

# Use of the ANDHII Tool for Core Dietetic Data Monitoring: The CANDHII-UK Project

## Part 2:

### Electronic Monitoring of Outcome Measures for Parenteral Nutrition

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# Plymouth University Hospital and Yeovil Hospital A Joint Venture



Leading with excellence, caring with compassion



# Nutrition Support Team Plymouth

- Consultant Gastroenterologist
- Specialist Nutrition Nurse
- Specialist Dietitian
- Dietitian Assistant



# Why Parenteral Nutrition (PN)?

- Decision to focus on in-patient care, to pilot use of the tool at ward level
- Well defined patient group primarily located on GI surgery and gastroenterology wards
- Well defined parameters monitored as part of routine patient care
- Reviewed daily (Mon-Fri) by specialist nurse 3 times weekly by dietitian

# First steps...

## 1. Establishing the PN 'Core Dietetic Dataset'

Our 'core questions' included:

- What are the most frequent 'medical' and 'nutrition' diagnoses?
- What is the relationship between nutrient (PN) delivery and eg:
  - Blood biochemistry
  - % Weight change
  - Grip strength
- What is the frequency of deranged biochemistry?



# First steps...

## 2. Defining the PN CDD outcome measures

- Review the ANDHII tool to establish methodology for the recording and collation of data within ANDHII-complicated-1700 terms !
- Review PN patient monitoring forms and agree which 'data' is essential to monitor PN patients....our 'Core Data'?!



**Plymouth NHS Trust  
Nutrition Support Team Patient Notes**

<b>Name</b>
<b>Dob</b>
<b>Hosp No</b>
<b>NHS No</b>

Date of:  
 Admission  
 PN referral:  
 PN commenced:  
 PN stopped:  
 Discharge:  
 Outcome:

Ward:  
 Consultant:  
 Age:

<b>Diagnosis and treatment</b>
--------------------------------

**Feeding Devices in situ**

<b>Line Placement</b>		
<b>Date</b>		
<b>TPN Line Type:</b>		
<b>Inserted by:</b>		
<b>Lumens:</b>		
<b>External length:</b>		
<b>Date removed:</b>		
<b>Blood Cultures</b>		
<b>Date:</b>		
<b>Central</b>		
<b>Peripheral</b>		
<b>Catheter Tip</b>		
<b>Enteral Feeding</b>		
<b>Tube</b>		

**Nutritional Requirements and Anthropometry**

	Admission Weight:	Height :	Usual Weight:	%Weight Loss 3-6mt:
<b>Date</b>				
<b>Weight</b>				
<b>BMI</b>				
<b>BMR</b>				
<b>TEE</b>				
<b>Nitrogen(g)</b>				
<b>Fluid (ml)</b>				

Date				
<b>Treatment plan</b>				
<b>PN regime prescribed (Volume and rate)</b>				
<b>Temperature</b>				
<b>B. Gic</b>				
<b>CVAD</b>				
<b>CCAT (0-3)</b>				
<b>CHG in situ (Y/N)</b>				
<b>Comment if applicable:</b>				
<b>Oral Intake:</b>				
<b>Output:</b>				
<b>Stoma</b>				
<b>Wound/fistula</b>				
<b>Urine</b>				
<b>NG/vomit</b>				
<b>Fluid Balance</b>				
<b>Blood results/Date</b>				
Na (133-146 mmol/L)				
K (3.5-5.3 mmol/L)				
Bic (22-29 mmol/L)				
Urea (2.5-7.8 mmol/L)				
Creat (50-98 µmol/L)				
AKI				
Alb (35-50 g/L)				
Corr Ca (2.10-2.55 mmol/L)				
Po <sub>2</sub> (0.8-1.5 mmol/L)				
AlkP (30-130 IU/L)				
Bili (1-20 µmol/L)				
ALT (1-55 IU/L)				
Gamma GT (7-21 IU/L)				
CRP (0.1-5 g/L)				
WBC (3.6-9.2 x10 <sup>9</sup> /L)				
Hb (130-175 g/L)(m) (120-155)(f)				
Platelets (140-400 x10 <sup>9</sup> /L)				
Mg <sup>2+</sup> (0.7-1mmol/l)				
Trig (0.4-1.7mmol/l)				
eGFR (ml/min)				

# Next steps...

## **3. Creating a bespoke version of ANDHII**

In conjunction with the ANDHII team a 'bespoke' tool for the CANDHII-UK 'PN' dataset was produced.

