Real Time Measurement of Work-Related Stress & Well Being in Critical Care Nurses: A Feasibility Study

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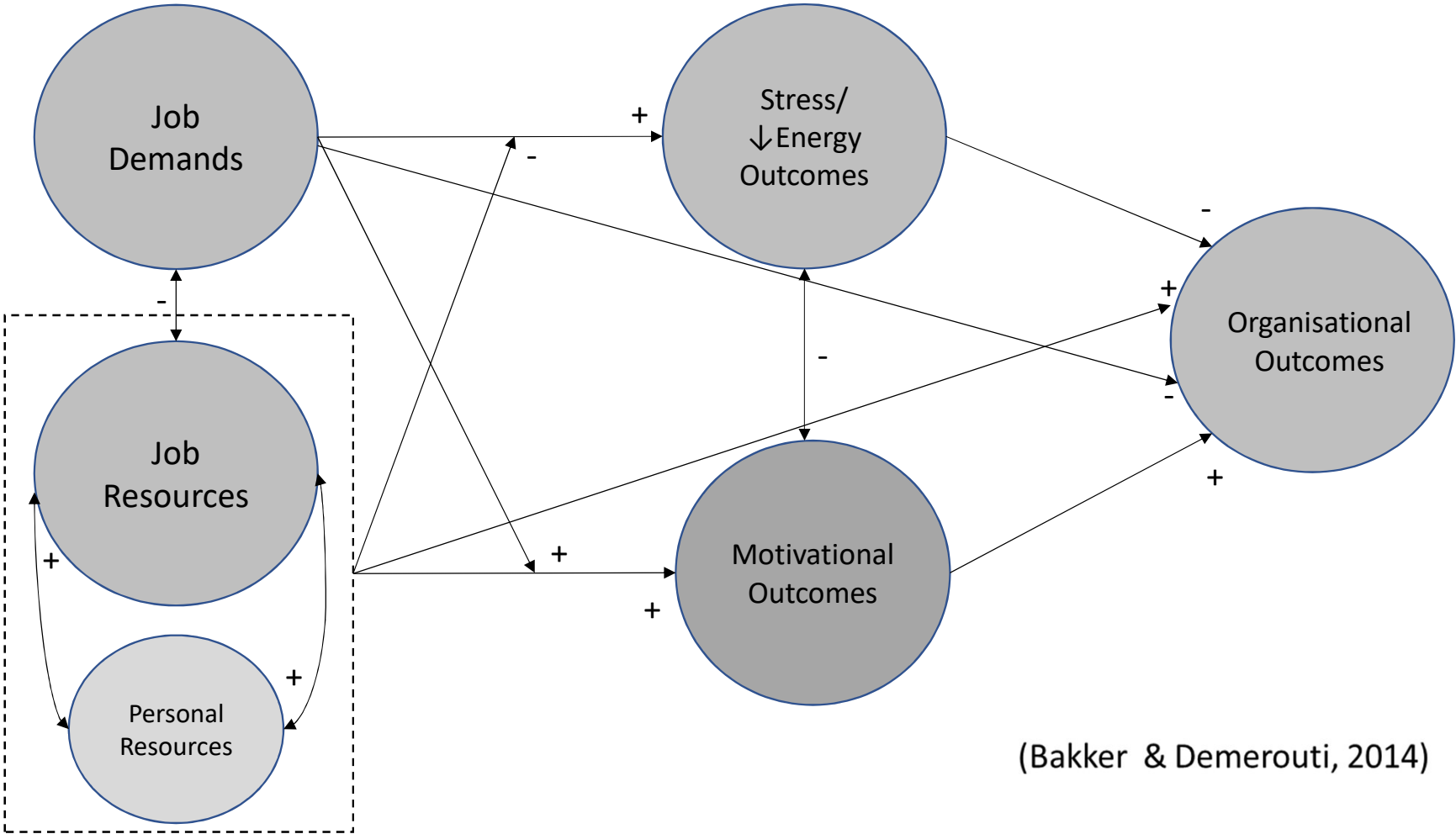Prof. Martyn Jones, Dr Jan Boehnke, Dr Kenny Morrison & Dr Janice Rattray.

