

# How useful is the Guideline Development Group's (GDG) BiliWheel as a tool for implementing their guidance on management decisions about neonatal jaundice?

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## SAMPLE OF CASE VIGNETTE USED DURING VALIDATION

Postnatal visit on 27-8-2010 at 2.30 pm Transcutaneous bilirubin reading: 240 micromol/L (14 mg/dl)

Gender: Male GA: 37 weeks BW: 2.7kg Mother's ethnic origin: Asian Feeding: Formula  
Date of Birth: 25-8-2010 Time of birth: 10.00 pm Time of discharge: 10.00am on 26-8-2010  
Bilirubin at discharge: Not recorded Bilirubin at 48 hours: 160 micromol/L (9.4 mg/dl)

**BACKGROUND:** The BiliWheel was conceived of by the Neonatal Jaundice Guideline Development Group (GDG) as an aid for clinical staff. The GDG accepted that while visual inspection was useful in recognizing jaundice, it was unreliable in estimating its severity, and the GDG recommended that bilirubin levels be measured and managed according to age-appropriate management thresholds. Another problem is that it is generally accepted that calculating age in hours quickly and accurately is difficult. The GDG saw a need to create a tool that would make calculating the age in hours easier and would also inform on the age-appropriate management strategy recommended in the guidance. A tool was developed and an evaluation study carried out.

**METHODS:** Second and third year midwifery students were presented with six case vignettes of babies with jaundice and asked to complete a questionnaire covering clinical decisions (age in hours and appropriate management), feedback on design and layout issues, and a 5 point scale for determining the usefulness of the BiliWheel.

**RESULTS:** Overall 94 midwifery students took part and tested three iterations of the BiliWheel (only 86 reported on the age in hours and management questions). 447 (87%) of the 513 responses (3 missing) correctly calculated the age in hours with 46 (53%) of the students correctly calculating the age in hours for all case vignettes. Of the 406 who reported on appropriate management strategy 317 (78%) decided on the correct management strategy. Satisfaction and confidence with the BiliWheel was high but it was noted that additional training in its use would allow midwives be more confident in using it. Commonly reported themes included advice on colour, font size, size of window, need for more information and instructions.

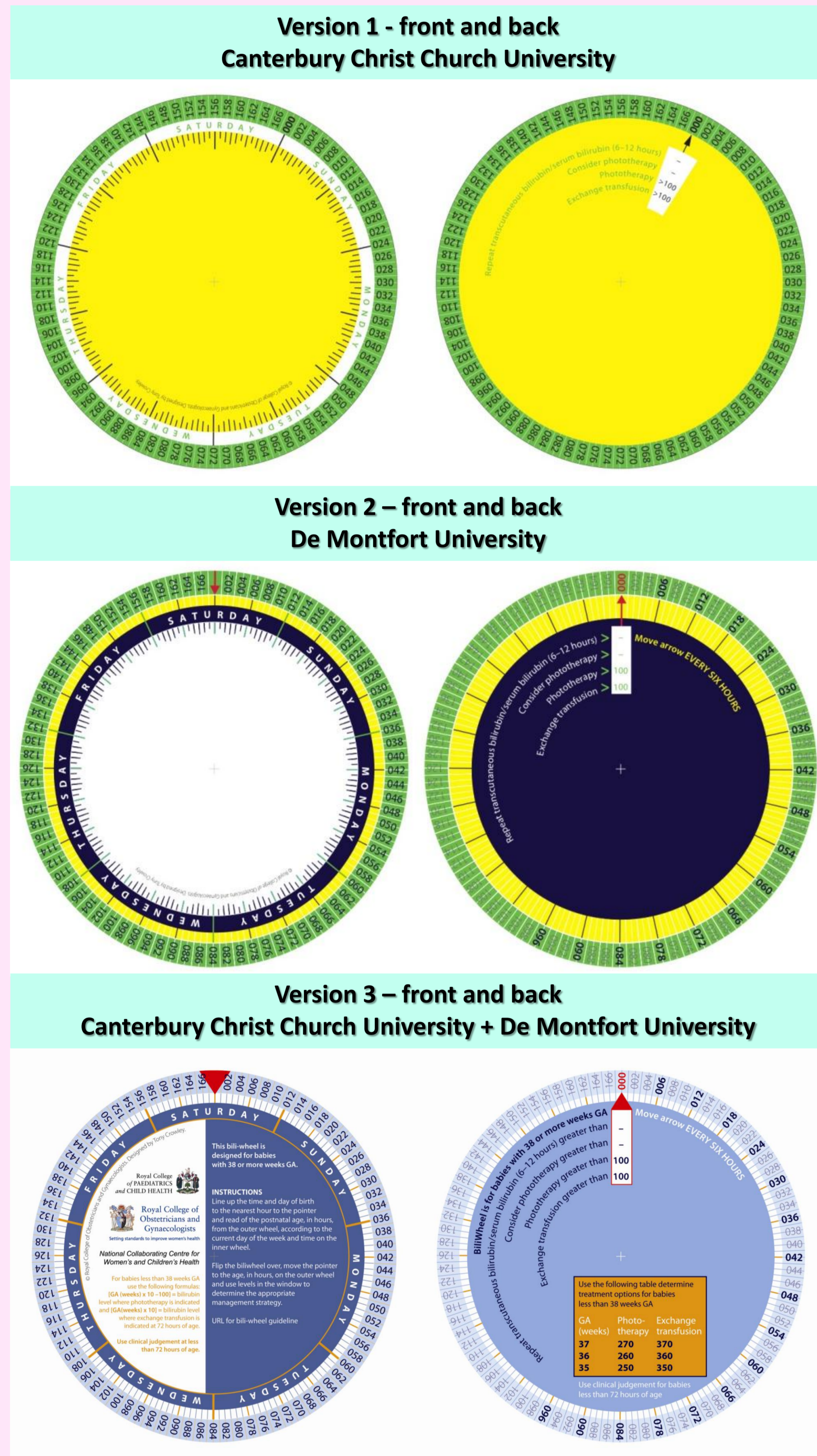
**DISCUSSION:** Developing an implementation tool is a rewarded activity for a GDG. It help raise the profile of a guideline and can facilitate changes in clinical practice. However it is time consuming to develop and validate an implementation tool. This process does not always fit easily within the tight deadlines for guidelines. Adequate thought and provision should be given to the need for training and support for new implementation tools. After successful validation, we are planning a case-control study in which the BiliWheel will be compared to usual care after which the BiliWheel will be made available on the internet for health care professionals.

