Using new technologies to capture infant sleep: protocol for the BabyCam pilot study

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BACKGROUND

- Waking and crying out during sleep periods is one of the earliest and most common sleep problems:
  - reported by as many as 20-30% of infants' parents from many countries[1,2]

- The ability of an infant to self-settle without the use of external aids is believed to be one of the earliest markers of self-regulation, and predicts the development of healthy sleep–wake patterns in later years[2].

- Traditional methods of assessing settling techniques and baby responses rely on:
  - *parental report* - can be inaccurate
  - *video capture* - limited as the camera is fixed in one place

- Given that daytime naps are an important component of an infant's total sleep, it is important we can look at sleep in ALL environments.

How do infants ***get*** to sleep and ***stay*** asleep?

OBJECTIVES

Primary Aim
To assess the ability of a self-worn auto-camera to capture important aspects of infant *sleep-wake behaviours* in all environments.

Secondary Aim
To assess the *acceptance* of the wearable camera by the families and review the operational procedures.

METHODS

Data Collection
Thirty healthy infants aged three to six months will be recruited via community advertising. Sleep, wake and self-settling behaviour will be captured during daytime naps using four different tools:

- A *video camera* will be fixed to the cot/bassinette, which has the advantage of continuously recording all sleep behaviour.
- An *auto-camera* will be worn on a headband by the infant which takes a still image every 15 seconds.
- Infants will wear an *accelerometer,* which measures both sleep and rest, but not settling.
- Parents will complete *sleep-wake and behaviour diaries* to log crying and self-settling behaviour.

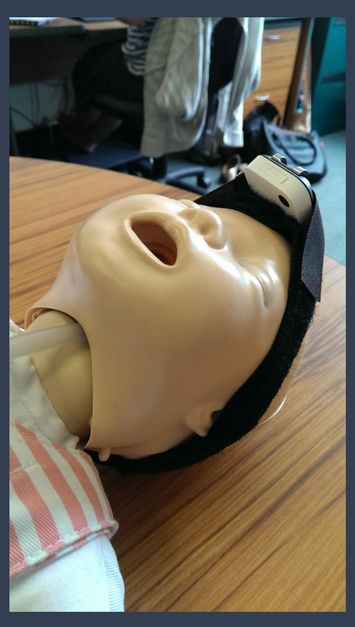
Finally, parents will complete questionnaires assessing the acceptability of methods, which will be used to revise the protocol and operational use of the auto-camera.

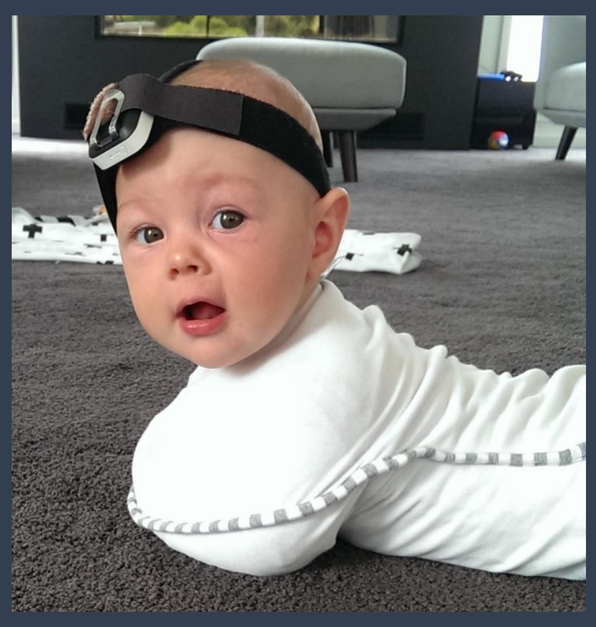
Data Analysis
- Video and auto-camera recordings will be viewed using Timelapse2 software.
- A *coding system* will be established based around the main themes of:
  - sleep, awake, drowsy, awake content, awake fuss/crying, awake feeding, indeterminate, out of view, camera turned off[3,4]
- Accelerometer data and sleep-wake diaries will be used as comparative markers of sleep and wake periods.

Wearable ***auto-cameras*** may capture self-settling behaviours more ***accurately***

CONCLUSIONS

- Self-settling is associated with healthy sleep-wake habits in later years.
- Improving measurement to enhance our understanding of the mechanisms behind the relationship between sleep and health is important.
- Comparing our gold standard video footage with the sample of still photos, we will be able to determine the proportion of behaviours correctly identified.
- This pilot study will inform methods for future intervention studies focusing on improving sleep early in life to benefit long term health, including:
  - Sleep
  - Weight
  - Behavioural regulation





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