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Job Demand-Resource Model Concepts

(Bakker & Demerouti, 2014)

Aims of this Presentation

- To outline the processes in electronic diary development.

- To present the results of the feasibility & acceptability test of the diary & study protocol, used to measure work-related stress & well being within critical care nurses (CCNs).

Ecological Momentary Assessment (EMA)

"EMA…allows subjects… to report repeatedly on their experiences in real-time, in real-world settings, over time and across contexts".

(Shiffman, Stone & Hufford, 2008, p3)
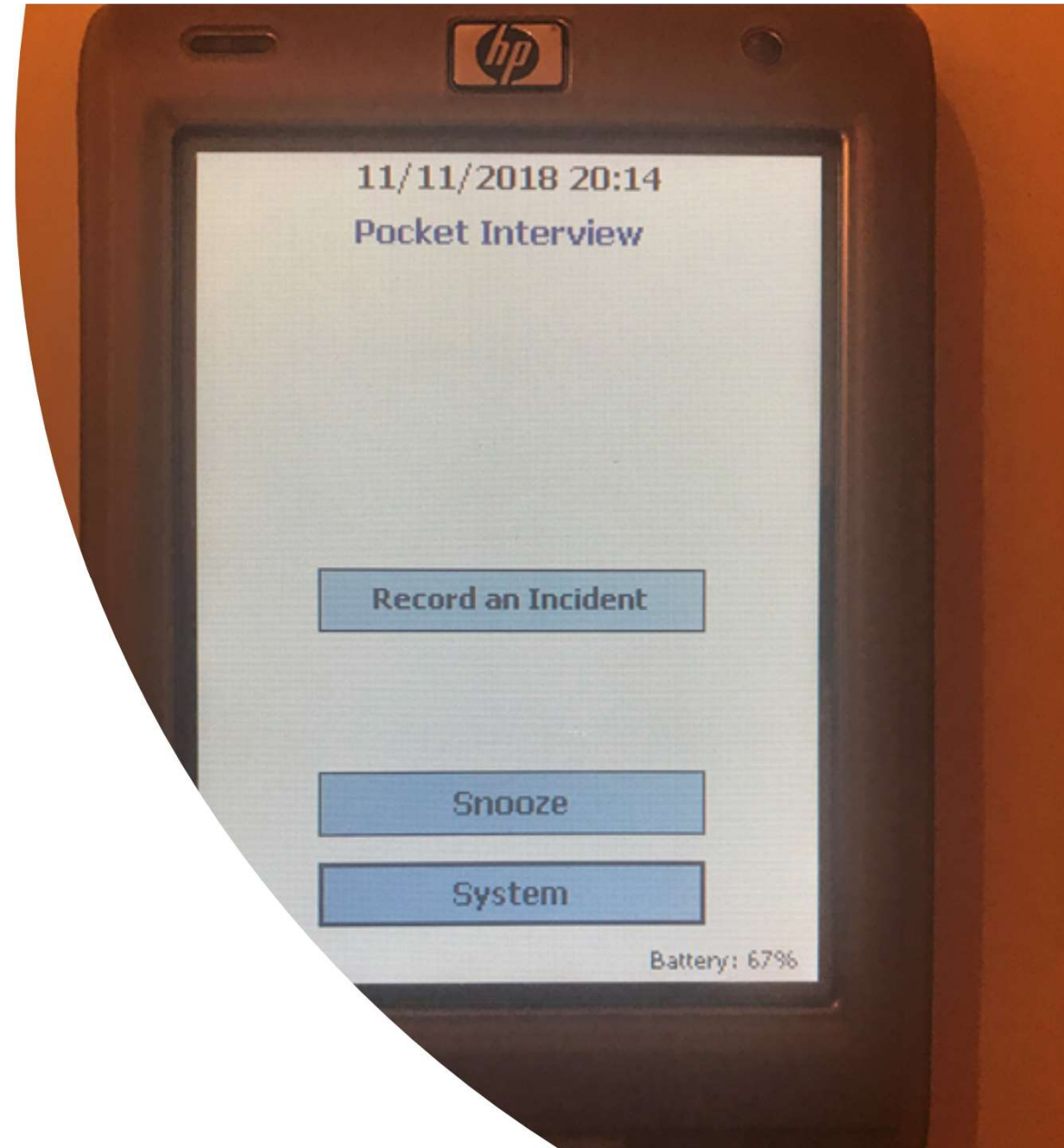
Summary of Method for Electronic Diary Development & Feasibility Testing

