— Too much force can have undesired effects.
Are higher medication doses more effective?

Up to a point, most medications exhibit a clear relationship between dosage amount and treatment benefit -- the higher the dose, the better the effect! The relationship, however, tends to level off at higher doses, so that further increases in dosage lead to minor increases in effectiveness. Also important is the fact that higher doses are associated with more frequent and more severe adverse effects. At very high doses, the benefit-harm balance changes and harmful effects may begin to outweigh beneficial ones.

FDA approval of a medication includes a recommended dose or doses and a dose interval (frequency). Although physicians may, in individual cases, prescribe medications in doses that are higher than the approved and recommended levels, scientific documentation of safety and efficacy at these higher doses may be very limited or nonexistent.

**When are very high doses indicated?**
In acute, life-threatening conditions such as sepsis (bacterial infection in the blood and tissues) or meningitis (infection causing inflammation of the membranes surrounding the brain or spinal cord), it is critical to secure a rapid treatment response. In these situations, achieving the optimal beneficial effect may be more important than avoiding temporary adverse effects. In the treatment of cancer patients, giving the highest tolerable dose may increase the likelihood of a positive effect on the cancer cells. Therefore, more emphasis is placed on achieving optimal benefit than on avoiding adverse effects during short-term treatments for serious diseases.

For many medications, benefits may not be noticed until blood concentrations reach a certain level. If treatment begins with a typical maintenance dose (the lowest dose that yields an optimally therapeutic effect), it may take days to reach the effective blood concentration. Therefore, starting treatment with higher doses may lead to a faster response. If this is done, the dose can be reduced later to recommended maintenance levels.

**When is the lowest effective dose important?**
During long-term treatments with medications that cause troubling adverse effects, it is desirable to find the lowest effective dose. A typical example is treatment of asthma with corticosteroids. This medication is preferably inhaled
so a higher concentration reaches the sites of inflammation in the airways. Any advantage of using a higher-dose corticosteroid may be marginal, given that this leads to a marked increase in adverse effects. Finding the lowest effective dose is important, especially since treatment with corticosteroids often lasts for many years.

Another chronic condition for which it is important to keep the medication dose low to avoid adverse drug effects is high blood pressure. If it is difficult to control blood pressure, it may be preferable to add a low dose of a second medication rather than doubling the dose of the first one.

**Should I take higher doses on days when I don't feel well?**

This is something you should discuss with your doctor. For treatment of symptoms, you may be the best judge of when to adjust the dose and its frequency based on your symptoms. For example, if you have angina pectoris (chest pain), you should decide when to take nitroglycerin and place it under your tongue. For painkillers, you can adjust the dose depending on your pain level as long as you stay within the recommended dosing frequency and below the recommended maximum daily dose. If you have asthma, your physician may have told you that it is all right to increase the dose of your medication if, for example, you develop an infection. For preventive treatments such as the use of bisphosphonate medications (Actonel, Boniva, Fosamax) to prevent or treat reduced bone density (osteoporosis), there is no reason to adjust your medication dose based on how you feel. Reduced bone density increases the risk of bone fractures.

**Key messages**

- Higher doses may improve the treatment effect, but often by a modest amount.
- Higher doses often increase adverse effects more than beneficial effects, which, in turn, may result in an unfavorable benefit-harm balance.
- For short-term treatment of acute (sudden onset), life-threatening diseases, it is more important to ensure optimal benefit over the risk of short-term adverse effects.
- During long-term treatments, a key goal is to find the lowest effective dose in order to try to limit side effects.
- For preventive treatments, there is no reason to adjust the dose based on how you feel.