Canadian Clinical Practice Guidelines 2015
Summary of Revisions to the Recommendations

Critical Care Nutrition

#	Topic	Number of new RCTs	Recommendation compared to 2013				2015 Recommendation	2013 Recommendation
			same	upgraded	downgraded	n/a (new section)		
1.	**The Use of Enteral Nutrition vs. Parenteral Nutrition**	4			X		When considering nutrition support for critically ill patients, we recommend the use of enteral nutrition over parenteral nutrition in patients with an intact gastrointestinal tract.	When considering nutrition support for critically ill patients, we strongly recommend the use of enteral nutrition over parenteral nutrition.
2.	**Early vs. delayed nutrient intake**	0	X				No changes from 2013.	We recommend early enteral nutrition (within 24-48 hours following admission to ICU) in critically ill patients.
3.1	**Nutritional Prescription: Use of Indirect Calorimetry vs. Predictive Equations**	0	X				No changes from 2013.	There are insufficient data to make a recommendation on the use of indirect calorimetry vs. predictive equations for determining energy needs for nutrition or to guide when nutrition is to be supplemented in critically ill patients.
3.2	**Nutritional Prescription of Enteral Nutrition: Achieving Target Dose of Enteral Nutrition**	2	X				When starting enteral nutrition in critically ill patients, strategies to optimize delivery of nutrients (starting at target rate, volume-based feeding strategies, higher threshold of gastric residual volumes, use of prokinetics, concentrated feeding solutions and small bowel feedings) should be considered.	When starting enteral nutrition in critically ill patients, strategies to optimize delivery of nutrients (starting at target rate, higher threshold of gastric residual volumes, use of prokinetics and small bowel feedings) should be considered.

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3.3a	**Intentional Underfeeding: Trophic Feeds vs Full Feeds**	0	X				No changes from 2013.	In patients with Acute Lung Injury, an initial strategy of trophic feeds for 5 days should not be considered
3.3b	**Intentional Underfeeding: Hypocaloric Enteral Nutrition**	3		X			Intentional underfeeding of calories (not protein) should be considered in patients at low nutrition-risk. However, this recommendation does not apply to patients at high nutrition risk.	There are insufficient data to make a recommendation on the use of hypocaloric enteral nutrition in critically ill patients.
4.1a.	**Composition of EN: Diets Supplemented with Arginine and Select Other Nutrients***	1	X				No changes from 2013.	We do not recommend diets supplemented with arginine and other select nutrients be used for critically ill patients.
4.1b(i)	**Composition of EN: Fish Oils, Borage Oils and Antioxidants**	1	X				No changes from 2013.	The use of an enteral formula with fish oils, borage oils and antioxidants in patients with Acute Lung Injury (ALI) and Acute Respiratory Distress Syndrome (ARDS) should be considered.
4.1b(ii)	**Composition of EN: Fish oil supplementation**	1	X				No changes from 2013.	There are insufficient data to make a recommendation on the supplementation of fish oils alone in critically ill patients

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4.1c	**Composition of EN: Immune Enhancing Diets: Glutamine**	**3**			**X**		We recommend that enteral glutamine NOT be used in critically ill patients.	Enteral glutamine should be considered in burn and trauma patients. There are insufficient data to support the routine use of enteral glutamine in other critically ill patients. We caution against the use of any glutamine in patients with shock and MOF given the possibility of harm as demonstrated by the results of the REDOXS study of combined enteral and parenteral glutamine.
4.1d	**Composition of EN: Immune Enhancing Diets: Ornithine Ketoglutarate (OKG)**	**0**	**X**				No changes from 2013.	There are insufficient data to make a recommendation regarding the use of ornithine ketoglutarate for burn patients and other critically ill patients.
4.2.a	**Composition of EN: (Carbohydrate/fat): High fat/low CHO**	**0**	**X**				No changes from 2013.	There are insufficient data to recommend high fat/low CHO diets for critically ill patients.
4.2.b	**Composition of EN: (Carbohydrate/fat): Low fat/high CHO**	**0**	**X**				No changes from 2013.	There are insufficient data to recommend low fat/high CHO diets for critically ill patients.
4.2.c	**Composition of EN: High Protein vs. Low Protein**	**1**	**X**				No changes from 2013.	There are insufficient data to make a recommendation regarding the use of high protein diets for head injured patients and other critically ill patients.

