Supplemental Information

Evidence-based recommendations for energy intake in pregnant women with obesity

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Table S1. Metabolic Biomarker Early and Late in Pregnancy of Women with Obesity

	Early Pregnancy (14.9±0.1 weeks)				Late Pregnancy (35.9±0.1 weeks)				
	INA (n=10)	**REC (n=8)**	**EXS (n=36)**	**Group**	**INA (n=10)**	**REC (n=8)**	**EXS (n=36)**	**Time**	**Group**
Fasting Plasma Biomarkers									
Glucose, *mg/dL*	92±3	90±4	87±1	0.21	87±4	90±4	85±1	0.03	0.27
Insulin, *uU/mL*	19.1±2.5a	15.4±3.0[a,b]	12.6±1.1b	0.04	19.7±3.1	21.8±4.0	17.8±1.3	<0.001	0.18
HOMA-IR, *AU*	4.4±0.6a	3.4±0.7[a,b]	2.7±0.3b	0.03	4.4±0.7	5.0±1.1	3.8±0.3	<0.001	0.14
Triiodothyronine/T3, *ng/dL*	212±15[a]	168±7[b]	169±7[b]	0.02	191±12	167±11	172±7	0.61	0.77
Thyroxine/T4, *µg/dL*	9.8±0.5	10.4±0.5	9.8±0.3	0.67	10.1±0.4[a]	10.2±0.5[a,b]	9.0±0.3[b]	0.005	0.03
Thyroid-Stimulating Hormone, *uIU/mL*	1.8±0.3	1.2±0.3	1.8±0.2	0.27	2.0±0.3	1.7±0.5	2.0±0.2	0.05	0.96
Leptin, *ng/mL*	125±19	126±19	112±7	0.60	116±28[a]	112±14[a]	131±7[b]	0.03	0.007
Cholecystokinine, *pmol/L*	271±36	218±26	209±14	0.17	332±47	385±61	334±19	<0.001	0.10
Ghrelin, *pg/mL*	433±23	418±39	453±30	0.83	373±32	403±38	377±19	<0.001	0.22
Peptide YY, *pg/mL*	79±7	81±6	77±4	0.93	84±7	86±5	79±4	0.19	0.79
Urinary Biomarkers									
Creatinine, *mg/dL*	115±11	80±10	85±7	0.10	96±18	73±7	83±7	0.20	0.76
Epinephrine, *nmol/L*	14.3±2.3	7.5±1.1	11.4±1.1	0.10	12.0±2.3	7.2±0.6	8.3±0.9	<0.001	0.34
Norepinephrine, *nmol/L*	217±36[a]	116±22[b]	144±15[b]	0.04	183±38	100±15	113±12	0.006	0.29
Respiratory Quotient									
Sleep	0.85±0.015	0.85±0.013	0.85±0.007	0.99	0.82±0.009[a]	0.85±0.014[a,b]	0.86±0.007[b]	0.78	0.03
Rest	0.88±0.012	0.89±0.016	0.87±0.009	0.60	0.84±0.012	0.87±0.015	0.87±0.007	0.22	0.07

Data are presented as Mean±SEM. According to 2009 Institute of Medicine guidelines, weight gain was classified as inadequate (INA, <170g/week), recommended (REC, ≥170 and <270 g/week), and excessive (EXS, ≥270g/week). HOMA-IR, homeostatic model assessment of insulin resistance, HOMA-IR=glucose[mg/dL]*insulin[uU/mL]/405. Group present the P-values for the comparisons in early pregnancy, and for the change over time (late pregnancy), with the initial value used as covariate; and Time presents the P-values for the main effect of time, from early to late pregnancy. P≤0.05 is considered statistically significant; shared letters indicate no significant differences between groups in posthoc comparison.