1. Selection of Measures & Diary Structure

2. Developing, Programming & Preliminary Tests of PDAs (i) Research Team; (ii) Participants.

3. Testing the Study Protocol (i) Recruitment; (ii) Supporting Participants; (iii) Data Transfer

4. Determining Acceptability & Feasibility

1. Method - Measures

Job Demands

Pace of Work (3-items), *Emotional* (1-item), *Physical* (1-item), *Mental* (1-item), *Work Organisation* (1-item), *Complexity of Work* (3-items), all responses on VAS (0-100; Labelled *'No'* to *'Yes'*) (Van Veldhoven et al, 2015). *Incident Involving Relatives* (End of Shift Only), responses free text comments.

Job Resources

Autonomy (2-items), *Support from Colleagues* (2-items), *Support from Supervisor* (2-items), *Clarity of Task* (1-item), *Control* (3-items) all responses on VAS (0-100; Labelled *'No'* to *'Yes'*) (Van Veldhoven et al, 2015).

CCN Outcomes

Stress (stressed, nervous, calm & relaxed) (4-items); *Hedonic Tone* (happy, cheerful, sad, angry) (4-items); *Fatigue* (tired, sluggish, alert, energetic) (4-items), all responses on VAS (0-100; Labelled *'No'* to *'Yes'*) (Kamarck et al, 1998; Waterston et al 2011). *Job Satisfaction* (1-item) (Van Veldhoven et al, 2015); *Exhaustion* (1-item) (Maslach & Jackson, 2001), responses to both items on VAS (0-100). *Recovery from Last Shift* (beginning of shift only), responses on VAS (0-100) (Van Veldhoven et al, 2015).