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4.3	**Strategies for optimizing and minimizing risks of EN: Protein vs. Peptides**	**0**	**X**				No changes from 2013.	When initiating enteral feeds, the use of whole protein formulas (polymeric) should be considered.
4.4	**Composition of Enteral Nutrition: pH**	**0**	**X**				No changes from 2013.	There are insufficient data to make a recommendation regarding the use of low pH feeds in critically ill patients.
4.5	**Composition of Enteral Nutrition: Fibre**	**1**	**X**				No changes from 2013.	There are insufficient data to support the routine use of fibre (soluble or insoluble) in enteral feeding formulas in critically ill patients.
5.1	**Strategies to Optimize Delivery and Minimize Risks of EN: Feeding Protocols**	**2**	**X**				A feeding protocol should be considered that incorporates strategies to optimize delivery of enteral nutrition in critically ill adult patients.	An evidence based feeding protocol that incorporates prokinetics at initiation and a higher gastric residual volume (250 mls) and the use of post pyloric feeding tubes, should be considered as a strategy to optimize delivery of enteral nutrition in critically ill adult patients.
5.2	**Strategies to Optimize Delivery and Minimize Risks of EN: Motility Agents**	**0**	**X**				No changes from 2013.	In critically ill patients who experience feed intolerance (high gastric residuals, emesis), we recommend the use of a promotility agent. Given the safety concerns associated with erythromycin, the recommendation is made for metoclopramide. There are insufficient data to make a recommendation about the combined use of metoclopramide and erythromycin.

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5.3	**Strategies to Optimize Delivery and Minimize Risks of EN: Small Bowel Feeding vs. Gastric**	1	X				No changes from 2013.	Based on 11 level 2 studies, small bowel feeding compared to gastric feeding may be associated with a reduction in pneumonia in critically ill patients. In units where small bowel access is feasible, we recommend the routine use of small bowel feedings. In units where obtaining access involves more logistical difficulties, small bowel feedings should be considered for patients at high risk for intolerance to EN (on inotropes, continuous infusion of sedatives, or paralytic agents, or patients with high nasogastric drainage) or at high risk for regurgitation and aspiration (nursed in supine position). Finally, where obtaining small bowel access is not feasible (no access to fluroscopy or endoscopy and blind techniques not reliable), small bowel feedings should be considered for those select patients that repeatedly demonstrate high gastric residuals and are not tolerating adequate amounts of EN intragastrically.

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5.4	**Strategies to optimize delivery and minimize risks of Enteral Nutrition: Body position**	0	X				No changes from 2013.	Based on 1 level 1 and 1 level 2 study, we recommend that critically ill patients receiving enteral nutrition have the head of the bed elevated to 45 degrees. Where this is not possible, attempts to raise the head of the bed as much as possible should be considered.
5.5	**Strategies to Optimize the Delivery of EN: Threshold of Gastric Residual**	1		X			A gastric residual volume of either 250 or 500 mLs (or somewhere in between) and frequency of checking residuals either q4 or q8 hrs should be considered as a strategy to optimize delivery of enteral nutrition in critically ill patients.	There are insufficient data to make a recommendation for specific gastric residual volume threshold. A gastric residual volume of either 250 or 500 mLs (or somewhere in between) is acceptable as a strategy to optimize delivery of enteral nutrition in critically ill patients.
5.6	**Strategies to Optimize the Delivery of EN: Discarding Gastric Residual**	0	X				No changes from 2013.	There are insufficient data to make a recommendation to return gastric residual volumes up to a certain threshold in critically ill adult patients. Based on 1 level 2 study, re-feeding GRVs up to a maximum of 250 mls or discarding GRVs may be acceptable.
6.1	**Enteral Nutrition (Other): Closed vs. Open System**	0	X				No changes from 2013.	There are insufficient data to make a recommendation on the administration of EN via closed vs. open system in the critically ill.

