors, psychologists, social workers, and physicians engaged in school-based health services in the middle of a mental health crisis," said **MELISSA GARRETSON, MD**, a member of the AMA Board of Trustees.

Ensuring an Inventory of Products Used to Treat Opioid Use Disorder

The American Medical Association will advocate at the state and federal level to remove "red flag" or suspicious order designations for ordering FDA-approved products in treating opioid use disorder (OUD).

The AMA has heard reports that patients with OUD have struggled to have prescriptions for buprenorphine products dispensed at pharmacies. Some pharmacies are not increasing their orders for fear of triggering suspicious order reports and subjecting them to DEA scrutiny.

"Access to these buprenorphine products will remain a struggle across the country as long as FDA approved products are included in suspicious order designations," said AMA President **BOBBY MUKKAMALA, MD**. "It is beyond comprehension that at a time when we all have worked so hard to remove barriers to treatments that yet another barrier would rear up and put patients' lives in jeopardy."

The House-passed resolution also called for the AMA to advocate to remove all barriers to medications for opioid use disorder, including prior authorization, fail-first and step-therapy policies.

Ensuring Health Care Workforce Prepared to Address Veteran-specific Health Issues

Research consistently shows that veterans experience mental health disorders, substance use disorders, post-traumatic stress, traumatic brain injury, and other health conditions at disproportionately higher rates than their civilian counterparts. Additionally, veterans receiving care from the Department of Veterans Affairs (VA) are more likely to be diagnosed with post-traumatic stress disorder (PTSD) than those who seek community health services, in part because the VA screens all veteran patients for PTSD.

To help ensure veterans receive the comprehensive, informed care they deserve, the AMA adopted new policy aimed at enhancing clinical care related to military service.

Under the new policy, the AMA will advocate for legislation, as well as regulatory action, encouraging health care systems to develop and implement standardized protocols for identifying patients with a history of military service. The standardized protocols will help document military service history – including deployment locations and occupational exposures – to help improve care for veterans.

"We know that when military service is included as part of a patient's health history, it can lead to improved diagnosis and treatment, as well as better opportunities for accessing earned benefits. We have a responsibility to make sure the health care workforce has the information and tools needed to better understand and address the unique health needs of our veterans, and to provide them with the highest standard of care," said AMA Board Member **SANDRA ADAMSON FRYHOFER, MD**.

In addition, the AMA will advocate for developing evidence-based clinical guidelines for health conditions prevalent among veterans. The policy also calls for collaboration with medical education accrediting bodies to encourage medical schools, residency programs, and continuing medical education providers to incorporate training on veteran-specific conditions, occupational exposure assessment, and screening protocols into their curricula.

Expanding Efforts to Protect Health Care Professionals from Ionizing Radiation

As the use of imaging and interventional procedures that rely on ionizing radiation continues to grow, the AMA adopted new policy to strengthen protections for health care professionals and trainees who may face occupational exposure.

The new policy supports the use of well-fitting PPE that covers all body types, genders, and pregnancy statuses,

as well as the use of dosimetry badges for health care personnel and trainees who work in settings where radiation exposure is possible.

Additionally, the new policy urges continued research into the health effects of low-level- and very-low-level exposure to ionizing radiation; the effectiveness of PPE and administrative and engineering controls designed to reduce exposure; and barriers that prevent PPE use and ways to improve it. The policy also calls for educating all health care personnel and trainees – tailored to specific exposure risk – on how to limit radiation exposure for themselves and their patients. The policy also encourages medical specialty societies to establish education and training standards in this area. ❖

AMA adopts policy to advance AI literacy in medical education

NATIONAL HARBOR, MD — The American Medical Association (AMA) adopted policy Monday at its Interim Meeting of the House of Delegates to expand training in Augmented Intelligence (AI) across the medical education continuum.

The policy aims to strengthen the physician workforce and improve patient outcomes through standardized training in medical school and increased access to AI-focused Continuing Medical Education (CME) resources for practicing physicians. The policy builds on the AMA's commitment to ensuring AI is implemented ethically and responsibly across health care settings.

Under the new policy, the AMA will develop and disseminate model AI learning objectives and curricular toolkits to guide foundational education on the use of AI in clinical practice. The AMA also will collaborate with other medical organizations to work toward recognizing AI literacy elements and will advocate for funding and faculty-development resources to expand AI training initiatives.

"As AI becomes increasingly embedded across health care, we face an urgent need for a standardized educational framework that emphasizes patient safety, transparency, and accuracy," said AMA CEO & Executive Vice President **JOHN WHYTE, MD, MPH**. "Just as medical students learn anatomy and physiology, they must also understand how AI tools function, their limitations, and their potential to support clinical care. A strong foundation in AI education will help ensure these technologies are used in ways that improve patient care, reduce administrative burdens, and restore physician satisfaction in practicing medicine."

The new policy aligns with the mission of the AMA's Center for Digital Health and AI, launched in October, to ensure physicians play a leading role in shaping emerging technologies that are developed and used in clinical practice. The Center focuses on embedding physician expertise into the design and implementation of digital health and AI tools, strengthening education and training, and advancing policy and regulatory frameworks. By balancing innovation with real-world clinical needs, the Center aims to support technologies that enhance patient care and reduce physician burnout.

The AMA's ChangeMedEd® initiative features a seven-part *Artificial Intelligence in Health Care Series,available for free on the AMA Ed Hub™*, to help learners explore the ethics, evidence, and practical applications of AI in medicine. Modules in this series include Introduction to *Artificial Intelligence in Health Care, The Use of AI in Diagnosis*, and *Navigating Ethical and Legal Considerations of AI in Health Care*. For more education and CME on AI, visit the AMA Ed Hub™.

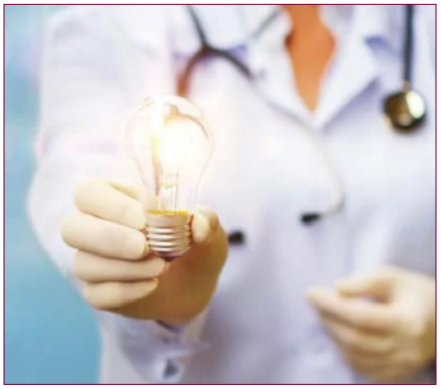
Delegates also approved a resolution that aims to create safeguards to protect patients and physicians from deepfake technology in the face of what supporters say is a "regulatory void."