## **4. Liaising with IT**

I pads configured for each organisation-time consuming and multiple resets (back to factory settings)

Pressure to get started 6 months for data collection only!



# Next step...

## 5. Understanding NCPT and NCP for data input (NCPT was formerly IDNT)

Not routinely used in dietetic team-learning curve!

Time to reflect and consider:

- What is the *nutrition* diagnosis?
- What is the *etiology*?
- What are the *signs and symptoms*?

## 6. CANDHII -Pilot

- Set up 'trial patients' on ANDHII to identify the appropriate 'Nutrition Care Process Terminology' (NCPT) for each entry
- This identified the need to 'think laterally' to find the appropriate terms required under each section
- New terms added for PN eg additional medical diagnoses, grip strength (though later discovered hand grip was on there already causing complications later!)

[Patients](#)[Reports](#)[Surveys](#)[Administration](#)[Profile](#)[Help & Training](#)**Patient**

Re-identification Code: QJm67n03

Address: denford, UK

[Edit](#)**Previous Visit Entries**

8/14/2018 \*

\*Indicates incomplete visit entry

[New Entry](#)**Attached Patient Files**[Upload File](#)**Nutrition Care Process Visit Entry****Entry Date\***

8/14/2018

Editing entry date disabled for de-identified mode.

**Measures**[Show Details](#)**Assessment**

ANDHE - Edit Entry

https://www.andhe.org/Patient/6514/Visit/Edit/8391

Show Details

### Assessment

NCPT Term	Value	Units/Indicators	Evaluation/Standard	Method/Source
medical diagnosis, current admission	Abdominal aor	Select from list		
reason for PH	Anastomotic le	Select from list		
gender	Male	Specify		
finding of cachexia	Present			
finding of loss of subcutaneous fat	Present			

finding of vomiting	Present				
					X

### Diagnosis

Problem	Etiologies	Signs/Symptoms	Diagnosis Status
inadequate energy intake	<input type="checkbox"/> disordered eating pattern <input type="checkbox"/> food- and nutrition-related knowledge deficit <input type="checkbox"/> limited access to food or water <input type="checkbox"/>	<input type="checkbox"/> body compartment estimates <input type="checkbox"/> body mass index <input type="checkbox"/> enteral nutrition formula or solution <input type="checkbox"/> growth pattern indices, percentile ranks <input type="checkbox"/> parenteral nutrition formula or solution <input type="checkbox"/> total energy estimated needs <input type="checkbox"/> total energy intake <input type="checkbox"/> total protein estimated needs <input type="checkbox"/> weight	New X

ANDHE - Edit Entry

https://www.andhe.org/Patient/6514/Visit/Edit/8391

modify composition of meals/snacks X

Details

Details

### Monitoring and Evaluation

Diagnosis	Monitors																
inadequate energy intake	<table border="1"> <thead> <tr> <th>Value</th> <th>Units/Indicators</th> <th>Evaluation/Standard</th> <th>Method</th> </tr> </thead> <tbody> <tr> <td><input type="text"/></td> <td>kg</td> <td>Normal / at goal</td> <td>Measured</td> </tr> <tr> <td><input type="checkbox"/> total energy intake</td> <td></td> <td></td> <td></td> </tr> <tr> <td><input type="checkbox"/> enteral nutrition formula or solution</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Value	Units/Indicators	Evaluation/Standard	Method	<input type="text"/>	kg	Normal / at goal	Measured	<input type="checkbox"/> total energy intake				<input type="checkbox"/> enteral nutrition formula or solution			
	Value	Units/Indicators	Evaluation/Standard	Method													
	<input type="text"/>	kg	Normal / at goal	Measured													
	<input type="checkbox"/> total energy intake																
<input type="checkbox"/> enteral nutrition formula or solution																	
<input type="text"/>																	

open for

## CANDHII –Time for Analysis

What analysis can the software offer?

Two Options available:

1. Individual visit summary
2. Cross tab report

# CANDHII –Time for Analysis

## 1. Individual visit summary

- Provides a summary of a *single* visit that can be printed or copied to external program
- Useful for individual patients

Not appropriate for this study.

