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ASTRONOMY

Predicting asteroid's path is an imprecise science

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In recent weeks, we've seen changing news reports about 2007 WD5, the asteroid which might or might not hit Mars at the end of this month.

In December, the odds of an impact were reported as 1 in 75. Around New Year's Day, it was 1 in 25. Last week, 1 in 10,000.

Holy moly, don't these scientists know what they're talking about? Or are the bookies running the joint?

The asteroid highlights the importance of error estimation in science. "Error" doesn't mean somebody messed up; it simply means that we can't get perfect information or make infinitely precise predictions. There is always a margin of uncertainty in any measurement.

A hallmark of good science is being honest about that uncertainty and trying to minimize it. Usually, that means getting more data.

For 2007 WD5, a lot of high-precision tracking data has been collected recently. As the precision has improved and the distance to the target has shortened, the margin of error for the asteroid's path has tightened.

The probable near miss reported last month with a large uncertainty is now a pretty definite near miss with a small uncertainty.

You can see how the precision has improved by looking at the graphs published by NASA's Jet Propulsion Laboratory at <http://neo.jpl.nasa.gov/2007wd5/>.

Everyone's heard of "lies, damn lies, and statistics." But the most common statistical lie — sweeping the margin of uncertainty under the rug — is something we see daily.

Take political polls. A typical poll collects opinions from about 1,000 people, which limits its margin of error to about 3 percent. Try counting the number of times a week you hear a TV pundit report that Candidate A is leading Candidate B by 2 percentage points based on a poll with a 3-point margin of error.

In politics this is just annoying; in medicine it can be more serious. Next time you see a scientific-sounding claim that some health product improves something by some percentage, ask, "What's the uncertainty?"

If they won't tell you, it's not statistics; it's just a damn lie.

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