The AMA will support organizations that work on federal legislation and regulations regarding deepfake technology to uphold the integrity of the medical profession against malpractice, increase awareness of the risks associated with deepfake content, and safeguard patient well-being.

Deepfake "doctors" are garnering millions of views on social media, endorsing products from weight-loss supplements to unproven medical treatments and devices for financial gain, jeopardizing patient safety and exposing them to serious harm. Advancements in generative deepfake technology have reached a point where distinguishing between real and fake content is increasingly difficult.

"The foundation of the patient-physician relationship is built on accurate information, trust, professionalism, and authenticity, all of which are under direct threat from deepfake content, which misleads patients and undermines their confidence in medical practice," Dr. Whyte said. ❖

AMA launches new national grant program to support physician-led community health innovation



CHICAGO — The American Medical Association (AMA) today launched the Community Health Impact Lab Micro Grants Program, a new national initiative to support physician-led projects that improve health outcomes at the community level.

Through the program, the AMA will award $50,000 grants to 20 physician-led projects that address urgent health challenges in areas with limited access to care. Projects may focus on issues such as food insecurity, maternal health, caregiving support, or other local health needs identified by U.S.-based physicians working in their local communities.

The goal is to spark physician-driven innovation that delivers practical, measurable improvements in community health—and to identify ideas that can be expanded or replicated to benefit more patients nationwide.

"Doctors see every day how factors like food insecurity, housing, and transportation access directly affect patients' health – often having broad impact across entire communities," said AMA CEO and Executive Vice President **JOHN WHYTE, MD, MPH**. "Through this program and investment, the AMA empowers physicians to design creative solutions that address community needs while using our national reach to scale what works – turning local innovation into lasting, national change."

To be eligible, proposals must focus on a clear community health challenge affecting patient populations. Projects should demonstrate feasibility, measurable outcomes within the 12-month grant period, and potential to be adapted for use in other communities.

Applications must be submitted by March 1, 2026. Grant recipients will be announced by April 30, 2026, with projects launching soon after.

Physicians interested in applying can learn more and submit proposals on the AMA Community Health Impact Lab Micro Grants Program webpage. ❖

Butler researchers develop successful suicide prevention program for those recently released from jail

PROVIDENCE — Researchers and clinicians from Care New England's Butler Hospital and The Providence Center contributed to the development and evaluation of an innovative program for people in jail that reduced suicide attempts by more than half during the year after their release.

That is the finding of a new study recently published in JAMA Network Open. **LAUREN WEINSTOCK, PhD**, an affiliated psychologist with the Psychosocial Research Program at Butler Hospital, and a professor of psychiatry and human behavior at Brown University, is the study's lead author. Co-authors include Butler's **SARAH ARIAS, PhD**; **IVAN MILLER, PhD**, and **BRANDON GAUDIANO, PhD**. The team also included researchers from Michigan State University. Several of the study clinicians providing care to the study participants are TPC staff.

The federally-funded study found that Safety Planning Intervention (SPI) with follow-up phone calls cut suicide attempts by 55% in the year after people were released from jail. The randomized clinical trial followed 800 at-risk individuals; some were recruited from the RI Department of Corrections; 655 of those released were followed in the community. This study highlights that this simple, low-cost SPI can save lives in the high-risk year after jail detention, a period linked to one in five suicide deaths nationwide. ❖

Rhode Island Life Science Hub awards funding to eight life science companies launching and relocating to Rhode Island

PROVIDENCE — The Rhode Island Life Science Hub (RILSH), the state-supported organization dedicated to growing Rhode Island's life sciences ecosystem, announced the investment of an additional $4.5 million in strategic, nondilutive investments to companies driving scientific and commercial innovation in the state. With these commitments, RILSH has now deployed more than $20 million since its inception.

RILSH's latest funding cohort includes companies that were conceptualized and scaled in Rhode Island, as well as several that are establishing new headquarters in the state. Collectively, these companies are advancing breakthrough work across neuroscience, oncology, women's health, regenerative medicine, and next-generation medical technologies.

"These investments underscore the momentum building across Rhode Island's life sciences sector and the growing number of companies choosing to advance their work here, a reflection of Rhode Island's emergence as a competitive destination for global biotech innovation, attracting new talent, and driving long-term economic growth for the State," said **MARK A. TURCO, MD**, President and CEO of RILSH.

New Business Attraction grant awardees (to build a Rhode Island presence for established companies) include:

- **Lyora Therapeutics** – This Massachusetts-based biotech company is developing novel genetic medicines for inherited retinal degenerations (IRDs) and hearing disorders; receiving support to establish a presence in Rhode Island and advance

technology development. The founding team comprises world-class scientists excited to grow Lyora Therapeutics in Rhode Island.

- **SymPhysis Medical** – A medical device company developing and advancing the releaze™ Drainage System as a platform for treating fluid build-up in the chest (pleural effusions). The goal is to improve the quality of life and provide independence for these terminally ill patients. This Galway, Ireland-based company is receiving support to establish a Rhode Island presence, and accelerate its technology and market development efforts.
- **Origyn Solutions** – A Venture Studio focused on accelerating medtech innovation in the field of women's health, is receiving support to relocate its portfolio technologies and company headquarters to Rhode Island. Origyn Solutions is currently based in Massachusetts.
- **p53-Therapeutics** – A biotech company that recently announced it would be part of the Ocean State Labs incubator in the 195 District. p53-Therapeutics is developing a new class of small-molecule cancer therapeutics targeting mutations in the p53 tumor suppressor gene; and is receiving funding to establish Rhode Island headquarters and advance IND-enabling work.

New companies receiving RI Innovation Bridge Grants to fill critical gaps in the technology development lifecycle include:

- **Homer Therapeutics** – A biotech company developing RNA-targeting therapeutics for select oncology indications and other high-unmet need diseases; receiving support for early-stage development milestones and establishment of a RI base.
- **Liseva Bio** – an innovative biotech company advancing its Liseva Cellular Armor Technology (LCAT), a breakthrough immune cell therapy platform that enhances the survival, function, and anti-tumor activity of T cells and NK cells to fight treatment-resistant solid tumors; awarded funding to support key early-stage milestones.
- **EnkaBio Inc**. – A company that is advancing orthopedic medicine by developing Celluvoir, a first-of-its-kind cell-based therapy designed to repair meniscus tears with superior healing and long-term joint protection compared to standard suture repair; receiving funding to support early-stage milestones and company development.

