How to implement a nutrition guideline:

Does knowledge change behaviour?

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Overview

- Details of a project evaluating the benefits of a nutrition guideline
- Describe the practice change that was achieved
- Described how the practice change was achieved
- Summary
The Critical Care Research Network: CCRNet

“CCRNet is a voluntary alliance of Critical Care Units whose mission is to improve patient care and resource utilization through the development, execution and implementation of health services research protocols.”
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- CCRNet includes more than 54 hospitals across Ontario, Canada
- has conducted numerous studies to understand care processes and improve patient outcomes


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• CCRNet includes more than 54 hospitals across Ontario, Canada
• has conducted numerous studies to understand care processes and improve patient outcomes
• member hospitals expressed an interest in understanding nutritional support in early 1990’s


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Structured literature review to find out ‘what we should be doing’
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Observational study to find out ‘what we were doing’

- nutrition therapy was started much later than the literature indicated
- EN was frequently stopped due to:
  - “diarrhea”
  - patient had a procedure, and forgot to restart
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- nutrition therapy was started much later than the literature indicated
- EN was frequently stopped due to:
  - “diarrhea”
  - patient had a procedure, and forgot to restart

To address this evidence-practice gap a formal study was initiated to find out if improving nutrition therapy resulted in improved patient outcomes.

14 CCRNet hospitals volunteered to participate.
Guideline development conference

• an extensive literature search was conducted
  • MEDLINE and EMBASE were searched for controlled trials and overviews of nutritional support (EN and TPN) in critically ill or intensive care patients
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Box. Evidence-Based Recommendations Approved (Ratified) for Inclusion in the Guideline at the Consensus Conference

<table>
<thead>
<tr>
<th>Grade B+</th>
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<tbody>
<tr>
<td>Recommendation favoring enteral nutrition over standard care (nothing by mouth):</td>
</tr>
<tr>
<td>1. Level II randomized controlled trials (RCTs). Supported by positive meta-analysis and validated evidence-based guideline (ERG) (Algoritmos de Nutrición Parenteral y Enteral [ACCEPT] study).</td>
</tr>
<tr>
<td>2. Level II RCTs. Supported by positive meta-analysis and validated evidence-based guideline (ACCEPT).</td>
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<td>1. Level II RCTs. Supported by validated evidence-based guideline (ACCEPT).</td>
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<tr>
<td>Recommendation favoring parenteral nutrition over standard care (intravenous glucose):</td>
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<td>1. Level II RCTs. Supported by validated evidence-based guideline (ACCEPT).</td>
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**Guideline development conference**

Applies to all patients expected to remain in the ICU at least 3 days

A

At ICU admission: Should this patient be fed?

Yes

No

Can EN be started within 24 hours?

Yes

No

Gastric challenge: Use full-strength concentration. Consider prokinetic with challenge. Goal: at least 80% of requirements at 72 h. Assess q12h.

Is progression on target to reach at least 80% by 72 h?

Yes

Use prokinetic
Use postpyloric tube

Increase rate to 100% of requirements

Is goal met?

Yes

No

Acceptable conditions:
- Tolerating adequate oral diet
- < 24 h to oral intake
- Palliative care

Acceptable conditions:
- Acute pancreatitis*
- Enteric anastomosis*
- Ischemic bowel
- Enteric fistula
- Imminent bowel resection
- Imminent endoscopy
- Bowel obstruction
- High nasogastric losses
- Severe exacerbation of inflammatory bowel disease

*May still opt for elemental enteral feeding

Begin TPN
Reassess q12h for EN eligibility

• Continue EN to maximum tolerated
• Supplement with PN
• Continue EN challenges q12h

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At ICU admission: Should this patient be fed?
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Gastric challenge: Use full-strength concentration Consider prokinetic with challenge Goal: at least 80% of requirements at 72 h Assess q12h

Is progression on target to reach at least 80% by 72 h?
No

Yes

- Use prokinetic
- Use post pyloric tube

Increase rate to 100% of requirements

Is goal met?
Yes

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- Supplement with PN
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No

Begin TPN
Reassess q12h for EN eligibility
Applies to all patients expected to remain in the ICU at least 3 days

