ABSTRACT:

Current methods of opioid delivery render post-surgery patients highly susceptible to opioid addiction, causing several issues to the patient and his/her family members. Yet, there remains no effective way to treat this growing epidemic. Many treatment methods, including detoxification centers and methadone treatment, often work from the rehabilitation platform and can cost up to $15,000, thus leaving a gap for an affordable treatment that prevents rather than treats opioid addiction. Our transdermal patch is a novel treatment for opioid addiction that fills said gap. Its combination of an opioid analgesic and naloxone, a reversal drug used in cases of opioid overdose, is very unique and affordable. When first attached onto the skin, the opioid (bottom layer) diffuses through the epidermis and bind to its receptors in the body. Then, the naloxone diffuses through a membrane so that once the original opioid has left its receptors, the naloxone takes its place. This is crucial because if the user were to attempt to overdose by putting on a second patch, the naloxone from the first patch would be bound to the opioid receptors, blocking the second opioid from taking effect. Due to financial and legislative constraints, we were unable to create our ideal patch so we modeled the diffusion of an opioid and naloxone across a membrane using dyes and other readily available materials. Thus, to improve our product, we would utilize the actual drugs and improve the physical design of the patch in order to make it usable for all patients.