A RI Lift Grant for prototype development was also awarded to SMOLTAP, Inc., a Providence-based medical technology start-up developing a Class I (510k exempt) device to aid in infant and neonatal lumbar puncture (spinal tap) procedures.

"Each awardee represents an area of the life sciences where Rhode Island has the talent, infrastructure, and research leadership to compete and lead. By supporting these companies at pivotal stages of development, RILSH is helping accelerate breakthroughs that will ultimately improve patient care while strengthening our commitment to building a world-class innovation ecosystem right here in the Ocean State," Turco added. Final disbursement of funds is contingent on execution of standard milestone-based agreements between each company and the Rhode Island Life Science Hub. ❖

South County Health's Board of Trustees explore a partnership

WAKEFIELD — In the following statement, South County Health's Board of Trustees announced on Nov. 20th that it has entered a 120-day exclusive diligence period to explore a transformational partnership. Though specific details and the names of the strategic, AI, digital, and clinical partners remain confidential at this time, the Board believes that this partnership would be revolutionary for South County Health, bringing, among other things, the following significant benefits to our organization and community:

- The opportunity to remain a non-profit and independent healthcare system in Rhode Island, while gaining access to national-scale capabilities and innovation.
- Clinical and digital relationships with a top ten national healthcare system, providing Rhode Islanders with access to world-class clinical expertise.
- Digital modernization through implementation of Epic – an electronic health record system that is compatible with other major RI and New England health care systems.
- Deployment of advanced digital and Artificial Intelligence-enabled clinical tools to accelerate quality, enhance patient experience, and personalized medicine through accessible genomics and expansive databases of best-in-class patient treatment protocols, allowing providers and nursing staff to more fully focus on the patient.
- Significant long-term capital infusion to assure modern facilities equipped with state-of-the-art technology.
- The assurances that all existing and future funds raised in South County will remain in South County permanently.

Many of these benefits are unique to this particular opportunity – a model that is focused on bringing long-term resources, digital modernization, and clinical innovation to South County Health – without changing our non-profit status or local governance. As with all of our partnership conversations, discussions are contemplated through the lens of benefit to the community, and South County Health will conduct a comprehensive evaluation of this transformational opportunity over the next 120 days to properly assess its potential impact on our patients, caregivers, and community. The parties have executed confidentiality agreements to facilitate the thorough diligence process, but are committed to providing further details as they become available. ❖

Rhode Island submits application to CMS' Rural Health Transformation Program

PROVIDENCE — Governor **DAN McKEE** recently announced that Rhode Island has formally submitted its application to the Centers for Medicare & Medicaid Services (CMS) for funding under the Rural Health Transformation Program (RHTP). This federal program was designed to strengthen and modernize health care in rural communities.

Built on extensive community feedback, the Governor's application outlines a comprehensive, strategic framework that advances his RI 2030 Plan's goal to expand access to high-quality, low-cost care and address the unique health challenges facing Rhode Island's 18 rural communities: Burrillville, North Smithfield, Foster, Glocester, Scituate, and Smithfield in Providence County; East Greenwich and West Greenwich in Kent County; Charlestown, Exeter, Hopkinton, New Shoreham, Richmond, and Westerly in Washington County; and Jamestown, Little Compton, Portsmouth, and Tiverton in Newport County.

The proposal includes several key strategies:

- **Building Integrated Community Care:** Integrated, community-based care models to improve chronic disease management, preventive care, and behavioral health services through local providers, community learning centers, and other trusted rural community institutions.
- **Expanding Access to Care Through Federally Qualified Health Centers (FQHCs):** Improving access to primary care, behavioral health, and dental services for rural residents through FQHCs serving as clinical anchors.
- **Investing in Mobile Health and EMS:** Mobile health services, a statewide tele-dentistry triage system, and major EMS modernization investments to expand access to coordinated, affordable care in rural communities.
- **Supporting Local Health Systems:** Investments designed to meet the distinct health needs of Block Island and the Narragansett Indian Tribe, strengthening local care systems and ensuring services reflect each community's priorities and culture.
- **Combating the Opioid Crisis and Expanding Behavioral Health:** Strengthen behavioral health capacity by launching crisis stabilization facilities and recovery centers so residents in small and remote communities hit hard by the opioid epidemic can receive 24/7 community-based support closer to home.
- **Growing the Health Workforce:** Workforce development, including new clinical training placements, mentorships, and education-to-employment pathways in high-demand health care fields to better serve rural patients.
- **Delivering Hospital Care at Home:** Expanding Hospital at Home programs that allow patients across the state, especially those in rural communities, to safely receive hospital-level care in their own homes – improving outcomes, lowering costs, and keeping families together during recovery.
- **Advancing Value-Based Care:** Investments in value-based payment models that reward quality and outcomes rather than volume of services, helping primary care practices, community health centers, hospitals, and local providers deliver more coordinated and preventive care – particularly targeting patients across rural towns.
- **Modernizing Health IT:** Health IT modernization grants to give providers the digital tools needed to expand telehealth, improve data connectivity, leverage AI for care coordination, and participate in value-based care programs to better serve residents across Rhode Island's 18 rural towns.

The application was developed through a coordinated effort within the McKee Administration led by the Executive Office of Health and Human Services (EOHHS) in partnership with the Department of Health (RIDOH)'s Office of Primary Care and Rural Health and multiple state agencies, with engagement from hospitals, primary care providers, behavioral health agencies, municipal leaders, and the Narragansett Indian Tribe. The process also incorporated extensive public input through a statewide rural health survey, which captured the experiences and priorities of rural residents and providers, along with a series of community listening sessions held across northern and southern Rhode Island and on Block Island.

"The Rural Health Transformation Program gives Rhode Island the opportunity to build a stronger, more sustainable health care system," Governor McKee said. "My Administration is fully committed to working with CMS and our federal partners to make this vision a reality."