Organisational Outcomes

Patient Safety (end of shift) (1-item), categorial response format, where 0=failing, 1=poor, 2=acceptable, 3=very good, 4=excellent; *Quality of Care* (end of shift) (1-item), categorial response format, where 0=poor, 1=fair, 2=good, 3=excellent (Mallidou et al 2011). *Care Left Undone* (end of shift) (12-items), binary response category (yes/no); *Risk to Patient* (end of shift) (12-items), all responses on VAS (0-100) (Ball et al, 2012).
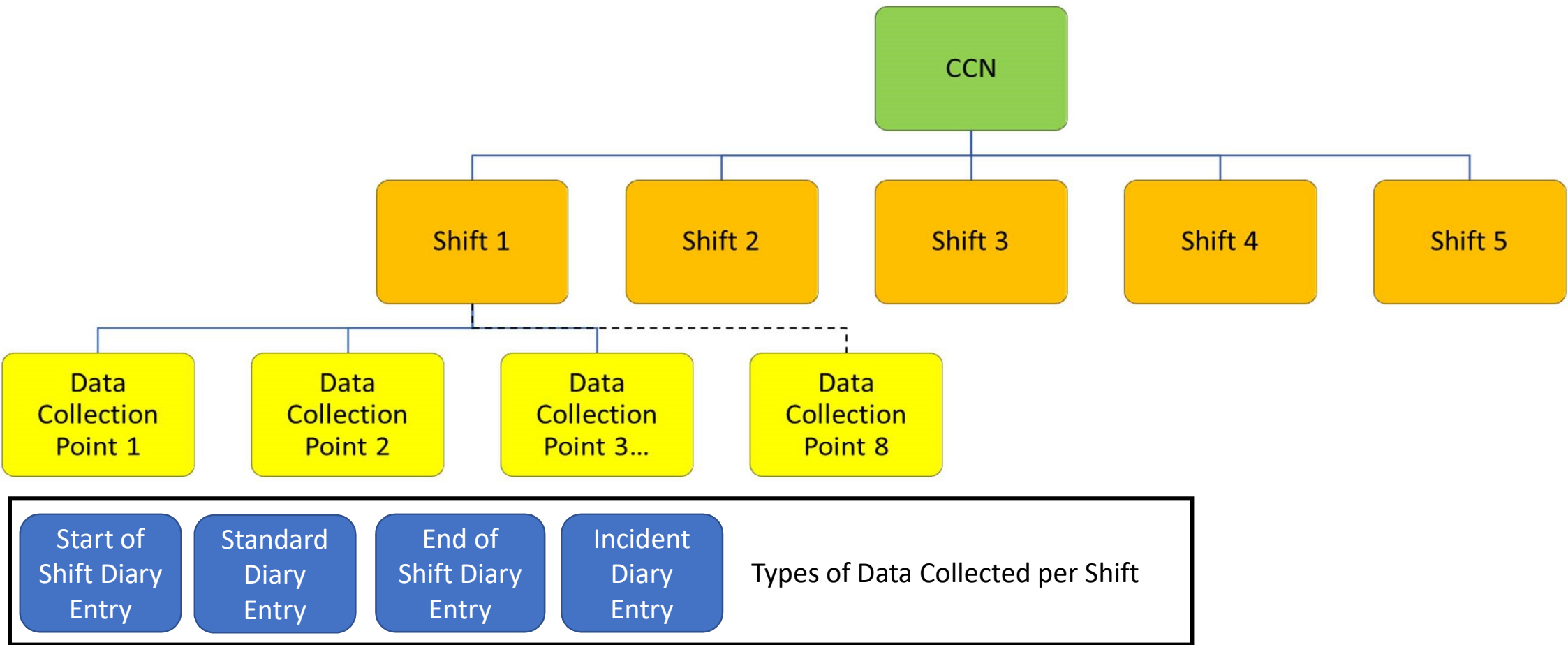
1. Method - Item Response Categories
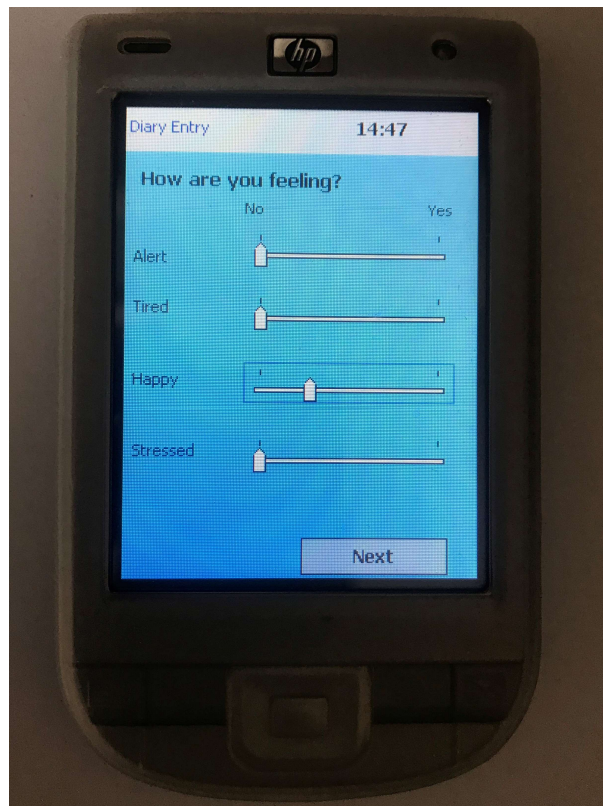
Visual Analogue Scales
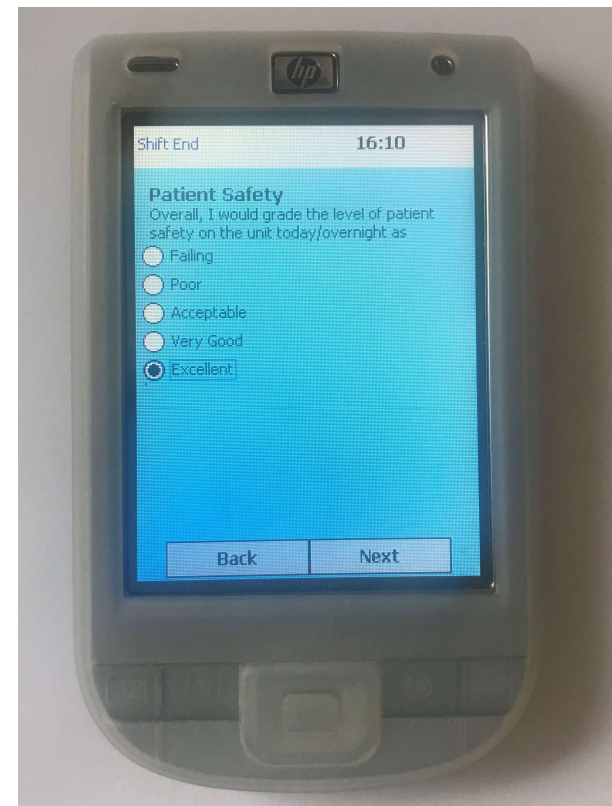
Radiobutton

