Guidance notes on evaluation of data in the Excel spreadsheet to calculate human milk intake by breastfed infants

1) Look at the graph. Does the line go through the data points?

2) If ‘Yes’ and the Total Error is less than 60, the model is a good fit to the data.

3) Check the volume of Human Milk Intake (HMI) and Non-milk oral intake (NMOI).
   a. Values over 1500 g per day are suspect.
   b. Occasionally negative values of NMOI occur. Small negative values (-25 to -1) are acceptable and should be included.
   c. If the NMOI is less than -25 and the total error is less than 60 it should be noted, but can be included in the final database.
   d. If the NMOI is less than -25 and the error is greater than 60. The data should not be included in the final database.
   e. A note should be kept of all the data excluded, and the reason for exclusion.
4) Check the mother’s body composition data. The % body fat should be greater than 15% in adult women.

<table>
<thead>
<tr>
<th>MOTHER’S BODY COMPOSITION</th>
<th>D space (V_m), kg</th>
<th>% body wt</th>
<th>normal values</th>
</tr>
</thead>
<tbody>
<tr>
<td>TBW, kg</td>
<td>34.4</td>
<td>53.2</td>
<td>40-65%</td>
</tr>
<tr>
<td>Fat-Free Mass, kg</td>
<td>46.9</td>
<td>72.7</td>
<td>50-85%</td>
</tr>
<tr>
<td>Body fat, kg</td>
<td>17.6</td>
<td>27.3</td>
<td>10-50%</td>
</tr>
<tr>
<td>Fat, %</td>
<td>27.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water intake, kg.d⁻¹</td>
<td>5.50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Negative values probably indicate a problem with dosing. The body composition data needs to be rejected, because the amount of deuterium consumed is not correct. The dose of deuterium is not included in the model for determining human milk intake, so it is possible to accept the values for Human milk intake and Non-milk oral intake, but reject the body composition data.

b. An estimate of the expected enrichment of deuterium on Day 1 can be obtained by estimating the mother’s Total Body Water \((7.4 \times \text{Height}^3)\) in kg and dividing the administered dose (mg) by the TBW in kg.

For example,

Mother’s Height = 160 cm = 1.60 m

Dose = 30 g = 30 000 mg

Estimated TBW = \(7.4 \times (1.60 \times 1.60 \times 1.60) = 30.3\) kg

Expected enrichment on Day 1 = \(30 000 \text{ mg} /30.3\) kg

= 990 mg/kg (ppm)
5) If the Total Error is greater than 60, look at the mean square error (MSE) for the individual data points and the coefficient of variation (CV) for the deuterium analysis. Replicates should agree within 1%. If there is one point with a very large error, try deleting the data from that line and use ‘Solver’ again to fit the curves to the remaining data.

**Note:** The lab should not report duplicates that do not agree. The sample analysis should be repeated.

**Before**

![Before graph](image1)

Total Error = 69.7  
HMI = 552 g/d  
NMOI = 590 g/d

**After**

![After graph](image2)

Total Error = 36.0  
HMI = 543 g/d  
NMOI = 611 g/d

[In this case, it did not make much difference to the volumes]
6) Look at the volume of HMI and NMOI.

Total Error = 198.86  HMI = 2389 g/d  NMOI = 78638 g/d

When the mother is not breastfeeding, or only occasionally breastfeeding, the assumptions in the model break down, and the results are clearly non-physiological. No person can drink 78 litres of water per day!

Note: In this case, the data on the mother's body composition should be OK.

Categorization of infant feeding practices

From the NMOI, infant feeding can be categorized as

1) Exclusive breastfeeding  NMOI < or = 25 g/d
2) Predominantly breastfeeding  NMOI 25 - 220 g/d
3) Partially breastfeeding  NMOI >220 g/d

Limits based on data from Haisma et al. EJCN 2003

We would expect that at 3 months and 6 months most infants should be in Category 1 or 2. At 9 months, they should be in Categories 2 and 3, and at 12 months they should be in Category 3.

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