The Governor's letter to CMS can be found here. The application program narrative can be found here.

The application included letters of support from the Block Island Health Center, Care Transformation Collaborative RI, the Hospital Association of Rhode Island, Narragansett Indian Health Center, New England Rural Health Association, the Rhode Island Health Center Association, the Rhode Island Medical Society, RI Chapter of the American Academy of Pediatrics, Mental Health Association of RI, RI Dental Association, Tufts University School of Medicine, and the League of Cities and Towns.

About RHTP

For the RHTP competitive grant, each state was required to apply for an award of $1 billion, with the understanding that funding would not be awarded evenly across states. Rather, it would be awarded through a CMS formula based on each state's unique situation and rural characteristics – such as population size and health care access indicators. States retain the discretion to scale or phase their proposals based on the final award amount while maintaining alignment with the program's core objectives and outcomes.

The funds will be distributed to states with approved transformation plans through two separate allocations:

- The first $25 billion will be divided evenly among all participating states with CMS-approved plans. Based on this structure, Rhode Island's estimated share would be approximately $100 million per year for five years.
- The remaining $25 billion will be distributed competitively over the same period based on criteria such as rural population size, the number and condition of rural health facilities, and other state-specific factors identified by CMS. ❖

Westerly Hospital buries time capsule to be opened in 2075

WESTERLY — Westerly Hospital buried a time capsule in its Healing Garden in November to honor the hospital's 100th anniversary and preserve its legacy for future generations.

"This time capsule is a symbol of our enduring commitment to the people of Westerly and the surrounding region," said hospital President **RICH LISITANO**. "As we look back on a century of compassionate care, we also look forward to the future with optimism and dedication. We hope that when this capsule is opened in 2075, it will reflect the strength of our community and the progress of health care."

Inside the capsule are messages from hospital employees and leadership to those who will open it in 2075, marking Westerly Hospital's 150th anniversary. Other historical artifacts include a gavel used by the first Westerly Hospital Board of Trustees, a copy of the history of Florence Nightingale's cap which was donated to the hospital, a history of the hospital printed in 1950 – the 25th anniversary of the hospital; a glass commemorating the hospital's 100th anniversary and a challenge coin distributed to employees recognizing the centennial anniversary. Many documents such as annual reports, employee newsletters, photos, videos, have been shared to a USB flash drive.

Westerly Hospital partnered with the Community College of Rhode Island (CCRI) maritime sheet metal program, taught at the Westerly Education Center, to design and construct the custom capsule – a collaboration that celebrates both the hospital's century of care and the craftsmanship of local students.

The capsule features a two-layer design:

- Inner aluminum box (13" x 13" x 8.5") filled with mementos from the hospital's past and present. Many hospital employees and board members engraved their names on the lid of the inner box.
- Outer steel container (16" x 16") that will protect the inner box when sealed and buried in the Healing Garden.

Faculty at the Westerly Education Center unveil the time capsule design created by welding students.

"Partnering with Westerly Hospital to design and build this time capsule at the Westerly Education Center was an exciting and meaningful project – made even more special knowing it will stay in our own community," said Christopher Maher, maritime program coordinator, Workforce Development, CCRI. "CCRI is proud to give students hands-on opportunities to refine their metalworking skills, and while our projects usually focus on strength and design, this one challenged us to work with something new: time."

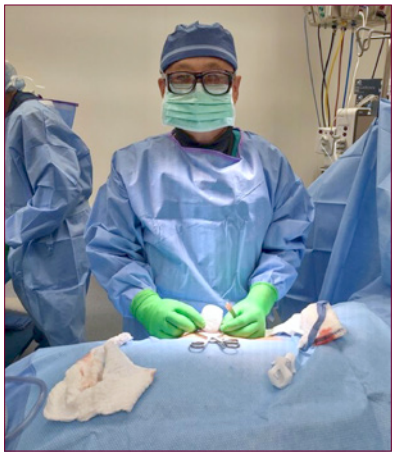
"The Office of the Postsecondary Commissioner is delighted to showcase the talent of students enrolled in Electric Boat's sheet metal trades class here at our Westerly Education Center," said Tom Pearce, director of the Westerly Education Center. "In addition to sharpening their new skills, the students built a time capsule that will illuminate for future generations how vital Westerly Hospital is for the community."

This initiative follows Westerly Hospital's centennial celebration this past summer, which unveiled a historical timeline in the hospital's main lobby. Titled "100 Years of Milestones," the display chronicles Westerly Hospital's century-long commitment to compassionate care, from its founding on August 17, 1925, to its current affiliation with Yale New Haven Health. ❖

The time capsule was buried in the Healing Garden in November to honor the hospital's 100th anniversary and preserve its legacy. [PHOTOS: YALE NEW HAVEN HEALTH]

University Orthopedics' S. Chris Tian, MD, becomes first in RI to implant closed-loop spinal cord stimulator

EAST PROVIDENCE — University Orthopedics announced that **S. CHRIS TIAN, MD**, an expert in interventional pain management, recently became the first physician in Rhode Island to successfully implant a Closed-Loop Spinal Cord Stimulator (SCS) – marking a major milestone in the state's advancement of neuromodulation-based pain care.



The landmark procedure was performed on October 27, 2025, at University Orthopedics' East Bay Surgery Center in East Providence and is meant to help patients with chronic spinal or neuropathic pain, including low back pain, sciatica, and peripheral neuropathy, who have exhausted conservative treatments.

The Closed-Loop SCS system represents a new generation of spinal neuromodulation technology. Unlike traditional open-loop stimulators that deliver fixed electrical pulses, closed-loop devices continuously monitor evoked compound action potentials (ECAPs) – the spinal cord's real-time electrical responses to stimulation – and automatically adjust output to maintain consistent neural activation.

This feedback-controlled approach minimizes overstimulation, reduces loss of efficacy during movement or posture changes, and provides more stable, durable pain relief.

"Closed-loop spinal cord stimulation represents the next frontier in neuromodulation," said Dr. Tian. "By tailoring stimulation dynamically to the patient's neural feedback, we can provide safer, more consistent, and longer-lasting pain relief. This technology allows patients to regain control over their lives without the unpredictability often associated with chronic pain."

