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Abstract: Phase specific models for cancer chemotherapy are described as optimal control problems. We review earlier results on scheduling optimal therapies when the controls represent the effectiveness of chemotherapeutic agents, or, equivalently, when the simplifying assumption is made that drugs act instantaneously. In this paper we discuss how to incorporate more realistic medical aspects which hitherto have been neglected in the models. They include pharmacokinetic equations (PK) which model the drug's plasma concentration and various pharmacodynamic models (PD) which describe the effect the concentrations have on cells. We also briefly discuss the important medical issue of drug resistance.

Keywords: optimal control, mathematical models for cancer chemotherapy, pharmacokinetics, pharmacodynamics, drug resistance