Methodology:

Sampling

The procedure used in the study consisted of identifying journal articles, lab work dissertations, theses, and magazine articles, and obtaining data from Internet sites to be used in trying to obtain answers to the proposed research questions.

Collection of Data

Primary data would be obtained for the laboratory processing of the UTI patients (Male/Female). Detailed of the patient history of infection by the *P. aeruginosa*.

Hand hygiene and transmission of *Pseudomonas aeruginosa* on hands in a hospital environment

Colonization and infection with *Pseudomonas aeruginosa* from the water supply constitutes a risk in neonatal hospital units. This short research note demonstrates that the use of correct hand hygiene minimizes the risk of contamination of hands with *P. aeruginosa* even when heavily contaminated wash water is used.

Water sampling and testing

The sampling protocol is intended to help healthcare providers establish if the water from taps in at-risk units is contaminated with *P. aeruginosa* and, if it is, to help locate its origin and to monitor the efficacy of remedial measures.

The same water outlet can give very different results if sampled at times of normal use and may be negative if water from the tap is used before a sample is collected. To maximize the recovery of these free floating planktonic bacteria it is essential that water samples are taken: a) during a time of (preferably) no use (at least 2 hours or preferably longer) or b) Low use the first water to be delivered from the outlet should be collected to assess the microbial contamination in the outlet.

In order to be able to carry out the appropriate microbiological examinations on a sample and provide a meaningful interpretation of test results, it is essential that samples are Water sources
and potential Pseudomonas aeruginosa contamination of taps and water systems collected in a suitable manner using the correct equipment and that the sampling protocol.

**Interpretation of pre- or post-flush water sample test results**

The range of levels of P. aeruginosa which may be found in water samples are outlined in together with the actions which should be taken.

Table : 1

<table>
<thead>
<tr>
<th>Hazard</th>
<th>CFU in 100ml</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>P. aeruginosa</td>
<td>0</td>
<td>Satisfactory</td>
</tr>
<tr>
<td></td>
<td>1 – 10</td>
<td>Retest and refer back to those responsible for the WSP to determine what actions may be required.</td>
</tr>
<tr>
<td></td>
<td>&gt;10</td>
<td>Investigate cause and put corrective actions in place</td>
</tr>
</tbody>
</table>

Experience to date has shown no meaningful correlation between the presence and level of P. aeruginosa and the level of total viable count of bacteria.

If water sample test results are satisfactory (0 cfu per 100ml) there is no need to repeat such sampling for a period of 6 months unless there are changes in the water distribution and delivery systems components or system configuration (e.g. refurbishments that could lead to the creation of dead legs). Water sampling could be undertaken earlier than at 6 months if there are clinical suspicions that the water may be linked with patient colonization or infection.

If water sample tests show counts between 1-10 cfu per 100ml then refer to those responsible for the water safety plan who would risk assess the use of water in the unit. Simultaneously, retesting of the water outlet should be undertaken.

If water sample test results are not satisfactory (> 10 cfu per 100ml), further sampling, along with a survey of the water system, could be used to identify problems areas and modifications that may be implemented to improve water quality.
After such interventions, the water should be re-sampled after three weeks (to allow possible biofilm to re-establish). If this sampling shows satisfactory results, no further sampling is necessary for six months unless indicated by patient colonization or infection.

**Interpretation of results**

Considering the variation in counts that can occur depending on the type of sample collected for augmented care units/high risk areas then a threshold level of $<1$ cfu P.aeruginosa per 100ml of water would be appropriate (see Table 1) and represents the possibility of the presence of biofilm.

High counts in preflush samples but with low or zero counts post flush would indicate that areas at or near the outlets are the source of contamination. In addition a few positive outlets where the majority of outlets are negative would also indicate that the individual outlets are contaminated.

If the samples indicate that the circulating water is the problem, then most outlets would possibly be positive and other points in the water system could then be sampled to assess the extent of the problem.