Clinical Evidence Supporting Closed-Loop SCS

Peer-reviewed studies have demonstrated significant clinical advantages of closed-loop technology over conventional open-loop systems:

- **Superior and sustained pain relief:** Patients experience greater long-term reductions in pain intensity and functional impairment compared to open-loop stimulation.[1]
- **Stable neural activation:** Real-time ECAP feedback maintains consistent spinal cord activation across posture and activity changes.[2]
- **Improved durability and lower reprogramming burden:** Patients require fewer reprogramming sessions and show lower explant rates due to therapy stability.[3]

About the Procedure

The Closed-Loop SCS is a minimally invasive outpatient procedure performed under local anesthesia with sedation. The system delivers targeted electrical pulses to the dorsal columns of the spinal cord to interrupt chronic neuropathic pain signals. It is indicated for patients with chronic intractable pain of the trunk and/or limbs, including failed back surgery syndrome (FBSS), complex regional pain syndrome (CRPS), and post-laminectomy pain. ❖

Sources

(De Ridder et al, Pain Pract. 2022; 22(1): 13–25)
(Kramer et al, J Pain Res. 2021; 14: 2789–2803)
(Mekhail et al, Neuromodulation. 2020; 23(7): 1029–1038)

Miriam Hospital performs Rhode Island's first endoscopic spinal fusion

PROVIDENCE —The Miriam Hospital has become the first hospital in Rhode Island to perform an endoscopic lumbar spinal fusion. Performed by **BRYCE BASQUES, MD**, endoscopic spine fusion offers patients a groundbreaking surgical option that dramatically reduces pain, recovery time, and length of hospital stay compared to traditional spinal fusion techniques.

Endoscopic spinal fusionrepresents a significant evolution in spine surgery. Using a tiny camera and highly specialized instruments, surgeons can complete the same fusion procedure performed in open or minimally invasive surgery, but through far smaller incisions and without cutting through large muscle groups. This results in less tissue trauma, reduced postoperative pain, and a faster return to normal activity.

Patients who undergo endoscopic spinal fusion typically report meaningful differences in their recovery, including smaller incisions, less blood loss, dramatically reduced postoperative discomfort, and fewer days away from work or daily life. While traditional fusion may require several days of hospitalization, many endoscopic fusion patients can safely return home on the day of surgery.

"This is a major step forward for spine surgery in the state of Rhode Island," said Dr. Basques. "Endoscopic spinal fusion allows us to perform a highly complex procedure through minimal incisions, avoiding the muscle disruption that often makes recovery from traditional fusion so challenging. Being the first in Rhode Island to offer this level of innovation reflects our team's deep expertise and commitment to bringing the most advanced, least invasive care to our patients." ❖

University Gastroenterology acquires advanced endoscopy system to help improve patient care

PROVIDENCE — University Gastroenterology and University Endoscopy Group announced they have invested in a new advanced endoscopy system to help improve the detection and treatment of gastrointestinal disorders.

The Olympus EVIS X1™ endoscopy system provides a combination of diagnostic and therapeutic innovations to help improve patient care and streamline endoscopic procedures.

"In my 20 years at UGI/UEG, our mission has not changed: to utilize the best and latest technologies to provide outstanding GI care for the people in the state of RI. With the rise of GI cancers, this mission remains vital. By implementing this new Olympus technology in our endoscopy centers, we continue to fulfill this mission in the comfort and ease of our outpatient setting," said **WILLIAM CHEN, MD**, University Endoscopy Group Chair.

Along with maintaining a healthy lifestyle, regular screenings like colonoscopy can help prevent CRC from developing by finding and removing lesions and slow-growing polyps before they have the chance to develop into cancer.[1] Technology associated with the EVIS X1™ endoscopy system, such as Texture and Color Enhancement Imaging (TXI™) visualization, can help physicians enhance the quality of preventive screenings.

TXI™ is designed to increase the visibility of potential lesions and polyps by enhancing image color and texture during an endoscopic screening.[2]

The EVIS X1™ endoscopy system also features endoscopes with Extended Depth of Field (EDOF™) technology, currently Olympus' most advanced imaging technology.

EDOF technology creates an image in total focus by using two prisms to split light entering the endoscope lens into two separate beams with near- and far-focused images. Those beams are then projected simultaneously onto an image sensor, combining them into one image with a wide depth of field, providing improved visibility and less blurring.[3]

The EVIS X1 system also offers compatible endoscopes that feature lighter handles and easy-to-reach control knobs and switches compared to previous-generation Olympus endoscopes. These changes are designed to make maneuverability easy for physicians.

Along with TXI™ technology, other observation modes associated with the EVIS X1™ endoscopy system include:

- **Red Dichromatic Imaging (RDI™) Technology:** Designed to enhance the visibility of deep blood vessels and bleeding points.[2]
- **Brightness Adjustment Imaging with Maintenance of Contrast (BAI-MAC™) Technology:** Designed to correct the brightness levels in dark areas of the endoscopic image, while maintaining the brightness of lighter areas, to increase visibility of distant areas.[4]
- **Narrow Band Imaging™ (NBI™) Technology:** Designed to enhance visual observation of mucosal and vascular patterns by utilizing specific blue and green wavelengths absorbed by hemoglobin.[2]

TXI, RDI, BAI-MAC, and NBI technologies are not intended to replace histopathological sampling as a means of diagnosis. These are adjunctive tools for endoscopic examination that can be used to supplement Olympus white light imaging. ❖

References

1. American Cancer Society, "Can Colorectal Cancer Be Prevented?" Rev. April 25
2. Data on file with Olympus (DC00489968)
3. Data on file with Olympus (DC00493386, DC00433276, DC00510434 and DC00567392)
4. Data on file with Olympus (DC00436067)

Appointments

Matthew Akelman, MD, joins University Orthopedics

EAST PROVIDENCE — University Orthopedics recently announced the addition of **MATTHEW AKELMAN, MD**, a fellowship-trained hand-to-shoulder surgeon, to its team of specialists. Dr. Akelman also serves as a Clinical Assistant Professor of Orthopedic Surgery at the Warren Alpert Medical School of Brown University.