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1. At ICU admission: Should this patient be fed?
   - Yes
   - No

2. Can EN be started within 24 hours?
   - Yes
   - No

   3. Gastric challenge: Use full-strength concentration
      Consider prokinetic with challenge
      Goal: at least 80% of requirements at 72 h
      Assess q12h

4. Is progression on target to reach at least 80% by 72 h?
   - Yes
   - No

   5. Use prokinetic
      Use postpyloric tube

6. Increase rate to 100% of requirements

7. Is goal met?
   - Yes
   - No

8. Acceptable conditions:
   - Tolerating adequate oral diet
   - < 24 h to oral intake
   - Palliative care

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   - Enteric anastomosis*
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   - Enteric fistula
   - Imminent bowel resection
   - Imminent endoscopy
   - Bowel obstruction
   - High nasogastric losses
   - Severe exacerbation of inflammatory bowel disease

   *May still opt for elemental enteral feeding

10. Begin TPN
    Reassess q12h for EN eligibility

11. Continue EN to maximum tolerated
    Supplement with PN
    Continue EN challenges q12h

---

ACCEPT Nutrition Guidelines Trial

Guideline development conference

14 Hospitals

Randomization

Receive guideline information package plus training in change management (7 Hospitals)

**ACCEPT Nutrition Guidelines Trial**

- Guideline development conference
- Randomization
- Receive guideline information package *plus* training in change management (7 Hospitals)
- Do not receive information package, no training in change management (7 Hospitals)

14 Hospitals

**Randomized results: balance**

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<tr>
<td>Patients enrolled</td>
<td>214</td>
<td>248</td>
</tr>
<tr>
<td>Age</td>
<td>67.9 years</td>
<td>64.6 years</td>
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<tr>
<td>Admission APACHE II</td>
<td>22.5</td>
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**Randomized results: nutrition therapy**

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<tbody>
<tr>
<td>ICU admit to EN</td>
<td>2.34 days</td>
<td>1.53 days</td>
<td>0.07</td>
</tr>
<tr>
<td>ICU admit to EN/PN</td>
<td>1.99 days</td>
<td>1.47 days</td>
<td>0.09</td>
</tr>
<tr>
<td>EN delivered</td>
<td>5.31 days fed / 10 patient days</td>
<td>6.97 days fed / 10 patient days</td>
<td>0.02</td>
</tr>
<tr>
<td>TPN delivered</td>
<td>1.94 days fed / 10 patient days</td>
<td>2.25 days fed / 10 patient days</td>
<td>0.65</td>
</tr>
<tr>
<td>EN or TPN delivered</td>
<td>6.81 days fed / 10 patient days</td>
<td>8.63 days fed / 10 patient days</td>
<td>0.01</td>
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Randomized results: Primary outcomes

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**Primary outcomes**

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<tr>
<td>Hospital Mortality</td>
<td>37%</td>
<td>24%</td>
<td>0.047</td>
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<tr>
<td>ICU LOS (days)</td>
<td>11.7</td>
<td>10.8</td>
<td>0.65</td>
</tr>
<tr>
<td>Hospital LOS (days)</td>
<td>34.3</td>
<td>25.4</td>
<td>0.006</td>
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Mortality by subgroup

Absolute Risk Reduction for Mortality with 95% confidence interval (test based), accounting for clustering

- Favours control
- Favours Guideline

All patients n=492
Medical Admit n=132
Emerg Dept Admit n=150
Surgical Admit n=147
Emergent Sx n=81
Elective Sx n=66
From other hospital n=39
From other ICU n=15
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- provided EN earlier
- provided EN on more days whilst in the ICU


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Evidence supporting benefits from early EN convinced clinicians to start EN earlier.

Summary


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Active implementation of our evidence-based guideline for nutrition therapy in critical illness resulted in improvements in clinical practice:

- provided EN earlier
- provided EN on more days whilst in the ICU

Evidence supporting benefits from early EN convinced clinicians to start EN earlier.

These improvements in clinical practice translated to:

- Reduced mortality
- Reduced hospital stay

$1,000,000 question:

How did we improve practice across a network of 7 hospitals?
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How did we improve practice across a network of 7 hospitals?