Table S2. Energy Expenditure and Physical Activity Early and Late in Pregnancy of Women with Obesity

	Early Pregnancy (14.9±0.1 weeks)				Late Pregnancy (35.9±0.1 weeks)				
	INA (n=10*)	**REC (n=8)**	**EXS (n=36#)**	**Group**	**INA (n=10*)**	**REC (n=8)**	**EXS (n=36#)**	**Time**	**Group**
Energy Expenditure									
Total Daily EE, *kcal/d*	2719±142	2664±119	2563±53	0.41	2966±156	2984±121	2882±54	<0.001	0.92
Sleeping EE, *kcal/d*	1907±104	1688±77	1648±33	0.009	2125±88[a]	2081±102[b]	1975±36[a,b]	<0.001	<0.05
Adaptive Thermogenesis, *kcal/d*					108±36[a]	248±47[b]	135±14[a]	<0.001	0.008
Physical Activity									
Physical Activity Level	1.401±0.053	1.515±0.054	1.519±0.030	0.19	1.301±0.045	1.449±0.067	1.454±0.031	0.004	0.20
Activity-related EE, *kcal/d*	504±86	629±74	612±40	0.44	382±98[a]	604±104[a]	596±48[a]	0.35	0.01
Activity-related EE, *%TDEE*	18.0±2.2	23.4±2.6	23.4±1.2	0.13	12.4±2.8	20.0±3.2	20.3±1.5	0.003	0.18
Activity-related EE, Adjusted, *kcal/d*	2508±76	2710±82	2661±37	0.12	2719±71	2840±120	2862±49	<0.001	0.78
Activity-related EE, Residual, *kcal/d*					-61±99	-143±118	-71±45	0.06	0.79
Mean Amplitude Deviation, *mg*	46.6±3.1	56.4±2.3	53.8±1.7	0.07	41.4±4.0	52.9±3.8	47.5±1.9	0.004	0.40

Data are presented as Mean±SEM. According to 2009 Institute of Medicine guidelines, weight gain was classified as inadequate (INA, <170g/week), recommended (REC, ≥170 and <270 g/week), and excessive (EXS, ≥270g/week). EE, energy expenditure, TDEE, total daily EE. Adaptive thermogenesis describes the increase in sleeping EE that is not explained by the increase in body weight, and was calculated as measured minus adjusted energy expenditure minus residual sleeping energy expenditure early in pregnancy; Physical Activity Level=TDEE/RMR; Activity-related EE, kcal/d = 0.9TDEE-RMR; Activity-related EE, %TDEE = Activity-related EE [kcal/d]/TDEE; Adjusted and Residual Activity EE were calculated as function of TDEE=a+b*SleepEE; Activity-related EE, residual = TDEE, measured - TDEE, adjusted - Activity-related EE, residual (early pregnancy). Group present the P-values for the comparisons in early pregnancy, and for the change over time (late pregnancy), with the initial value used as covariate; and Time presents the P-values for the main effect of time, from early to late pregnancy. P≤0.05 is considered statistically significant; shared letters indicate no significant differences between groups in posthoc comparison. *Sleeping EE, adaptive thermogenesis and physical activity was only available in 9 patients; #Sleeping EE, adaptive thermogenesis and physical activity was only available in 33 patients.