Dr. Akelman's practice encompasses the entire upper extremity – from fingertip to shoulder – caring for patients with:

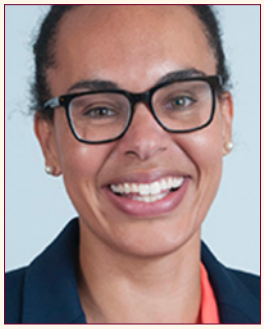
- Nerve compression conditions, such as carpal and cubital tunnel syndromes
- Muscle and tendon disorders, including rotator-cuff tears and trigger fingers
- Arthritis of the shoulder, elbow, wrist, and hand
- Traumatic injuries and fractures

A Rhode Island native, Dr. Akelman earned his undergraduate degree at Brown University, his medical degree at the Medical University of South Carolina and completed his orthopedic surgery residency at Wake Forest University, where he was honored with the Frank E. Pollock Award for extraordinary clinical proficiency. He then pursued fellowship training in Hand & Upper Extremity Surgery at Duke University, focusing on complex reconstruction, arthroscopy, and arthroplasty.

"It is a privilege to return to Rhode Island to care for the community that has given so much to me," Dr. Akelman said. "My goal is to provide patients with the highest level of orthopedic care, while ensuring that every decision is made together with their values and goals in mind."

In addition to his clinical practice, Dr. Akelman is an active clinician-scientist whose peer-reviewed research on upper extremity disorders has been published and presented at national meetings. Dr. Akelman will be seeing patients at University Orthopedics locations in Cranston, Cumberland, and East Providence at Kettle Point. ❖

Theresa Williamson, MD, MPH, appointed to key neurosurgery leadership positions at Brown University Health



PROVIDENCE — Brown University Health recently announced the appointment of **THERESA WILLIAMSON, MD, MPH**, as Director of the Center for Minimally Invasive and Endoscopic Spinal Surgery and Director of the Center for Innovative Neurotechnology for Neural Repair (CINNR).

Dr. Williamson, a neurosurgeon and bioethicist, specializes in spine disorders as well as brain and spinal trauma. Her appointment reflects Brown University Health's continued commitment to advancing cutting-edge care and equitable access to neurotechnology for patients across the region.

Prior to joining Brown Health, Dr. Williamson served as Chair of the Surgical Ethics Working Group at the Harvard Medical School Center for Bioethics, Director of the Neurotech Justice Accelerator at Mass General Brigham, and Director of the Minimally Invasive Spine Service at Massachusetts General Hospital (MGH). In a joint effort between Brown University Health and MGH, Dr. Williamson will continue to lead the Neurotech Justice Accelerator, a Dana Center Initiative, fostering collaboration between clinical care, bioethics, and technology innovation.

Dr. Williamson's extensive background in both neurosurgery and bioethics will strengthen the research and innovation underway at CINNR, where her leadership will focus on improving access to neurotechnological advances for patients in need.

"My goal is to make sure that all patients have access to neurotechnologies and procedures that can improve their quality of life," said Dr. Williamson. "To do this, we must be able to both connect with individuals and improve systems of care."

Her research explores how patients across diverse communities make decisions regarding neurosurgical interventions, aiming to deliver precision technologies that are both cost-effective and outcome driven. Dr. Williamson has also mentored more than 50 undergraduate and medical students conducting research at the intersection of neuroscience, ethics, and society.

"I see CINNR as a space where we can bring patients of all backgrounds together with technological expertise and innovation to find new ways to treat spinal cord injury, pain, and neurotrauma," Dr. Williamson added.

"We are delighted to welcome Dr. Williamson to Brown University Health and the Department of Neurosurgery," said **ZIYA L. GOKASLAN, MD, FAANS, FACS**, Chair of the Department of Neurosurgery at The Warren Alpert Medical School of Brown University and Neurosurgeon-in-Chief at Brown University Health. "Her expertise in minimally invasive and endoscopic spinal surgery, combined with her nationally recognized leadership in surgical ethics and equitable access to emerging neurotechnologies, brings a unique and timely perspective to our clinical and research missions. Dr. Williamson's commitment to ensuring that the most advanced treatments are available to all patients aligns closely with our values and priorities as an academic health system. We look forward to the impact her vision and energy will have on our spine program, CINNR, and the communities we serve." ❖

Appointments

Newport Hospital names Community Advisory Panel members to help shape future of birthing center

NEWPORT — Newport Hospital has named the members of the Community Advisory Panel (CAP) who will assist in evaluating the future of the Noreen Stonor Drexel Birthing Center. The panel includes patients, representatives from philanthropic and community organizations, employees, and maternal health experts who will offer guidance and recommendations throughout the review process.

The 12 panel participants are:

Lori Allan, RN – The Noreen Stonor Drexel Birthing Center

Carol Bazarsky – Newport Hospital Foundation Board

Emily Blosser, MD – Obstetrician-Gynecologist, Medical Director, Newport Women's Health

Alex Hammer Ducas – Social Enterprise Greenhouse

Rebecca Homer, RN – The Noreen Stonor Drexel Birthing Center

Rebecca Hurd, CNA, CLC – The Noreen Stonor Drexel Birthing Center

Elizabeth Lynn – van Beuren Charitable Foundation

Thomas McGue, MD – Newport Hospital Foundation Board, Former Newport Hospital Chief Medical Officer

Latisha Michel, CLC, CBE, CHW – Certified Perinatal Doula, Ready Set Latch Go, LLC

Sydney Ormerod – Women's Resource Center, Newport Health Equity Zone (HEZ)

Alexandra Quick, PT, DPT – Mae Physiotherapy

Methodius Tuuli, MD – Chief of Obstetrics and Gynecology, Women & Infants Hospital

"We are grateful to the members of the panel for generously agreeing to bring their time, experience, and perspectives to an important dialogue about the future of maternity care in our region" said **TENNY THOMAS, MD**, President and Chief Medical Officer of Newport Hospital. "We look forward to working collaboratively with the panel. Their valuable community input is vital as we plan for the future of the Noreen Stonor Drexel Birthing Center." ❖

Recognition

Hasbro Children's named to *Newsweek's* List of America's Best Children's Hospitals 2025

PROVIDENCE — Hasbro Children's, part of the Brown University Health health system, has been listed among *Newsweek's* list of America's Best Children's Hospitals 2025. The award is presented by *Newsweek* and Statista Inc., a leading market and consumer data portal.