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6.2	**Enteral Nutrition (Other): Probiotics**	**6**	**X**				No changes from 2013.	The use of probiotics **should be considered** in critically ill patients.
6.3	**Enteral Nutrition (Other): Continuous vs. Other Methods of Administration**	**0**	**X**				No changes from 2013.	There are **insufficient data** to make a recommendation on enteral feeds given continuously vs. other methods of administration in critically ill patients
6.4	**Enteral Nutrition (Other): Gastrostomy vs. Nasogastric Feeding**	**0**	**X**				No changes from 2013.	There are **insufficient data** to make a recommendation on gastrostomy feeding vs. nasogastric feeding in the critically ill.
6.5	**Enteral Nutrition: Other Formulas: ß Hydroxyl Methyl Butyrate (HMB)**	**0**	**X**				No changes from 2013.	There are **insufficient data** to make a recommendation of ß Hydroxyl Methyl Butyrate (HMB) supplementation in critically ill patients.
7.1	**Combination Parenteral Nutrition and Enteral Nutrition**	**0**	**X**				No changes from 2013.	For critically ill patients starting on EN **we recommend** that PN **not be started** at the same time as EN. In the patient who is not tolerating adequate EN, there are **insufficient data** to put forward a recommendation about when PN should be initiated. Practitioners will have to weigh the safety and benefits of initiating PN in patients not tolerating EN on a case-by-case basis. We **recommend** that PN **not be** started until all strategies to maximize EN delivery (such as small bowel feeding tubes, motility agents) have been attempted.

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7.2.	**Early vs. Delayed Supplemental Parenteral Nutrition**	0	X				No changes from 2013.	We **strongly recommend** that early supplemental PN and high IV glucose **not be used** in unselected critically ill patients (i.e. low risk patients with short stay in ICU). In the patient who is not tolerating adequate enteral nutrition, there are **insufficient data** to put forward a recommendation about when PN should be initiated. Practitioners will have to weigh the safety and benefits of initiating PN in patients not tolerating EN on an individual case-by-case basis.
8.0	**Parenteral Nutrition vs. Standard care**	1		X			In critically ill patients with an intact gastrointestinal tract, we **recommend that parenteral nutrition not be used routinely**, but early PN **should be considered** in nutritionally high-risk patients with a relative contraindication to early EN.	In critically ill patients with an intact gastrointestinal tract, we **recommend** that parenteral nutrition **not be used** routinely
9.1	**Composition of Parenteral Nutrition: Branched Chain Amino Acids (BCAA)**	0	X				No changes from 2013.	In patients receiving parenteral nutrition or enteral nutrition, there are **insufficient data** to make a recommendation regarding the use of intravenous supplementation with higher amounts of branched chain amino acids in critically ill patients.

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9.2	**Composition of Parenteral Nutrition: Type of lipids**	4	X				No changes from 2013.	When parenteral nutrition with intravenous lipids is indicated, IV lipids that reduce the load of omega-6 fatty acids/soybean oil emulsions **should be considered**. However, there are **insufficient data** to make a recommendation on the type of lipids to be used that reduce the omega-6 fatty acid/soybean oil load in critically ill patients receiving parenteral nutrition.
9.3	**Composition of Parenteral Nutrition: Zinc (either alone or in combination with other antioxidants)**	0	X				No changes from 2013.	There are **insufficient data** to make a recommendation regarding IV/PN zinc supplementation in critically ill patients.
9.4.a.	**Composition of Parenteral Nutrition: Glutamine Supplementation**	4	X				When parenteral nutrition is prescribed to critically ill patients, we **recommend parenteral supplementation with glutamine NOT be used**. There are insufficient data on the use of intravenous glutamine in critically ill patients receiving enteral nutrition but given the safety concerns we also **recommend intravenous glutamine not be used in enterally fed** critically ill patients.	When parenteral nutrition is prescribed to critically ill patients, parenteral supplementation with glutamine **should be considered**. However, we **strongly recommend** that glutamine **NOT be used in** critically ill patients with shock and multi-organ failure (refer to section 9.4 b). There are **insufficient data** to generate recommendations for intravenous glutamine in critically ill patients receiving EN.

