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Propagators, or evolution families, are two-parameter families of bounded linear operators on a Banach space, satisfying the flow condition (forward propagators), or the backward flow condition (backward propagators). An important example of a propagator is an evolution family corresponding to a second order parabolic partial differential equation with time-dependent coefficients. More general examples are backward free propagators associated with transition probability functions, and their perturbations by time-dependent measures (backward Feynman-Kac propagators). We show that if a time-dependent measure belongs to an appropriate non-autonomous Kato class, then many properties of free propagators are inherited by their Feynman-Kac perturbations. These properties include the L^p -boundedness, the $(L^p - L^q)$ -smoothing property, and the Feller property. (Received August 12, 2005)