The ranking awards the best hospitals in eight pediatric subspecialties: cardiology and cardiac surgery, endocrinology, gastroenterology and gastrointestinal surgery, neonatology, neurology and neurosurgery, oncology, orthopedics and pulmonology. The underlying data analysis is based on four data sources:

1. Nationwide Online Survey: Participants with knowledge about pediatric care (e.g., general and specialized pediatricians and nurses) were asked to recommend leading children's hospitals in the U.S. The survey was also promoted on newsweek.com.

2. Hospital Quality Metrics: Hospital quality metrics with a focus on indicators relevant to the respective subspecialties and accreditations/certifications were considered.

3. Patient Satisfaction: Evaluations from Google were researched for each children's hospital as a proxy for patient satisfaction with the hospital.

4. Statista Patient Reported Outcome Measures (PROMS) Implementation Survey: Voluntary PROMS implementation survey to determine the status quo of PROMs implementation, audits and reporting of data.

"Hasbro Children's is honored to be recognized on Newsweek's list of America's Best Children's Hospitals for the outstanding work and high-quality care provided to our patients every day. Our unwavering dedication to the best interests of our patients and community while ensuring the highest standards of patient safety truly makes a difference in the lives of our patients and families," said **SARAH FROST**, chief of hospital operations and president of Rhode Island Hospital and Hasbro Children's Hospital. ❖

Recognition

Reps. Baginski, Hopkins, Sen. Valverde and Care New England celebrate our veterans

PROVIDENCE — On Nov. 7, Reps. **JACQUELYN M. BAGINSKI** (D-Dist. 17, Cranston) and **MARIE HOPKINS** (R-Dist. 21, Warwick), Sen. **BRIDGET VALVERDE** (D-Dist. 35, North Kingstown, East Greenwich, South Kingstown) and Care New England held a special ceremony at the VNA of Care New England to honor the significant contributions and sacrifices made by Care England colleagues who have served and continue to serve in the military.

Sen. **Bridget Valverde**, third from the left, Rep. **Jacquelyn M. Baginski**, fourth from the left, Rep. **Marie Hopkins,** fifth from the left, Congressman **Gabe Amo**, sixth from the left, and **Kasim Yarn**, Director of the RI Office of Veteran Services, seventh from the left, at the Care New England veterans celebration. [STATE HOUSE PHOTO]

"In addition to the tremendous responsibility our team shoulders every day, delivering high-quality, compassionate care to the patients and families in our community, our colleagues in service have also accepted the extraordinary responsibility of serving our country," said **MICHAEL WAGNER, MD**, president and CEO of Care New England Health System. "We are deeply grateful for our veterans who remind us every day what true dedication looks like."

Care New England has previously honored veteran colleagues at Kent Hospital and Women & Infants Hospital. However, this year, the event takes place at the VNA of Care New England because of an important step the VNA is taking with veterans through our partnership with the We Honor Veterans program.

"Care New England and our VNA team are deeply committed to ensuring that every veteran receives the respect and compassionate care they deserve, especially as they are near the end of life," said **JANE PIKE-BENTON**, president, VNA of Care New England. "This initiative allows us to better understand the unique experiences and needs of those who served, honoring their courage through compassionate listening and grateful acknowledgment of their life stories as a focus of the care we provide." ❖

Four Brown University Health hospitals receive 'A' grade for patient safety from Leapfrog Group

PROVIDENCE — Four hospitals within the Brown University Health system received an 'A' Hospital Safety Grade from The Leapfrog Group, a national nonprofit upholding the standard of patient safety in hospitals and ambulatory surgery centers. The four hospitals gaining this distinction in patient safety are:

- Rhode Island Hospital in Providence
- The Miriam Hospital in Providence
- Newport Hospital in Newport
- Saint Anne's Hospital in Fall River

"The teams at Rhode Island, The Miriam, Newport, and Saint Anne's hospitals, showcase Brown University Health's commitment to delivering outstanding patient care across our facilities," said **SARAH FROST**, chief of hospital operations and president of Rhode Island Hospital and Hasbro Children's Hospital. "I couldn't be more grateful to our amazing staff - their teamwork, skill, and unwavering focus on patient safety and outcomes are the driving force behind this national recognition."

The Leapfrog Hospital Safety Grade is the only hospital ratings program based exclusively on hospital prevention of medical errors and harm to patients. The grading system is peer-reviewed, fully transparent and free to the public. Grades are updated twice annually, in the fall and spring. ❖

Westerly Hospital earns 'A' safety grade from Leapfrog Group

WESTERLY — Westerly Hospital has earned an "A" Hospital Safety Grade from The Leapfrog Group, an independent national nonprofit watchdog focused on patient safety, for the Fall 2025 report.

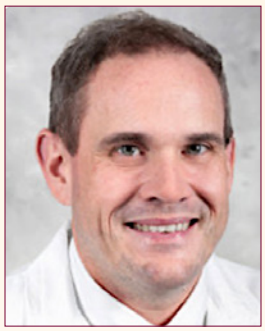
The Leapfrog Hospital Safety Grade rates the safety of general hospitals in the United States. The grade is based on over 30 measures, including the number of errors, accidents, injuries and infections, as well as the hospital's systems to prevent them. The program is peer-reviewed, fully transparent and free to the public. Grades are updated twice annually, in the fall and spring.

"At Westerly Hospital, patient safety is our top priority and the foundation of every interaction, decision and care plan," said **RICHARD LISITANO**, president of Westerly Hospital. "I'm proud to recognize our dedicated team for their exceptional performance and unwavering commitment to delivering safe, high-quality care. Their collaboration and focus continue to make a meaningful difference in the lives of our patients."

"This recognition is a testament to the dedication and excellence of our entire team at Westerly Hospital," said **OLIVER MAYORGA, MD**, chief medical officer. "As a high reliability organization, we are committed to consistently delivering safe, efficient and high-quality care. This achievement reflects our unwavering focus on patient safety and clinical excellence." ❖

Recognition

Sean Monaghan, MD, recipient of the 2025 Bruce Selya Award awarded at Brown University Health 32nd Annual Research Day



PROVIDENCE — **SEAN MONAGHAN, MD**, is Brown University Health's 2025 Bruce Selya Award recipient. The annual award honors rising stars in research who demonstrate outstanding commitment to academic medicine. Dr. Monaghan was recognized for his work in "Sepsis and Innovation."

