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The past several decades has seen an explosion of growth in mechanistic understanding of circadian clocks in several model organisms and in humans. However, translation of that knowledge into actionable medical interventions has been slow to nonexistent. Here, I will discuss our efforts to develop circadian medicine in a pediatric hospital. I will talk about our recent progress in understanding the molecular output of the clock in the mouse and humans, including identifying new opportunities for circadian dosing time in improving drug action -- hypothesis-driven, mechanistic circadian medicine. I will talk about our efforts to test these hypotheses prospectively in model organisms and retrospectively in large clinical databases. Finally, I will discuss future opportunities and challenges.