We used change management theory to actively implement our guideline!!
Change management encompasses a broad set of theories and structured processes aimed at helping to transition *individuals, teams* and *organisations* from a current state to a desired future state.

Smith WR. Evidence for the effectiveness of techniques to change physician behavior. *Chest* 2000;118(2) Suppl :8S-17S
Efficient and effective change

1) Understand the potential benefits of change.
Efficient and effective change

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   • Presented the evidence to the user, but also allowed them to read it themselves.
Efficient and effective change

1) Understand the potential benefits of change.

• Presented the evidence to the user, but also allowed them to read it themselves.

• Don’t try to change everything at once.
  • *We focussed on the benefits of early EN!*
2) Conduct an Audit
   • Review baseline data.
Efficient and effective change

2) Conduct an Audit

• This data was presented to the active guideline hospitals:
2) Conduct an Audit

- This data was presented to the active guideline hospitals:
Efficient and effective change

2) Conduct an Audit

• This data was presented to the active guideline hospitals:
Efficient and effective change

2) Conduct an Audit

- Promotes awareness of the need for change.
- Allows clinicians to see ‘others’ using the new technology.
- Regarded as being a moderately strong motivator for change.

Efficient and effective change

3) Gentle reminders:


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3) Gentle reminders:

- Hallways
- Bedside
- Staff areas
- Waiting room


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4) Add tincture of time (Be patient, change takes a long time!)

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Don’t start by fighting with these people! They are highly resistant to change!

Efficient and effective change

4) Add tincture of time (Be patient, change takes a long time!)

Don’t start by fighting with these people! They are highly resistant to change!

Start with these people! They love change, and will eventually influence everyone else!

Efficient and effective change

5) Repeat steps 2, 3, and 4 as required.

Efficient and effective change: Recap

1) Understand the evidence

2) Conduct an audit

3) Use gentle reminders.

4) Add tincture of time.

5) Repeat steps 2, 3 and 4 as required.

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These improvements were achieved by using a relatively simple practice change package.


Summary

- Early EN is a dominant technology: It improves health outcome and reduces costs!!

- EN should begin within 24 h of ICU admission, as soon as shock is stabilised:
  - Shock Index ≤ 1 (Heart rate / SBP) for one hour or
  - SBP > 100 mmHg without need for *increasing* doses of vasoactive agents for one hour.

"Stable shock is not defined by weaning or removing all vasoactive agents."


Immediately after resuscitation:

Stable shock can be defined as:

Shock Index $\leq 1$ (heart rate $\div$ systolic blood pressure = Shock Index)

or

Systolic blood pressure $> 90$ mmHg or mean blood pressure $> 70$ mmHg for at least one hour.

Canadian vs Australian cRCT


Canadian vs Australian cRCT

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<td>1.4 days</td>
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# Canadian vs Australian cRCT

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<td></td>
<td>1.4 days</td>
<td>0.8</td>
</tr>
<tr>
<td>Admit to any feed</td>
<td>1.9</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>2.1 days</td>
<td>0.9</td>
</tr>
<tr>
<td>EN delivered</td>
<td>5.4</td>
<td>6.7</td>
</tr>
<tr>
<td></td>
<td>5.8 days fed / 10 ICU days</td>
<td>7.2</td>
</tr>
<tr>
<td>EN or TPN delivered</td>
<td>6.9</td>
<td>8.5</td>
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<td></td>
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<td>8.1</td>
</tr>
<tr>
<td>Energy delivered</td>
<td>999</td>
<td>1257</td>
</tr>
<tr>
<td></td>
<td>1065 kcal/ICU day</td>
<td>1241</td>
</tr>
<tr>
<td>% of patients never fed</td>
<td>25%</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>28%</td>
<td>6%</td>
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Multifaceted practice change strategy

1) Academic detailing
2) Educationally influential opinion leaders
3) Local consensus process
   • local champions
4) Reminders (manual or computerized)
   • active ongoing bedside reminder system
   • educational materials
5) Audit and feedback
   • computer generated, timely
   • should be delivered by peers or opinion leaders
6) Educational outreach process
   • didactic lecture based CME (conferences, lectures)
7) Unsolicited mail
   • educational materials