London Measure of Unplanned Pregnancy (LMUP)

ANALYSIS GUIDANCE

This short paper offers simple guidance about analysis to people using the LMUP. Following sections include:

> *Use the full LMUP scale where possible*
> *Presenting the LMUP scores on their own*
> *LMUP scores by a dichotomous categorical variable*
> *LMUP scores by a categorical variable with three or more response options*
> *Multifactorial analysis with the LMUP as the outcome variable*
> *Interpreting the LMUP scale*

Use the full LMUP scale where possible

Analysis of the LMUP scores should use the full scale wherever possible, otherwise there is unnecessary loss of statistical power and a decrease in interpretability. In the Barrett et al (2004) paper it explains….

> *"The increasing scores of the measure represent increasing degrees of pregnancy planning/intention and there are no obvious cut points in the scale; each score provides additional information" (p.431).*

Hall et al (2017) provide comprehensive advice on using the LMUP as an outcome measure, recommending the use of the full scale where possible.

Presenting the LMUP scores on their own.

The LMUP scores are best presented as a frequency distribution, bar chart or histogram, or as median and inter-quartile range (or mean and standard deviation depending on the distribution of scores). If presenting simple headline prevalence estimates, this information can be supplemented with the information about the three sections of the scale (see 'interpreting the LMUP scale' below).

Examples of presentation are given over the page.

LMUP score (frequency distribution)

	Frequency	Percent
.00	15	2.3
1.00	54	8.3
2.00	59	9.1
3.00	52	8.0
4.00	25	3.8
5.00	31	4.8
6.00	22	3.4
7.00	24	3.7
8.00	30	4.6
9.00	18	2.8
10.00	67	10.3
11.00	91	14.0
12.00	163	25.0
Total	651	100.0

A bar chart showing the same information as the frequency distribution *(NB. The skewed, possibly bimodal, distribution is clearer to the eye)*
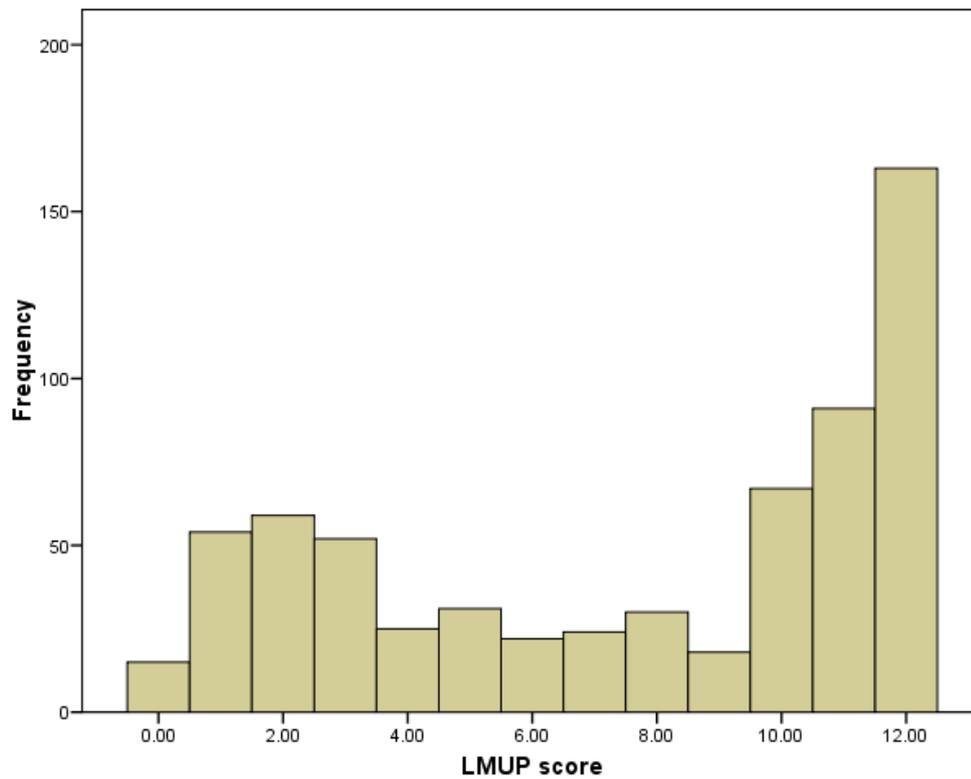
Mean 7.5 (SD 4.2)