## Comments and suggestions

- 'make time indicator more obvious'
- 'days of week written inside the lines so lines match up'
- 'needs to be clearer and easier to use'
- 'the window to be bigger so don't have to round it up or down'
- 'require larger font to make easier to read and also require better indicator'
- 'too small, colour too bright makes the definition between lines difficult, Window too small, indicators difficult to read'

- 'the white lines on the yellow background were difficult to see'
- 'make distinction line clearer so easier to line up times in the day section'
- 'colours other than green and red, some people are colour blind and cannot read red on green'
- 'the numbers are quite small'
- 'change indicator colour to make it more distinct'
- 'colour scheme – values side quite dark, day side dislike white middle'
- 'make indicator a bit larger / clearer'
- 'the time scale is not clear or easy to see'

- 'put times on wheel: 6am, 12pm, 6pm, 12am'
- 'although the colour works well, its the same colour as the EDD + BMI wheel'
- 'Gold writing difficult to read'
- 'may be easier to read if management statements were changed to read "less than"'
- 'change the colour of the font for each level of SBR eg green for repeat SBR, amber/orange for phototherapy, red for exchange transfusion.'
- 'needs better labelling, instructions on how to use'
- 'instructions need to be in a bigger font'



## Satisfaction with the BiliWheel

	Version 1 (N = 28)	Version 2 (N = 32)	Version 3 (N = 34)		Version 1 (N = 28)	Version 2 (N = 32)	Version 3 (N = 34)
During the Pilot Test of this Device, I found...	1 = Strongly disagree - 5 = Strongly Agree			Design of the BiliWheel	1 = Strongly disagree - 5 = Strongly Agree		
The BiliWheel was easy to use	3.65 ± 0.89	3.50 ± 0.91	3.53 ± 1.05	The BiliWheel is an acceptable size	4.08 ± 1.20	4.00 ± 0.84	4.18 ± 0.58
I could work out how to use the BiliWheel with minimal training	4.04 ± 0.92	3.91 ± 1.02	3.74 ± 1.02	The colour scheme was acceptable	4.23 ± 0.82	3.47 ± 0.98	4.29 ± 0.52
The BiliWheel informs my clinical practice	4.35 ± 0.75	3.97 ± 0.90	4.03 ± 0.90	The text (font and size) was easy to read	3.69 ± 1.01	3.25 ± 0.91	3.94 ± 0.85
The BiliWheel will facilitate safe practice in the management of jaundice	4.35 ± 0.85	4.13 ± 0.75	4.09 ± 0.97	The indicator was easy to see	3.15 ± 0.88	3.44 ± 0.84	3.74 ± 1.24
				The window was sized appropriately	3.23 ± 1.14	3.69 ± 0.82	3.62 ± 1.16

## LEARNING OBJECTIVES (TRAINING GOALS):

- The validation process corroborated the GDG's assertion that the development of a bespoke tool would help health care professionals follow the recommendations in the guideline in their clinical practice
- Outcomes
  - The GDG's range of experience enabled them to identify a key barrier to implementation and come up with a practical idea for a tool that drew on health care professionals existing training and resources i.e. The gestational age wheel
  - Validation indicated that the tool did help healthcare professionals make the correct decisions about management options
  - Creating a tool partially resolved the fact that the recommendations called for a significant change in practice but basing management decisions on bilirubin level and age in hours remained inherently difficult to implement
  - the GDG nor technical team were not sufficiently experienced or resourced in product development to ensure that their tool survived the validation process
- The validation process identified training needs of health care professionals using the tool and that at least an hour of instruction was required to ensure correct use of the tool
- Barriers to the development of guideline-specific implementation tools identified by the biliwheel example include:
  - Insufficient time to develop tools during the guideline development process
  - Identified a funding requirement to create fit-for-purpose prototypes for use during validation
  - Lack of experience in product development which contributed to avoidable errors occurring during validation

## Acknowledgements:

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