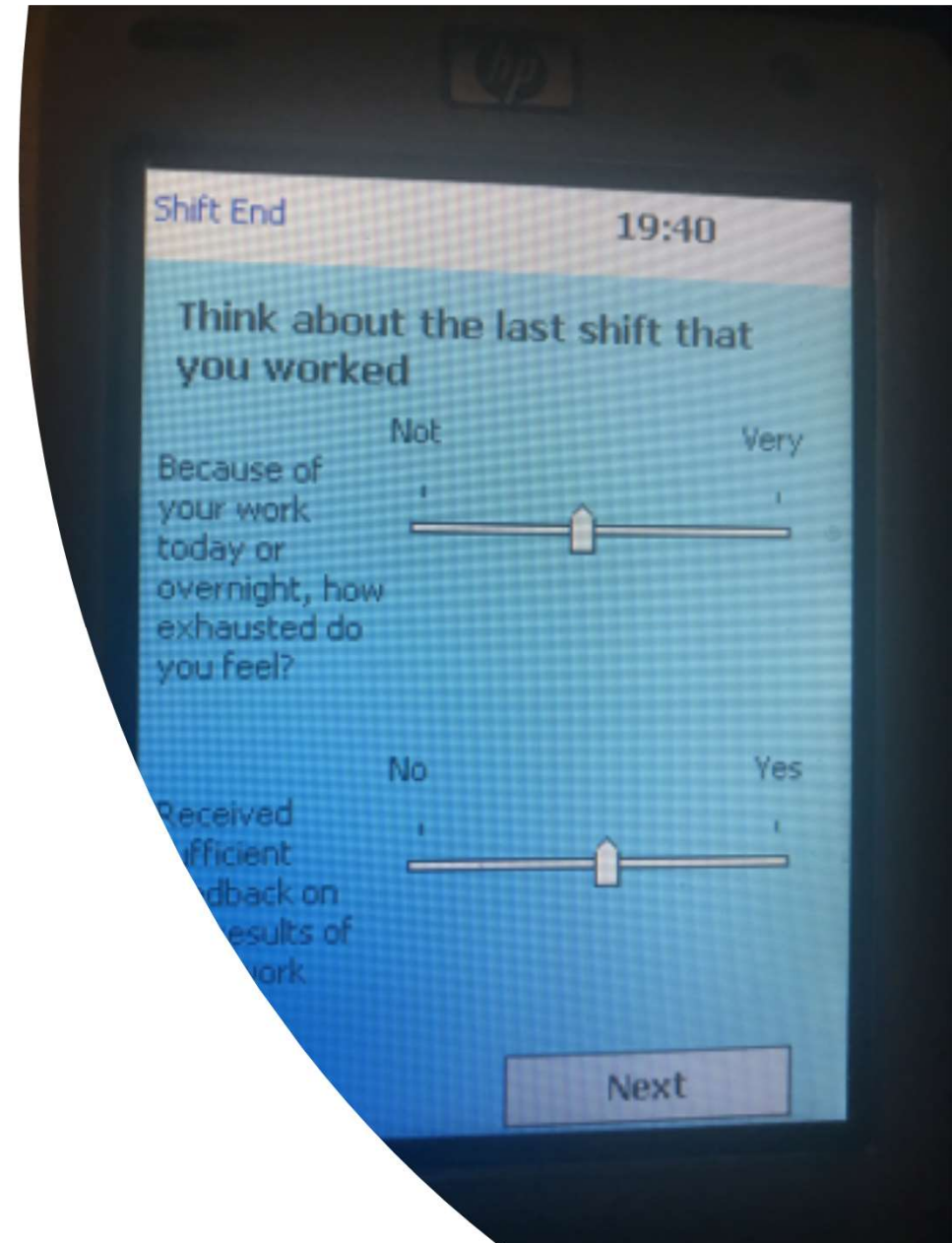**1. Method – Diary Structure**

2. Method - Programming PDAs

- Personal Digital Assistants (PDAs) - Hewlett Packard iPAQ 114.

- Diary software programme 'Pocket Interview' (Morrison et al, 2009).

- GNC for Scotland (Education) Fund 1983 & Margaret Callum Rodger Midwifery Award.

- UREC, Sponsorship NHS Tayside & R&D Approvals.

- Preliminary Testing amongst Research Team.

3. Method – Testing Study Protocol

Single tertiary referral centre, N=28 CCNs volunteers from Phase I (September 2018).

Recruitment – to contact volunteers.

Participant Support – documentation, contact for help.

Infection control.

Transfer Data from PDA → Pocket Interview → Data Analysis Package.

Data Management Plan.

Results –
Participant Demographic & Professional Information

Characteristics of Participants	Result Phase II Feasibility (N=8)	Range	Result Phase I: Total Cohort Sample (N=557)	Range
Age (years)	M=42.1 (SD 11.5)	28-56 years	M=40.37 (SD 10.19)	21-63 years
Gender (Female)	8 (100%)		498 (90.1%)	
Scottish/UK/Welsh/English	6 (75%)		523 (94.4%)	
Children (Yes)	3 (37.5%)		322 (58.1%)	
Married/Steady Relationship Single Widowed	4 (50%) 3 (37.5%) 1 (12.5%)		458 (82.8%) 64 (11.6%) 6 (1.1%)	
No. Years as RN	M=20.63 (SD 11.73)	6-35 years	M=15.93 (SD 10.05)	.55 – 43 years
No. Years CCN	M=17 (SD 12.5)	3-35 years	M=11.72 (SD 9.0)	.55 – 40 years
Fulltime Contract	7 (87.5%)		379 (68.7%)	