## 2. Cross tab report

- Tabular data for a group of patients
  - Patients can only be identified for inclusion by their unique patient re-identification code
  - -Required term is selected
  - -Date range
  - -Options of First and Last, Average, Sum or all
- This is then exported to Excel for analysis



# CANDHII: Analysis issues

A few issues were uncovered

- Not all terms can be included in the report eg WCC , energy requirement, protein requirement, BMI
- Only terms published as part of the NCPT can be included in the report. Report of custom terms is not an option
- We added new terms eg grip strength-system analysis was not feasible for these. Multiple options to chose from at data entry point make analysis more difficult eg 'measured weight' and 'weight', hand grip strength, measured grip
- Cannot generate a single report for all required terms- tool 'times out' quickly and request is lost
- Text entries (reported as O and 1's) and not available for EXCEL analysis hence details of PN regimes were not accessible for analysis
- Unable to identify contribution from nutrient sources eg contribution of food, ONS and PN to total intake-ANDHII team are looking at this

## CANDHII: Analysis-Another way?

For complex analysis of data, it was necessary to download data firstly to Excel to:

- Transpose the data into a 'per visit' format
- 'Clean' the data for consistency of reporting of variables/terms eg 2 variables used to report one measure, text reporting lower and upper case

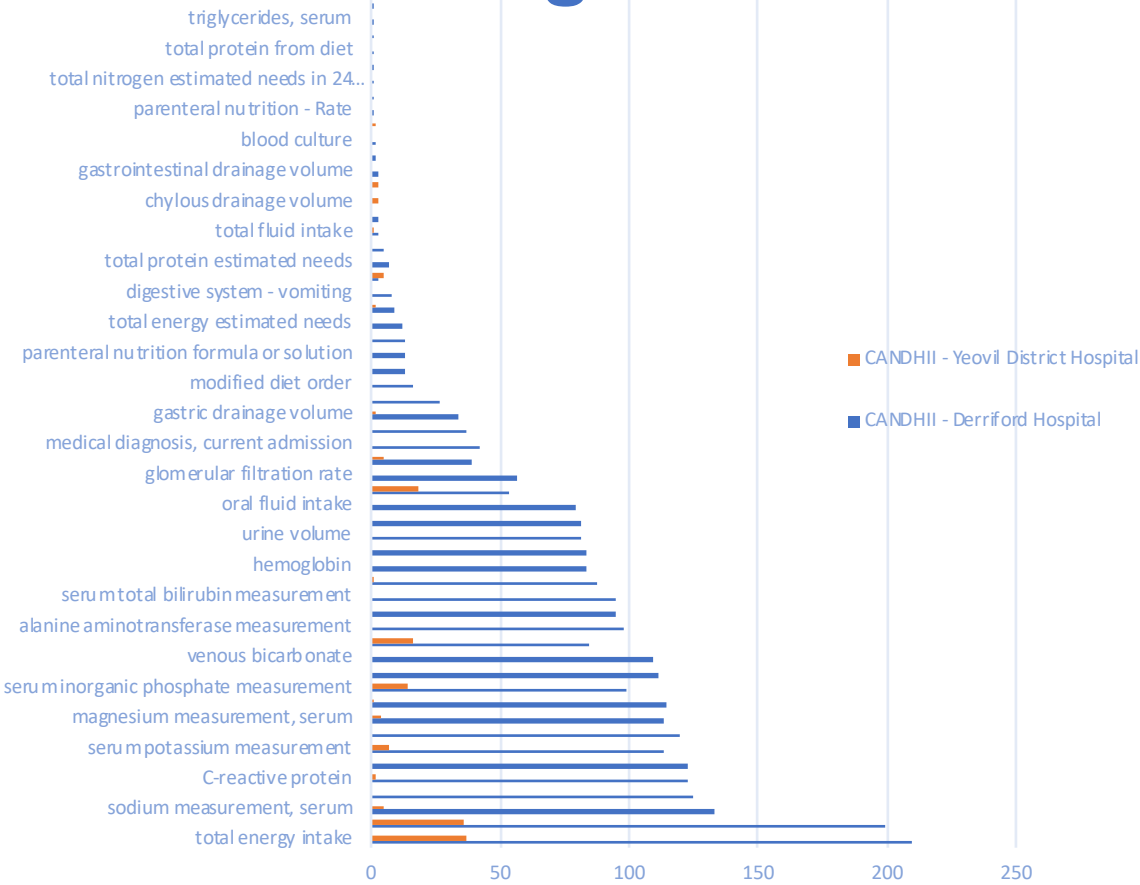
Then

- Further analysis of the data required external help to convert files into a format that could be drawn into SPSS to create tables of data and summarise 'text' input

These limitations are being addressed by the ANDHII team to support the management of future data input and analysis.