Dr. Monaghan is a board-certified surgeon at Rhode Island and The Miriam hospitals, associate professor of surgery at Brown University, a member of the Division of Trauma and Surgical Critical Care, and vice chair of research for the Department of Surgery.

The award was presented at Brown Health's 32nd Annual Research Day at Rhode Island Hospital on November 7th, which celebrates the systems' vibrant research community and its commitment to advancing science, education, and clinical excellence across the region.

"Research and education are central to our mission, and our teams have done a remarkable job growing and strengthening that mission through the most challenging of times," said **JOHN FERNANDEZ**, CEO and President, Brown University Health. "Brown Health also continues to play a critical role in training the next generation of academic and scientific leaders."

Over the past year, Brown University Health achieved a record $160 million in federal research funding, marking the highest level in its history. Notable new awards include $12 million for the COBRE on Pathogens program, underscoring the health system's culture of scientific curiosity and collaboration.

Reflecting the institution's commitment to translating research into real-world impact, Brown University Health announced new nationally scoped clinical trials in cancer prevention launching next year. These initiatives will build on an already robust clinical trials portfolio that spans nearly every department.

In addition, planning has begun for a new clinical research building on the Bradley campus, supported by a recently awarded National Institute of Health (NIH) C06 grant of $8 million. The facility will serve as a national center of excellence in pediatric and adolescent behavioral medicine.

SUZANNE PHELAN, PhD, professor of kinesiology and public health and director of women's health at California Polytechnic State University, delivered this year's keynote presentation, "Lifestyle Interventions for Cardiometabolic Health: From Preconception Through Pregnancy, and Postpartum." Dr. Phelan completed her postdoctoral fellowship in psychiatry and human behavior at The Miriam Hospital and The Warren Alpert Medical School of Brown University. ❖

Obituaries

WILLIAM H. GRAFF, MD, 94, of Dartmouth, Massachusetts, passed away peacefully on November 3, 2025. He attended Bowdoin College, where he played football and made lifelong friendships. At Cornell Medical School, he met the love of his life, Anne Patterson, a nursing student from Michigan. Bill and Anne were married in 1956, and they were happily married for 65 years.

After Cornell, he trained at the Dartmouth/Hitchcock Hospital in Hanover, served in the Army Medical Corps, and was a teaching fellow at the University of Rochester/Strong Memorial Hospital before he relocated to Massachusetts to join the Truesdale Hospital and Clinic.

He was an attending at the Truesdale Hospital, where he became Chief of Medicine and Vice President of the Medical Staff, and then joined the Charlton Hospital. He made home visits, sat at bedsides, and eased the fears of many coping with terminal illness. He will be remembered for his dedication to his patients, his deep respect for his co-workers, and his ability to find hope in the everyday.

He is survived by his four children, Kathryn G. Low (Bill) of Bristol, Rhode Island; Timothy H. Graff (Mary Martin) of Barrington, New Hampshire; William R. Graff of Los Angeles, California, and Marjorie P. Graff of Bristol, Rhode Island, 10 grandchildren, and one great-granddaughter. He was predeceased by his wife, Anne, in 2021.

The family is grateful for the companionship and support he found at the Atria in Portsmouth after Anne's death, and for his caretakers over the last few months as his health declined. When asked in the last few weeks about the key to his longevity, he responded without hesitation: "Love!"

In his memory, donations can be made to the Southcoast Health Home Compassion Fund. For online tributes, please visit www.Waring-Sullivan.com. ❖

GEORGE "AL" KUROSE, MD, MBA, formerly of East Greenwich, RI, passed away peacefully at home, surrounded by his loving family, on October 30, 2025, at the age of 64. He faced his battle with pancreatic cancer with the same determination and grace that defined his remarkable life.

Dr. Kurose earned a Bachelor of Arts degree from Wesleyan University and his Doctor of Medicine from Washington University School of Medicine, as well as an Executive Master of Business Administration from Yale University School of Management.

He dedicated the first 20 years of his career to his patients as an internal medicine physician with a private practice in East Providence. He was known for his dedication to his patients. In the latter half of his career, Dr. Kurose channeled his passion for clinical excellence into leadership, serving as the President and Chief Executive Officer of Coastal Medical. There, he drove the organization's evolution into an Accountable Care Organization (ACO) that was nationally recognized for its best-in-class performance on quality and cost.

His leadership continued at Lifespan as the Senior Vice President of Primary Care and Population Health. Most recently, he served as the President and Chief Operating Officer of Nuvance Health Medical Practice. His expertise in value-based care and healthcare reform led him to testify before the U.S. Senate HELP and Budget Committees.

In addition to his professional roles, he was a unifying community leader. He served on the board of the Rhode Island Foundation, including a term as Board Chair. He also served as Co-Chair of the RI Cost Trend Steering Committee.

Integrity and honor defined his character. He embodied the values of empathy, mindfulness, presence, and hard work. He was raised in Norwalk, CT, where he met his loving wife, Sharon, with whom he had been married for 41 years. Together, they built a beautiful life in Rhode Island, characterized by adventure, love, and the joy of family as they raised their three children. As a father, he was compassionate, fair, and ever the teacher, guiding them through life with patience and wisdom. In addition to his wife, Sharon, he is survived by his three children, Ben Kurose and his fiancée, Samantha Browne-Walters, Alex Kurose and his wife, Heather Loring, Megan Kurose and her husband, Justin Culshaw, his brothers, Jim Kurose and Ned Kurose, and numerous nieces and nephews.

He loved spending his free time boating, gardening, and enjoying various outdoor activities and sports. He was known for his unwavering commitment to fitness, exemplified by his personal achievement as a two-time Ironman finisher.

The family requests that, in his memory, donations be made to a charitable fund established in his honor to carry forward his legacy of making a positive impact for patients in healthcare. Donations can be made to The G. Alan Kurose, MD Healthcare Impact Fund at the Rhode Island Foundation via the following link: www.rifoundation.org/gakurose