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9.4.b.	**Combined Parenteral and Enteral Glutamine Supplementation**	1	X				We recommend that high dose combined parenteral and enteral glutamine supplementation NOT be used in critically ill patients.	We strongly recommend that high dose combined parenteral and enteral glutamine supplementation NOT be used in critically ill patients with shock and multi-organ failure.
9.4.c.	**Enteral Glutamine vs Parenteral Dipeptide Supplementation**	1				X	There are insufficient data to make a recommendation on the use of enteral glutamine vs. parenteral dipeptide supplementation. However given concerns of glutamine supplementation, we strongly recommend that glutamine supplementation NOT be used in critically ill patients, hence we do not recommend the use of enteral glutamine or parenteral dipeptides.	New topic in 2015.
10.1	**Strategies to Optimize Parenteral Nutrition and Minimize Risks: Dose of PN**	0	X				No changes from 2013.	In critically ill patients who are not malnourished, are tolerating some EN, or when PN is indicated for short term use (< 10 days), low dose PN should be considered. There are insufficient data to make recommendations about the use of low dose parenteral nutrition in the following patients: those requiring PN for long term (> 10 days); obese critically ill patients and malnourished critically ill patients. Practitioners will have to weigh the safety and benefits of low dose PN on an individual case-by-case basis in these latter patient populations.

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10.2	**Strategies to Optimize Parenteral Nutrition and Minimize Risks: Use of lipids**	**0**	**X**				No changes from 2013.	In critically ill patients who are not malnourished, are tolerating some EN, or when PN is indicated for short term use (< 10 days), withholding lipids high in soybean oil **should be considered**. There are **insufficient data** to make a recommendation about withholding lipids high in soybean oil in critically ill patients who are malnourished or those requiring PN for long term (> 10 days). Practitioners will have to weigh the safety and benefits of withholding lipids high in soybean oil on a case-by-case basis in these latter patient populations.
10.3	**Strategies to optimize Parenteral Nutrition: Mode of lipid delivery**	**0**	**X**				No changes from 2013.	There are **insufficient data** to make a recommendation on the use of lipids in total nutrient admixtures (TNA) vs. piggyback in critically ill patients.
10.4.a	**Optimal glucose control: Insulin therapy**	**1**	**X**				We recommend that hyperglycemia (blood sugars > 10 mmol/L) **be avoided** in all critically ill patients and we **recommend** a blood glucose target of around 8.0 mmol/L (or 7-9 mmol/L), rather than a more stringent target range (4.4 to 6.1 mmol/L) or a more liberal target range (10 to 11.1 mmol/L). There are **insufficient data** to recommend the administration of insulin via subcutaneous over IV.	We **recommend** that hyperglycemia (blood sugars > 10 mmol/L) **be avoided** in all critically ill patients and we **recommend** a blood glucose target of around 8.0 mmol/L (or 7-9 mmol/L), rather than a more stringent target range (4.4 to 6.1 mmol/L) or a more liberal target range (10 to 11.1 mmol/L).

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10.4.b.	**Optimal glucose control: Carbohydrate restricted formula + insulin therapy**	**0**	X				No changes from 2013.	There are **insufficient data** to recommend low carbohydrate diets in conjunction with insulin therapy for critically ill patients.
11.1	**Supplemental Antioxidant Nutrients: Combined Vitamins and Trace Elements**	**2**					Coming Soon	The use of supplemental combined vitamins and trace elements **should be considered** in critically ill patients.
11.2	**Supplemental Antioxidant Nutrients: Parenteral Selenium**	**2**					Coming Soon	The use IV/PN selenium supplementation, alone or in combination with other antioxidants, **should be considered** in critically ill patients.
11.3	**Supplemental Antioxidant Nutrients: IV Vitamin C**	**1**				X	There are **insufficient data** to make recommendation on Vitamin C supplementation in critically ill patients.	New topic in 2015.
12.0	**Vitamin D**	**1**	X				No changes from 2013.	There are **insufficient data** to make a recommendation for the use of Vitamin D in critically ill patients.