# Results

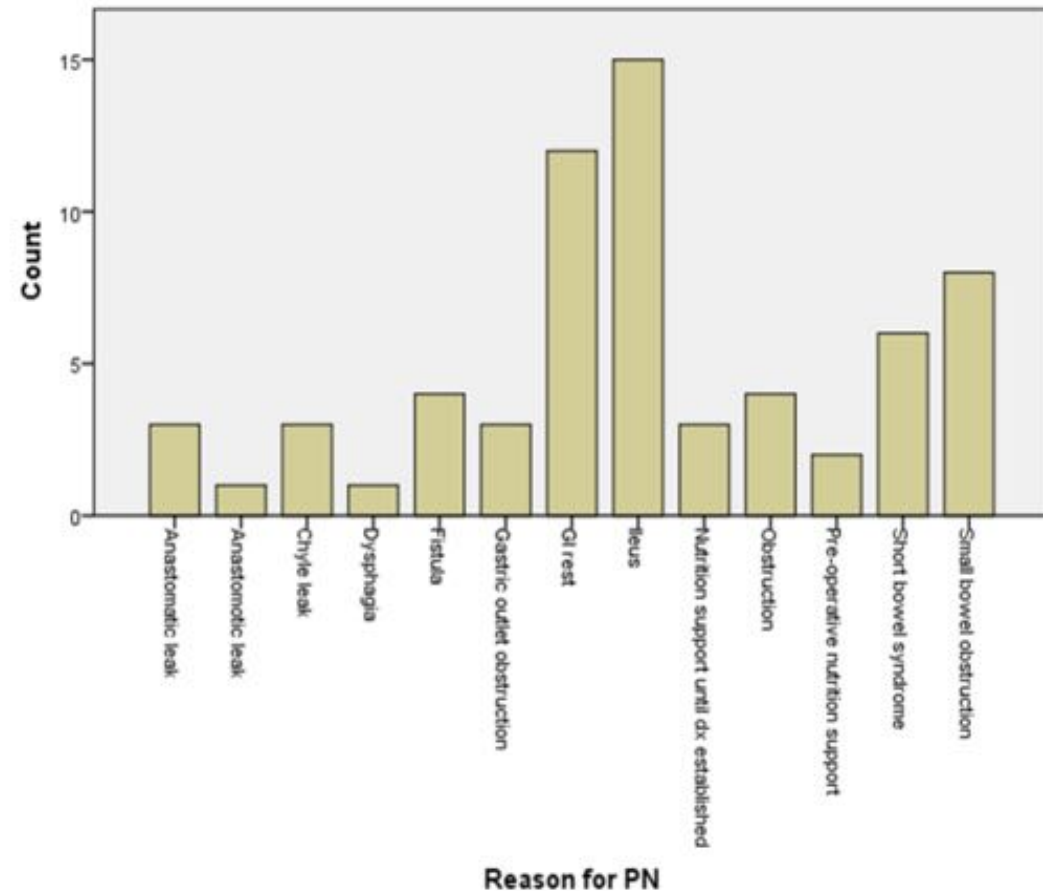
## Chosen terms for monitoring and evaluation



## Results : Reason for PN

Most frequent reasons for initiating PN:

- Ileus 22%
- GI rest 18%
- SB obstruction 12%
- SBS 9%
- Fistula 6 %
- GOO 5%



## Medical diagnoses requiring PN

Most frequent:

