Executive Summary
7.0 EXECUTIVE SUMMARY

INTRODUCTION: There is a general agreement in the existing studies that endometrial cancer accounts for almost one out of every three cancer diagnosis in women. It is the most common and leading cause of death for women in their menopausal age. While many cancer rates have fallen in recent years, endometrial cancer rates continue to increase. Several organizations (NCRP, NCCP, DCCC etc.,) including WHO and Cancer Control Program (CCP) was formed to educate the local community people about their health. The present study involves the use of highly technical and updated tools such as GIS, Visual Basic, MapObject, Wavelet analysis to develop, suggest and aid endometrial Cancer control and management.

The computerized mapping and management of such visual data in GIS have greatly assisted in targeting the interventions and sustainable management strategies.

BACKGROUND: Cancer is one of the most important health issues throughout the world, because of it, health is highly a mortal disease, which leads to disablements and high treatment cost causing important loses in the National economy and labour. In India, Endometrial cancer is the leading gynaecological cancer among women. The control of endometrial cancer requires the effective implementation of knowledge derived from more than two decades of successful research. Oncologists are woeful that one third of the endometrial cancer cases are prevented and one third is potentially curable provided that they are diagnosed early. Hence a rational concept to put science into practice has to be formulated to counter endometrium cancer epidemic.

DATA AND METHODS: The data for the present study were obtained from the records of various cancer hospitals in and around the Southern region of Karnataka. The resulting data provides valuable information to GIS for the preparation of thematic maps to find the distribution, incidence rate and the factors responsible for the endometrial cancer incidences in the study area using MapObject, which may be a background information to assess the risk factors region wise for taking a decision to provide health care and support to that region. Following this, a method was developed and applied for predicting the risk factors associated with endometrial cancer using statistical methods and Data mining techniques. To extract the cancerous regions from the MRI an algorithm was developed and analyzed using fractal
dimension in association with Box-counting method. These methods were implemented in support of the research papers.

RESULTS: The study has been undertaken to assess the status of endometrial cancer in the Southern region of Karnataka and thereby suggesting suitable strategies to prevent endometrial cancer using GIS and associated tools. The first section describes the preparation and visualization of maps (thematic) to understand the distribution of endometrial cancer in Southern region of Karnataka. The power of GIS does not lie in visualization alone but also involved in prediction of the high risk region spatially. The ability to perform spatial and statistical analysis is a key aspect of cancer research. For the present study we have developed and applied statistical methods as a part of present investigation for Endometrial cancer.

The results have significant implications and can be used to understand the burden factors and of endometrial cancer at local and global levels. Based on the integration of GIS and other models and algorithm, the present study provides the Health managers, Doctors and New Drug Developers an opportunity to assess the cancer risk and to suggest suitable control / prevention strategies accordingly. The results were discussed with relevant literature.

Section 5.1 deals with the integration of Google Earth/Map with MapObject for visualizing the endometrial cancer cases, which comes from the Spatial query builder. Whatever changes affect on the MapObject reflects into the Google Earth or Map or vice versa.

In section 5.2, we introduce a known multivariate technique that is Multinomial logistic regression Analysis to enumerate the important risk factors which are responsible for the cause of this disease. The results reveal that parity, income, educational classification and Menopausal status play a important role.

Section 5.3 describes a knowledge discovery through data mining method using the algorithm mentioned in section 5.3 to categorize the risk factors associated with endometrial cancer. This study may be used by the health managers to prevent the occurrence of the cancer. Further the methodology applied is used as a guideline for any region, but the results may be region specific.

In the next section we introduced fractal geometry to detect the cancerous region in the MRI endometrial Images. The study is useful for detecting the cancerous region in the MRI and to distinguish the different stages for better treatment.
The last section elaborates another image processing method i.e. 2d wavelet analysis in MATLAB which is more sensitive than fractal dimension.

CONCLUSIONS: Traditional methods adopted to analyze health data are tedious and outdated. The present study demonstrates the use of time conserving, updated and accurate tools in effective planning and management and control of endometrial cancer. It also demonstrates that the practical application of using GIS technologies in solving health related problems in particular and other problems in general. In addition, the study can be seen as a pilot application for presenting the distribution of endometrial cancer cases on maps providing the merits of space-time interaction of endometrial cancer and examining the level of risk of cancer patients. Moreover a method for locating the cancerous regions of the endometrium through image processing is presented. Hence, the result obtained through our study is an informative and practicable one, which may be adopted by the health managers and doctors.

The major challenge therefore, is to device suitable location specific solutions, so as to reverse the process and ensure proper management and control strategies to decrease the endometrial cancer incidence.