

EXECUTIVE SUMMARY

Electrosurgery describes a method that utilizes a high frequency electrical current to cut and seal tissue, but generates surgical smoke and contaminants as a result. It is estimated that 500,000 health care workers are exposed to electrosurgical smoke every year. The immediate problem of the surgical smoke is that there is an evident foul odor to it; however, the real problem is the high concentrations of contaminants in the smoke. Therefore, the goal of this project is to come up with a cost effective solution for Chinese hospitals that will minimize the strong odor and health risks created by overexposure to the harmful contaminants found in electrosurgical smoke.

Overall, this project has been extremely successful because we were able to stay within the \$400 budget and were able to obtain great results within the given timeframe.

There were six major checkpoints in our entire design process in ME450. 1) Converting user requirements to quantifiable engineering specifications. 2) Coming up with an alpha-prototype after a detailed concept selection process. 3) Designing a CAD model of an initial prototype after a thorough engineering analysis. 4) Manufacturing and experimenting with the initial prototype to come up with a final prototype. 5) Manufacturing the final prototype and validating all engineering specifications through extensive experimentation. 6) Providing Covidien a recommended CAD design backed up by the results of experimentation from the two physical prototypes.

All of our user requirements and engineering specifications have been met, indicating that our prototype was successful.

User Requirements	
1	Patient Safety
2	Maintain cutting functionality of electrosurgical pencil
3	Significantly reduce the effects of airborne contaminants
4	Maintain surgeon accuracy
5	Maintain surgeon visibility
6	Maintain functionality throughout the duration of the surgery
7	Eliminate odor
8	Cost effective
9	Not significantly increase the setup time
10	Not significantly increase the size of the electrosurgical pencil
11	Not significantly increase the weight of the electrosurgical pencil
12	Must be relatively quiet