Table S3. Dietary Intake Early and Late in Pregnancy of Women with Obesity

	Early Pregnancy (14.9±0.1 weeks)				Late Pregnancy (35.9±0.1 weeks)				
	INA (n=5)	REC (n=5)	EXS (n=29)	Group	INA (n=5)	REC (n=5)	EXS (n=29)	Time	Group
Energy Intake, Self-report, *kcal/d*	2052±118	2319±248	2114±54	0.61	2333±131	2352±170	2233±72	0.05	0.77
Reporting Accuracy, *% of TDEE*	84.3±7.2	86.1±5.3	83.9±1.6	0.88	89.4±5.4	80.3±2.8	78.4±2.2	0.03	0.14
Protein, *% of Energy Intake*	18.9±5.4	16.3±1.6	15.3±0.7	0.19	13.7±1.4	16.1±1.7	15.3±0.8	0.28	0.41
Fat, *% of Energy Intake*	34.0±2.5	38.0±2.6	38.1±0.8	0.20	34.6±2.5	39.6±2.7	38.3±1.1	0.69	0.35
Carbohydrate, *% of Energy Intake*	48.2±5.5	46.6±3.8	47.6±1.3	0.57	52.7±3.7	44.9±3.6	47.4±1.6	0.87	0.36
Healthy Eating Index 2015									
Healthy Eating Index, *AU*	42.9±4.9	47.4±4.0	47.1±1.9	0.67	45.3±4.9	43.4±2.3	47.2±1.6	0.95	0.53
Total Fruits, *AU*	1.4±0.6	2.0±0.6	1.8±0.3	0.60	1.9±0.9	1.2±0.4	1.5±0.3	0.22	0.55
Whole Fruits, *AU*	1.3±0.8	2.0±0.5	1.6±0.3	0.49	1.6±0.9	2.1±0.7	1.5±0.3	0.86	0.82
Total Vegetables, *AU*	3.0±0.6	3.3±0.3	3.1±0.2	0.19	2.4±0.6	3.1±0.3	2.3±0.2	<0.001	0.30
Greens & Beans, *AU*	1.4±0.9	2.0±0.6	2.0±0.3	0.33	0.9±0.6	1.2±0.7	1.5±0.3	0.13	0.76
Whole Grains, *AU*	2.6±1.4	0.4±0.2	1.9±0.4	0.25	2.8±1.4	0.4±0.3	1.5±0.4	0.42	0.35
Refined Grains, *AU*	5.4±1.6	5.2±0.8	5.7±0.5	0.48	4.9±0.7	4.4±1.2	5.6±0.5	0.62	0.61
Dairy, *AU*	5.6±0.8	4.7±0.7	5.7±0.5	0.61	5.0±0.5	4.7±0.7	5.3±0.3	0.15	0.80
Total Protein Foods, *AU*	3.9±0.5	4.5±0.1	4.2±0.1	0.32	4.1±0.3	5.0±0.03	4.1±0.1	0.91	0.09
Seafood & Plant Protein, *AU*	0.6±0.3	2.0±0.8	2.2±0.3	0.23	2.2±0.8	1.9±0.8	2.4±0.3	0.07	0.51
Sodium, *AU*	3.2±1.6	3.2±0.8	3.4±0.4	0.58	4.1±0.5	3.4±1.1	5.1±0.5	0.002	0.40
Fatty Acids, *AU*	3.3±1.2	5.9±1.3	4.6±0.5	0.22	4.5±0.7	5.3±0.9	5.6±0.4	0.04	0.63
Saturated Fats, *AU*	4.7±0.6	5.3±0.9	4.4±0.4	1.00	5.7±1.3	4.3±1.1	5.0±0.4	0.25	0.67
Added Sugars, *AU*	6.5±1.2	6.9±1.6	6.4±0.6	0.60	5.1±0.9	6.5±1.4	5.8±0.5	0.12	0.69

Data are presented as Mean±SEM. According to 2009 Institute of Medicine guidelines, weight gain was classified as inadequate (INA, <170g/week), recommended (REC, ≥170 and <270 g/week), and excessive (EXS, ≥270g/week). Diet Intake was assessed by food photography, simultaneous with the doubly-labeled water period. Reporting accuracy was calculated as ratio of self-reported energy intake and total daily energy expenditure (TDEE) during that period, after days of obvious underreporting were excluded. Prior to analysis, days on which self-reported energy intake was less than 60% of TDEE were excluded. Group present the P-values for the comparisons in early pregnancy, and for the change over time (late pregnancy), with the initial value used as covariate; and Time presents the P-values for the main effect of time, from early to late pregnancy.

Table S4. Eating Behavior Constructs Early and Late in Pregnancy of Women with Obesity