Median 9 (Interquartile range 3 to 12)

(*NB. In this instance, the median and inter-quartile range is probably a better choice than the mean and SD as it more accurately reflects the skewed data.*)

LMUP scores by a dichotomous categorical variable

The data are best presented as medians and IQ range (or mean and SD, if appropriate) in a table, or as boxplots. The Mann-Whitney U test (non-parametric equivalent of t-test) is an appropriate significance test if the data are not Normal. Two examples below:

Variable	LMUP score Median (IQ range)	p-value
Pregnancy outcome		<0.001
-continued to term	11 (7 to 12)	
-abortion	2 (1 to 3)	
Born in Britain?		0.12
-yes	10 (3 to 12)	
-no	9 (3 to 11)	

Boxplots showing the same data are over the page. (For each box, the line across the middle represents the median and the edges of the box are the 25th and 75th percentiles.)
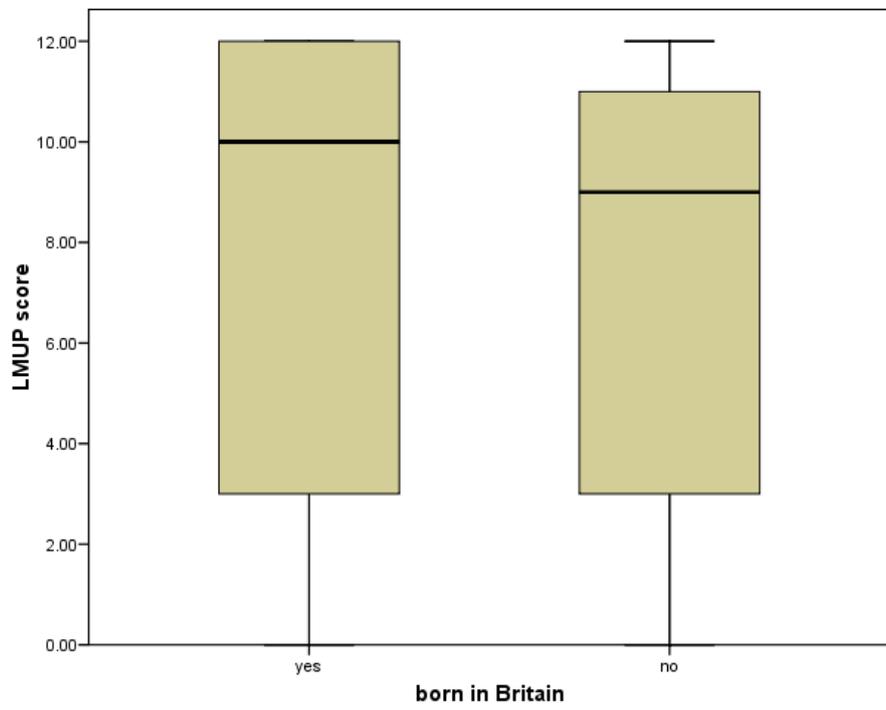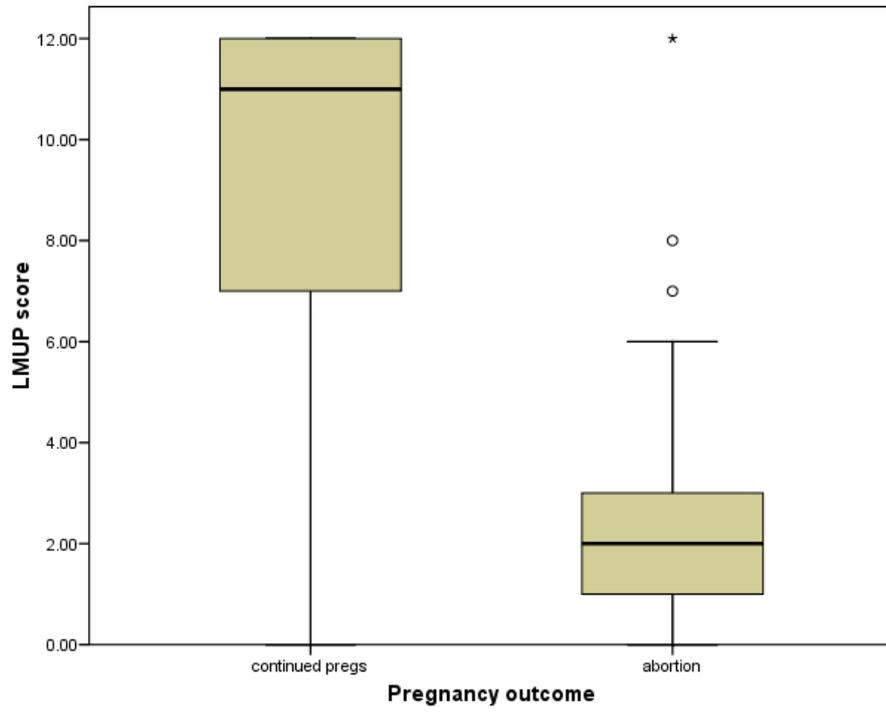
LMUP scores by a categorical variable with three or more response options