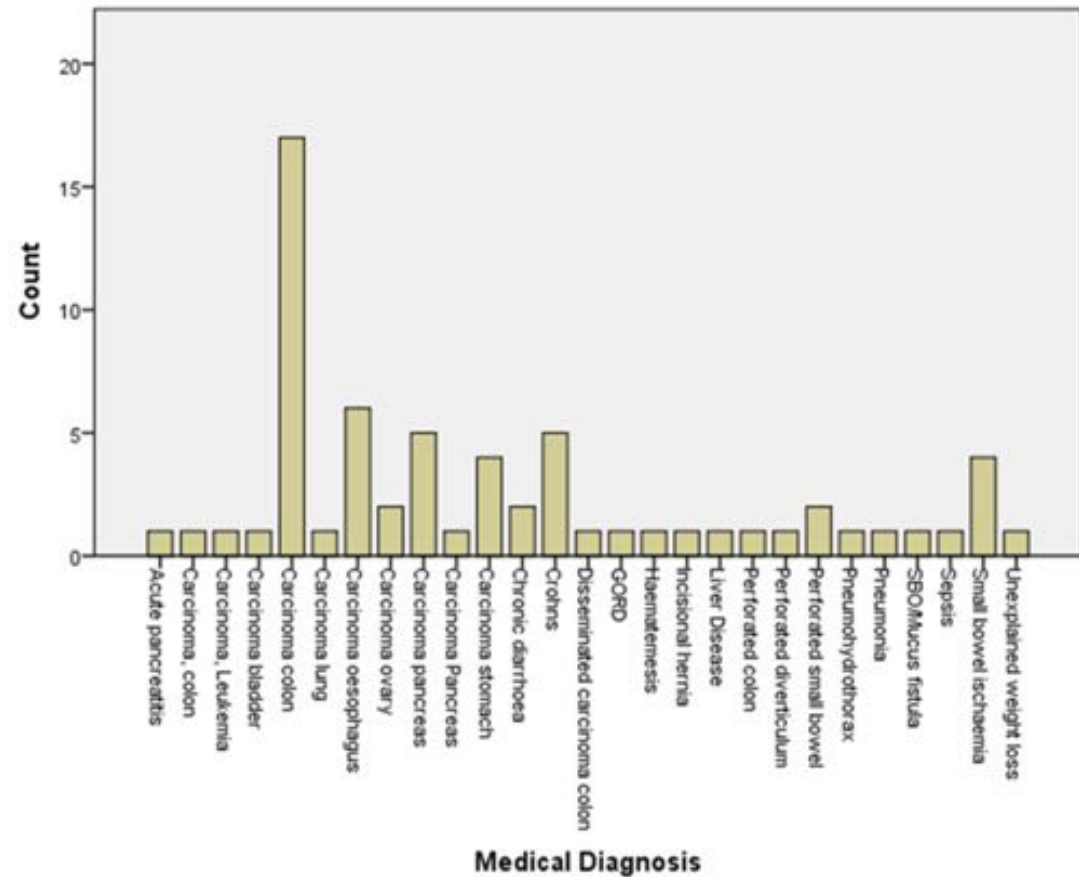
Ca colon 25%

Ca oesophagus 9%

Ca pancreas 8%

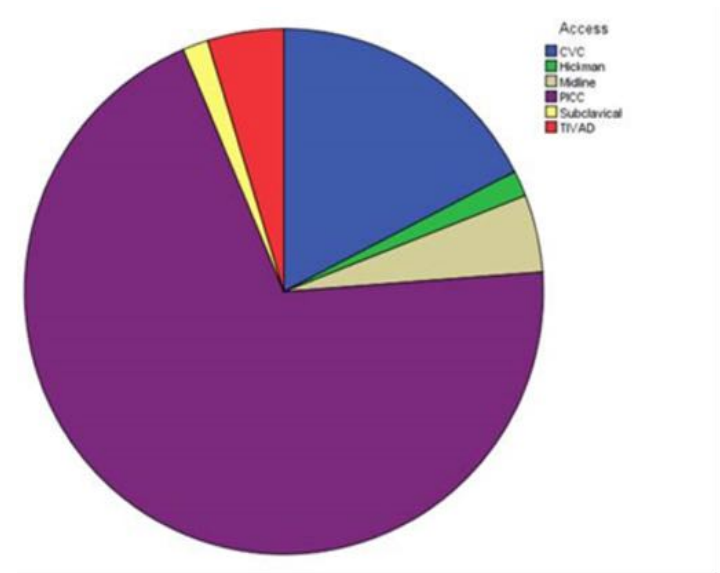
Crohns disease 8%

Ca stomach 6%



## PN Access

- PICC most frequently used means for administering PN- 66%
- CVC frequently inserted intraoperatively -16%
- TIVADS small numbers-5% - HPN patients most commonly admitted with suspected sepsis



# Results

## Demographics and anthropometrics

	Number	
Total patients	65 (58 Derriford , 7 Yeovil)	
Gender (m:f)	30:34	
Visits	65 (1-24)	
	<b>First visit</b>	<b>Last visit</b>
Weight	75kg (42-165) N=59	71kg (46-106) N=22
BMI	26 kg/m <sup>2</sup> (15-60) N=54	24kg/m <sup>2</sup> (14-34)N=20
Grip	19.7 (5.2-39.6) N=26	22.6 (4.4-52.6) N=16
Serum albumin	26.5 (16-37) N=56	26.9 (16-37) N=48
Serum CRP	129(1-445) N=62	82 (1-260) N=55
Alk Phos.	119 (41-957) N=56	148 (20-814) N=46

