Supplementary Table 2: Provisional descriptive themes

'Concerns about the Hawthorne effect and controlling for bias' emerged in twelve publications [6, 8, 9, 11, 12, 14, 16, 17, 18 19, 20, 24]. In eight publications it was suggested that observing hand hygiene in the control group might have caused a Hawthorne effect, reducing the difference between control and test group outcomes [9, 10, 12, 15, 16, 17, 19]. In three publications it was suggested that installing extra hand hygiene dispensers in control wards might have the same effect [11, 12, 20]. Four authors expressed concerns about contamination between test and control groups within the same organisation [9, 12, 13, 15].

'Limited scope for improving adherence in organisations where hand hygiene had already been intensively promoted' was considered problematic in five publications [6, 7, 13, 15, 20].

'*Challenges of determining which components of bundled HHIs were effective'* was identified in six publications [8, 11, 13, 21, 23, 24].

'The methodological key to sustainability' was specifically addressed in 5 papers [6, 7, 13, 15, 18].

'*Theory: why did it help?'* Theoretical frameworks were considered valuable by all the research teams applying them [6, 7, 9, 10, 17].

'*HHIs need to be embedded into wider patient safety and quality initiatives'* Attempts to embed the HHI into wider patient safety culture were made in seven publications [9, 14, 15, 23, 24, 25, 26].

'Health workers need to accept the HHI and be included in initiatives to involve behaviour change' Attempts to make the HHI acceptable to health workers or include them in plans to change behaviour were made in six publications [6, 7, 8, 12, 15, 26].

'HHIs work differently in different clinical settings and with different groups' HHIs were reported to work better in some clinical settings than others in four publications [6, 16, 19, 26]. Derde et al [19], however, did not believe that the heterogeneity evident between intensive care units, hospitals and health services in the thirteen countries taking part in their trial detracted from effective implementation.

'Flexibility of the HHI is important to enable it to fit with the needs of different groups of staff and settings' Flexibility of the HHI to meet the needs of diverse clinical settings, organisational cultures and different stakeholders and ability to refresh it to meet the needs of newly appointed staff and institutional changes over time were considered central to success in seven publications [14, 16, 20 21, 23, 24, 26].

'*Need to address specific challenges'* Targeting HHIs to meet specific challenges was considered to contribute to successful implementation in five publications: promoting hand hygiene at times when it was most likely to prevent cross-infection [9], targeting the most recalcitrant staff [13] and focusing on organisms that were most problematic [19, 21, 23].

'Patients are unwilling to challenge health workers about hand hygiene' Patient reminders were introduced by two research teams [8, 15]. These proved less effective than anticipated because there had been insufficient consideration of how stakeholders might perceive them. In one of these studies reported from China [8] the authors later concluded that patient reminders might not have been appropriate because questioning behaviour is considered confrontational in Chinese culture. Stewardson et al [15] suggested that challenging professional behaviour proved socially unacceptable despite patients' apparent willingness to engage with this approach when their views were sought in a pre-study survey.

'Leadership for the HHI and high visibility from managers and clinicians supports implementation' Attempts to secure leadership from senior management were apparent in five publications [13, 22, 23, 24, 25]. Support from senior clinicians was sought by four research teams [13, 22, 25, 26]. Visibility of managers and senior clinicians during 'walk-rounds' was considered especially helpful [13, 22, 24]. Support was sought from ward managers in nine reports [6, 8, 9, 13, 22, 23, 24, 25, 26]. Attempts to obtain organisational support to promote HHI were made in eleven publications but with variable success [6, 7, 8, 9, 12, 13, 22, 23, 24, 25, 26]. It was already considered good by another research team [15].

'Resources' were an important issue in ten publications. Heavy workload for clinical staff [6, 12, 13, 14, 16, 26] and for infection prevention teams assisting with implementation [6, 13, 25] were considered barriers to success. Having access to sufficient resources [e.g. alcohol handrub] was considered important in four publications [12, 13, 23, 25].