The data are best presented as medians and IQ range (or mean and SD, if appropriate) for each response option in a table, or as boxplots. The Kruskal-Wallis test (non-parametric equivalent of Anova) is an appropriate significance test. Two examples below:

Variable	LMUP score Median (IQ range)	p-value
Pregnancy outcome		<0.001
<20	3 (2 to 5)	
20-24	4 (2 to 10)	
25-29	9 (3 to 11)	
30-34	11 (8 to 12)	
35-39	11 (8 to 12)	
40+	10 (4 to 12)	
Educational level		<0.001
School	6 (2 to 11)	
Post-16 education	7 (3 to 11)	
Higher education	11 (5 to 12)	

Boxplots showing the same data are over the page.
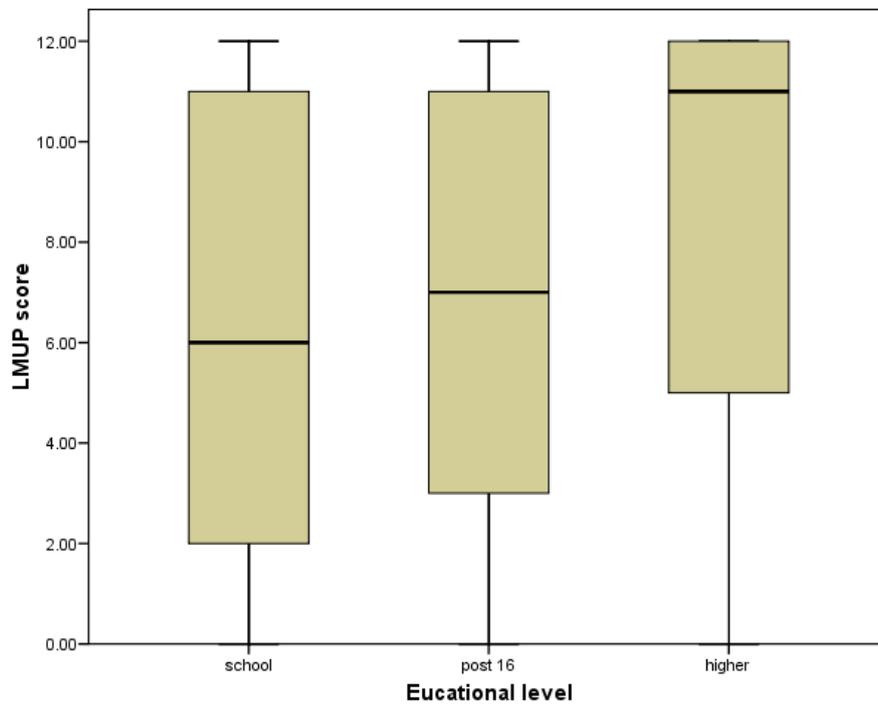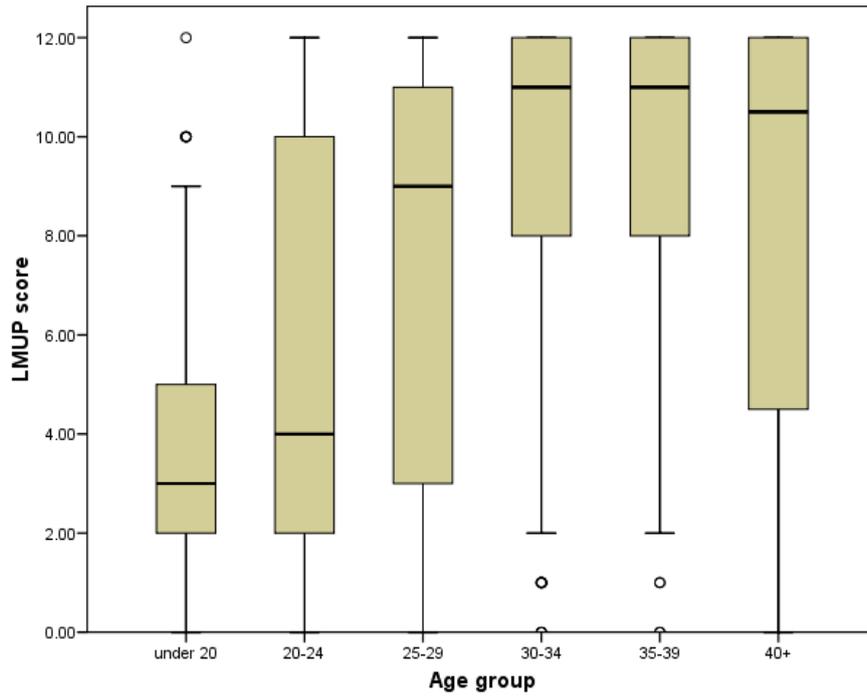
Multifactorial analysis with the LMUP as the outcome variable