# Results

	Initial visit (kcal/d and g/d) Mean (min-max)	Final visit Mean (min-max)
Total estimated energy requirement	1793 (1293-2936)	
Total Energy intake (kcal/d)	609 (0-2530)	1504 (200-3064)
Energy intake relative to requirements	33.9%	83.8%
Total estimated protein requirement	84 (38-188)	
Total protein intake (g/d)	19 (0-67)	58 (8-112)
Protein Intake relative to requirements	23%	69%



# Problems with data input

Comment	Example	Resulting problem
Poor consistency in format/spelling/syntax when recording text data	70mls per hour and 70 ml/hr	Database (SPSS) recognises each variation as a different variable, confusing graphics & tabulated data
Same information recorded twice using different variable names	PN Prescription and PN Order	Some data recorded as one variable and some as the other variable Some patients have <i>different</i> data recorded on each
Too many variables/terms, some with: -limited data recorded or NO data recorded in them  -Good recording of data, but is this necessary for all patients?	Random (casual) glucose  Renal biochemistry	Many missing variables  Waste of time recording unnecessary data Clutters data recording sheet

# Problems with data input

Comment	Example	Resulting problem
Flagging of assessment term/variables at first visit as 'normal' led to the term <i>not</i> being carried over for follow-up assessment.	An acutely admitted patient or well-managed Type 2 DM patient may have 'normal' biochemistry on admission, and the prompt to follow-up was not then carried forward.	Necessary biochemistry for a deteriorating patient could be missed if the monitoring dietitian only followed ANDHII prompts.

# ANDHII Trial Feedback & Improvements

Based on user and investigator feedback, several ANDHII software improvements were added and more are in progress or planned:

- Option to include 'custom' project terms in reporting
- Application/browser session timeouts were increased
- Crosstab Report enhancements (Coming Soon)
  - Option to include text-based terms and values when reporting for First, Last or All. Numeric terms only required for mathematical Sum and Average options.
- Alternate research-friendly output formats, eg data transform to per pt / per visit, for easier statistical analysis (Coming Soon)

# Conclusions

- “Core Data Set” variables should mirror the Nutrition Care Process (NCP) of both ANDHI & BDA, to include variable relevant to diagnosis, assessment, monitoring and evaluation of outcome measures.
- To maximise consistency and efficiency and minimise missing data for group evaluation, it is essential to identify and prioritise a minimal “core data set”.
- “Core Data Set” follow-up variables need to be recorded at every visit, as the ‘final visit’ cannot always be anticipated.
- Consistency in the chosen method of recording patient data is essential
- Inclusion of some additional terms such as ‘medical diagnosis’, as a ‘bespoke’ variable for CANDHII has been of value in the analysis of group outcomes.

# Conclusions

- The creation of a 'bespoke' data collection tool for PN patients within the CANDHII project helped support a more rapid assessment of patients at ward level.
- However, dietitians still have access to all other ANDHII variables (1700 in total from NCPT) and this led to the random selection on non-preferred terms for recording of data, 'weight' for example, and inclusion of a host of other 'random' variable within our final dataset, creating a huge spreadsheet of variable for analysis.
- Assessment and monitoring of individual patients is the key focus of the ANDHII process and not the evaluation of group outcome measures, which is very complex.

# Conclusions

From a patient 'group' perspective, 'outcome measures/variables' should enable us to evaluate

- (a) The effectiveness of patient care: we need to consider which terms/variable enable us to demonstrate that the patient's condition has improved? This may not be regarded as dietetic specific?
- (b) The effectiveness of dietetic input to patient care: we need to consider which terms/variable enable us to demonstrate that we have made a unique contribution to patient care? Is this realistic? Are there any skills/activities of dietitians that are unique? Do other members of the MDT need to prove this?

# Conclusions

- The selection of appropriate terms/variable to make this judgment is a much more complex process and as stated, is not readily supported by ANDHII at present.
- We also need a better understanding of which 'Core Data' terms/variable can be regarded as 'outcome measures'. This takes us back to the issue of 'key questions' and how we can use 'outcome measures' to answer these.
- This CANDHII project has enabled us to consider which terms/variable are of value in determining outcome measures, but our dataset is small and larger follow-up projects are required

# Core Dietetic Data Monitoring

What should our 'Key Questions' be?

Any further questions?

**THANK YOU FOR LISTENING**

Acknowledgements:

Louise Cleary Dietitian Assistant Plymouth University Hospital