	Early Pregnancy (14.9±0.1 weeks)				Late Pregnancy (35.9±0.1 weeks)				
	INA (n=10)	**REC (n=8)**	**EXS (n=36)**	**Group**	**INA (n=10)**	**REC (n=8)**	**EXS (n=36)**	**Time**	**Group**
Nausea and Vomiting									
PUQE Summary Score, *AU*	6.3±0.4	6.1±0.6	6.1±0.4	0.97					
Eating Inventory									
Cognitive Restraint, *AU*	7.7±1.4	6.4±1.7	8.8±0.8	0.41	7.8±1.2	7.6±1.8	8.9±0.9	0.53	0.79
Disinhibition, *AU*	6.9±1.4	5.0±0.5	5.7±0.6	0.48	5.8±1.5	5.5±1.1	5.6±0.6	0.41	0.09
Hunger, *AU*	4.8±1.1	4.6±0.7	4.4±0.4	0.88	4.7±1.1	4.0±0.7	5.1±0.5	0.27	0.40
Food Craving Inventory									
Fat, *AU*	2.0±0.2	1.9±0.2	1.8±0.1	0.46	2.2±0.3	2.0±0.2	1.9±0.1	0.12	0.81
Sweets, *AU*	2.2±0.2	2.1±0.2	2.0±0.1	0.61	2.4±0.2	2.5±0.3	2.4±0.1	0.001	0.67
Carbohydrates, *AU*	2.3±0.2	2.4±0.2	2.1±0.1	0.36	2.2±0.2	2.6±0.2	2.1±0.1	0.90	0.35
Fast Food Fat, *AU*	2.9±0.2	2.5±0.4	2.5±0.1	0.39	3.2±0.2	2.6±0.3	2.7±0.1	0.01	0.56
Fruits and Vegetables, *AU*	2.6±0.2	2.4±0.3	2.5±0.2	0.83	2.3±0.2	2.7±0.2	2.5±0.1	0.68	0.20
Total Score, *AU*	2.3±0.1	2.2±0.2	2.1±0.1	0.43	2.4±0.2	2.5±0.2	2.3±0.1	0.03	0.63
Mindful Eating									
Awareness, *AU*	2.6±0.1	2.5±0.2	2.5±0.1	0.95	2.4±0.2	2.5±0.1	2.6±0.1	1.00	0.34
Distraction, *AU*	3.3±0.2	3.3±0.1	2.9±0.1	0.22	3.1±0.2	3.2±0.1	3.1±0.1	0.22	0.59
Disinhibition, *AU*	3.1±0.2	3.2±0.1	3.1±0.1	0.96	3.2±0.2	3.2±0.2	3.1±0.1	0.33	0.64
Emotional Response, *AU*	3.1±0.2	3.3±0.1	3.3±0.1	0.63	3.3±0.3	3.5±0.1	3.3±0.1	0.27	0.59
External Cues, *AU*	2.3±0.1	2.3±0.2	2.5±0.1	0.54	2.3±0.2	2.3±0.1	2.5±0.1	0.63	0.97
Summary Score, *AU*	2.9±0.1	2.9±0.1	2.9±0.1	0.95	2.9±0.1	2.9±0.1	2.9±0.1	0.23	0.75

Data are presented as Mean±SEM. According to 2009 Institute of Medicine guidelines, weight gain was classified as inadequate (INA, <170g/week), recommended (REC, ≥170 and <270 g/week), and excessive (EXS, ≥270g/week). Nausea and Vomiting were assessed at the Screening Visit, while other questionnaires were completed after dinner during the overnight stays early and late in pregnancy. Group present the P-values for the comparisons in early pregnancy, and for the change over time (late pregnancy), with the initial value used as covariate; and Time presents the P-values for the main effect of time, from early to late pregnancy.

STROBE Statement—Checklist of items that should be included in reports of ***cohort studies***

	Item No	Recommendation	Page No
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4-5
Objectives	3	State specific objectives, including any prespecified hypotheses	5
Methods			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	14
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	14-15
		(*b*) For matched studies, give matching criteria and number of exposed and unexposed	
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	14-17
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	14-17
Bias	9	Describe any efforts to address potential sources of bias	17
Study size	10	Explain how the study size was arrived at	17
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	17
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	17
		(*b*) Describe any methods used to examine subgroups and interactions	17
		(*c*) Explain how missing data were addressed	NA
		(*d*) If applicable, explain how loss to follow-up was addressed	17, 6
		(*e*) Describe any sensitivity analyses	6, 18
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	6
		(b) Give reasons for non-participation at each stage	Figure S1
		(c) Consider use of a flow diagram	Figure S1
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	6, Table 1
		(b) Indicate number of participants with missing data for each variable of interest	NA
		(c) Summarise follow-up time (eg, average and total amount)	NA
Outcome data	15*	Report numbers of outcome events or summary measures over time	Table 1

Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included (*b*) Report category boundaries when continuous variables were categorized (*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	
Discussion			
Key results	18	Summarise key results with reference to study objectives	
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	
Generalisability	21	Discuss the generalisability (external validity) of the study results	
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at http://www.strobe-statement.org.