There are several options for multifactorial analysis with the LMUP as an outcome variable. Hall et al (2017) have published comprehensive advice. If you seek further advice on multifactorial analysis using the LMUP , please contact Jenny Hall (jennifer.hall@ucl.ac.uk).

Interpreting the LMUP scale

In terms of understanding the LMUP scores, particularly headline prevalence estimates, provisional guidance is given in Barrett et al (2004) and, more fully, in Geraldine Barrett's PhD thesis (Barrett, 2002):

      10-12 planned (or highly planned)
      4-9   ambivalent
      0-3   unplanned

Please note that this does NOT mean that the LMUP scores should be divided into three categories as a matter of course for the purposes of analysis. The full range of scores should be used wherever possible as this provides the maximum statistical and explanatory power within an analysis (Hall et al, 2017). As explained earlier each score represents an increase in pregnancy planning/intention. Below is the data shown earlier as a frequency distribution earlier, here shown in the three categories.

	Frequency	Percent
0-3 (unplanned)	180	27.6
4-9 (ambivalent)	150	23.0
10-12 (planned)	321	49.3
Total	651	100.0

If one cutpoint in the LMUP scale is used, for instance to provide simple, headline figures of the number of planned/intended pregnancies, then the cutpoint should be between 9 and 10 (i.e. an LMUP score of 10+ being "planned", and a score of 0-9 being "unplanned") (Hall et al, 2017).

Further information

For further information or help, please contact Geraldine Barrett (g.barrett@ucl.ac.uk) or Jenny Hall (jennifer.hall@ucl.ac.uk).

References

Barrett G. 2002. *Developing a measure of unplanned pregnancy*. University of London. Unpublished PhD thesis.

Barrett G, Smith SC, Wellings K. 2004 Conceptualisation, development and evaluation of a measure of unplanned pregnancy *Journal of Epidemiology and Community Health* 58:426-433

Hall JA, Barrett G, Copas A, Stephenson J. 2017 London Measure of Unplanned Pregnancy: guidance for its use as an outcome measure *Patient Related Outcome Measures* 8:43-56

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