Department of Mathematics and Statistics

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Colloquium

One Bulb? Two Bulbs? How Many Bulbs Light Up? A Discrete Probability Problem Involving Dermal Patches

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Abstract. A dermal patch is designed to activate some targeted receptors. Initially, there are 10 inactive receptors. On Day 1, the patch releases one dose of medicine which latches onto a receptor and makes it active. On Day 2, the patch releases two doses of medicine, which latch onto two receptors, one dose per receptor. If the receptor is already active, the new dose makes it inactive. If the receptor is inactive, the new dose makes it active. On Day 3, the patch releases three doses of medicine, which latch onto three receptors, one dose per receptor. This continues for ten days with the patch releasing a total of 55 doses progressively. In this talk, I will present the distribution of the number of receptors active at the end of Day 10. Generalizations and variations of this problem will be dealt with and the recent research development on this area will also be discussed.

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