Band 5 Band 6 Band 7	4 (50%) 2 (25%) 2 (25%)		396 (72.1%) 117 (21.3%) 33 (5.9%)	
Diploma Degree Masters	1 (12.5%) 6 (75%) 1 (12.5%)		146 (26.4%) 381 (68.8%) 27 (4.9%)	

Results – Recruitment, Retention

Data Collection Period

December 2018 - March 2019.

Across 35 Shifts (Nights & Days)

Recruitment Rate = 28.6% (N=8/28) of volunteers.

Retention Rate = 100%

Results – Diary Completions

Diary Completion Rate

- Overall, 261 (82%) diary entries completed.
- Two diaries 100% completion rate.
- Diaries with missing entries, completion rates ranged 40%-93%.
- Overall, 9 'Incidents' were Recorded.

Completion Time

- **Standard Diary Entry**: Median = 1mins 51 secs (Range: 22 secs – 1hr 41mins)
- **End of Shift**: Median = 3 mins 16 secs (Range: 38 secs – 21 mins 1 sec).

Snooze Time

- Modal Snooze Time = 10 mins; overall total of 114 (36%) entries were snoozed.

Results

Testing Cycle One (N=4)

- One participant with 100% completion
- Technical Issue – Pattern analysis identified the *'Snooze Function'* as the source (choice of 5-mins, 10mins, 15-mins, 30mins or 60mins).
- Reboot corrected the issue.

Testing Cycle Two (N=4)

- Based on Cycle One PDA software updated & ↓ no. *'Snooze'* options.
- One participant with 100% completion.
- Technical Issue - One device faulty, completely replaced.

Conclusion

- Electronic diaries are an acceptable method of data collection in CCNs. Recruitment rates were good & retention rates excellent.

- Question items & the diary structure were acceptable to participants. Compliance & completion rates were as good as those observed in other populations (Johnston et al, 2006; Hensel et al, 2012).

- The study protocol was effective. EMA can be used to generate real-time data capturing the determinants of work stress & wellbeing & the effects on CCNs, with the aim of improving the working lives of CCNs & patient safety.

- Progress to Phase II, the main EMA study containing a larger group of CCN participants (N=40).

References

BAKKER, A. & DEMEROUTI, E. 2014. Resources, coping & control. In In: P. CHEN AND C. COOPER (eds) Work and Wellbeing: Wellbeing: A Complete Reference Guide, Volume III. London: John Wiley & Sons, pp. 1-28.

BALL, J. MURRELLS, T., RAFFERTY, A., MORROW, E. & GRIFFITHS, P. 2013. 'Care left undone' during nursing shifts: associations with workload and perceived quality of care. Quality & Safety, [online] Available at: http://qualitysafety.bmj.com/content/early/2013/07/08/bmjqs-2012-001767

BURKE, L., SHIFFMAN, S., MUSIC, E. et al 2017. Ecological momentary assessment in behavioural research: addressing technological & human participant challenges. Journal of Medical Internet Research, 19(3), pp. 1-17.

HENSEL, D., FORTENBERRY, J., HAREZLAK, J. & CRAIG, D. 2012. The feasibility of cell phone based electronic diaries for STI/HIV research. BMC Medical Research Methodology, 12:75.

JOHNSTON, D., BEEDIE, A. & JONES, M. 2006. Using computerized ambulatory diaries for the assessment of job characteristics and work-related stress in nurses. Work & Stress, 20 (2), pp. 163-172.

JONES, M. & JOHNSTON, D. 2011. Understanding phenomena in the real world: the case for real time data collection in health services research. Journal of Health Services Research Policy, 16(3), pp 172- 176.

KAMARCK, T. W., SHIFFMAN, S.M., SMITHLINE, L., GOODIE, J.L., THOMPSON, H.S., ITUARTE, P.H.G., JONG, J.Y., PRO, V., PATY, J.A., KASSEL, J.D., GNYS, M., et al. 1998. The Diary of Ambulatory Behavioral States: a new approach to the assessment of psychosocial influences on ambulatory cardiovascular activity. In D. S. KRANTZ, & A. BAUM, (Eds.) Perspectives in Behavioral Medicine: Technology & Methods in Behavioral Medicine (pp. 163-194). Mahwah, NJ: Lawrence Erlbaum.

MALLIDOU, A., CUMMINGS, G. ESTABROOKS, C. and GIOVANNETTI, P. 2011. Nurse speciality subcultures and patient outcomes in acute care hospitals: a multiple-group structural equation modelling. International Journal of Nursing Studies, 48, pp. 81-93.

MASLACH, C. & JACKSON, S. 1981. The measurement of experienced burnout. Journal of Organizational Behaviour. 2, pp. 99–113.

MORRISON, K., RICKETTS, I., JONES, M., JOHNSTON, D., PITTS, N. and SULLIVAN, F. 2009. A secure electronic diary and data collection tool, p. 1-4. Available at: https://www.academia.edu/16447624/Pocket_interview_A_secure_electronic_data_collection_and_diary_tool

SHIFFMAN, S., STONE, A. & HUFFORD, M. 2008. Ecological momentary assessment. Annual Rev Clinical Psychology, 4, pp 1-32.

VAN VELDHOVEN, M., PRINS, J., VAN DER LAKEN, P. & DIJKSTRA, L. 2015. QEEW 2.0 42 short scales for survey research on work, wellbeing and performance. SKB: Amsterdam. Available at: file:///C:/Users/McCallum/Downloads/QEEW2.0_42_short_scales_for_survey_research.pdf

WATERSON, P., GRIFFITHS, P., STRIDE, C., MURPHY, J. & HIGNETT, S. 2010. Psychometric properties of the hospital survey on patient culture: findings from the UK. Quality & Safety, http://qualitysafety.bmj.com/content/early/2010/03/04/qshc.2008.031625.full