

Radioactivity in the Media: Critiquing *Bosch* Season 6

Dirty-Bombing the City of Angels



HPS member Andrew Karam preparing to critique Bosch Season 6 from a health physicist's perspective. Submitted photo

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A few weeks ago I saw the [trailer for Season 6](#) of Amazon's detective series *Bosch*. What caught my attention was hearing one of the characters say something about a medical physicist. So I gave the trailer more attention and noticed the characters were talking about radiation, death, making LA uninhabitable, and so forth.

"Aha!" I thought, "Another travesty of science. Let's watch!" What follows is a review of the radiological aspects of Season 6. For those of you who have not

watched the series, I'll try not to give away any nonradiological plot spoilers. But if you're a fan of the series, you might want to watch it yourself before reading the rest of this.

Please note—this is about the show—[please click here](#) to see the full scientific work-up, including some calculations and references.

Episode 1: A medical physicist bites the dust

The short version is that a medical physicist is shown stealing what fellow health physicists Tom Morgan and Bruce Thomadsen have identified as low-dose-rate (LDR) brachytherapy sources—sources that are inserted into a catheter that's run into a tumor to irradiate the tumor. Through the course of the first episode, the medical physicist seems to be using good radiation safety practices—until he wheels a pig full of sources (later in this episode we find out there were 32 of them) out of the hospital and puts them in the trunk of his car. He meets up with a masked man holding a gun and ... oops ... the sources aren't there. The guy with the gun seems perturbed; the medical physicist points out "You need me." And then we cut to Bosch rolling up to the murder scene and we realize that the poor medical physicist was not as needed as he'd thought.

Note: this is one "insider threat" that many of us fail to consider—an insider *forced* to help terrorists or criminals due to a threat against them or a family member.

From here we get into a number of fairly hyperbolic statements, including "catastrophic," "casualties," and that any of a number of landmarks could be "unusable for 300 years." And while I give them credit for the 10 half-life first-guess (although as we know, it really

depends on the original activity), the rest seems a bit overblown. The FBI also mentions that, inside the shield, the sources are "undetectable," which is also not quite accurate ([here's a link](#) to some of the calculations).

The rest of Episode 1 is nonrad, so I'll not spoil more than I have to.

Episode 2: The plot thickens

Aerial surveys have not yet shown any sign of radioactivity. Yay! But doesn't LAPD want to use hand-held or mobile instruments? Come to think of it—why aren't the FBI hazmat folks there with their meters?

For this episode, the only hyperbolic statement (made by one of the law enforcement folks) is "If even one of those radioactive rods is breached it'll kill anyone who comes in contact with it." Ummm ... the medical physicist survived the radiation (although not so much the bullet). And the patients survive treatment. And the lab techs. Plus, there's no indication that any of the sources was breached.

And that's it for Episode 2 except for a bunch of time wasted on plot and character development.

Episode 3: Oh—I did *not* see that coming.

There's an FBI briefing on dirty bombs with no wild overstatements and then the cops keep working the case. One of the detectives was issued a personal radiation detector (PRD).

Halfway through—a body is found on the street with "weird burns and blisters" and our detectives roll out, finding a body that does, indeed, have weird burns and blisters. If I remember correctly, it can take days or weeks for skin burns to manifest—so this might be premature. But positive points to the detective who says, "Dead bodies don't emit radiation."

Following up on the dead guy, they get to his home and their PRD alarms. Looking more closely, they find a small jar with what I count to be 29 sources (close enough to 32, right?). Or did the bad guys leave just a few real sources mixed in with a bunch of fakes to fool the cops? This is why there should be a health physicist present—to make sure the dose rates are what we'd expect for the amount of activity present! When I worked as a radiological expert for NYPD, this was our plan—for me to help confirm if the amount of activity found matched what was stolen, should the occasion arise.



Screen capture from series—count 'em yourself!

Bosch is sent to the hospital to be checked out. Points for telling his daughter he received "less radiation than a flight to NYC" and that it's safe for her to hug him.

Episode 5

Only one overstatement—a lawyer mentioned there was "enough cesium to poison the whole city" ... which isn't really true (again, [see the calculations](#) if you're interested). And the rest of the season's episodes are just wasted on still more plot and character development. Oh well.

Summary

To be honest, I was expecting this to be much worse than it was. And, sure, we can all nit-pick it to death because there are all sorts of little things that we could all do better. Having said that, these aren't major plot points and they don't spread misconceptions about radiation. As just one example—showing a guy in a helicopter who's supposed to be doing an aerial radiation survey but who seems to be looking at thermal imaging. Sure, it's a mistake. But he's not pointing at the screen saying, "Oh my god—all those people are going to die!" So while it's a mistake, it's not nearly as bad as so many of the errors in last year's *Chernobyl*.

So here are the biggest things that jumped out at me.

- Some nits:
 - Many hospitals have radiation detectors that would have alarmed when our poor medical physicist tried to take the sources from the hospital.
 - For this sort of brachytherapy, ^{137}Cs has largely been supplanted by ^{192}Ir .
 - Most radiation oncology departments would likely not have so many sources on hand.
- Having sat through a number of law-enforcement briefings (and having given some myself) I can sort of excuse the hyperbolic statements because that's what most people (including cops) think about radiation.
- At the same time, I do have to credit the show for including dialogue about irradiated people not posing a risk, that the dose Bosch and Edgar were exposed to was low, and that it was okay for his daughter to give him a hug at the hospital.
- So—as much as I'd like to be upset with the writers of this season ... I really can't be. I mean, I'd have loved it had they included a health physicist character to go over the mistakes that were made, even if only at the very end. But I have to admit that I'm sort of happy with the real-life situations (as opposed to hypothetical briefings) they showed and that they got those parts largely right. And as far as the season goes, this was a big part of only three episodes—so it's not as though they built the entire season around fears of radiation.
- So—unlike last year's *Chernobyl*—I find myself sort of neutral on this season of *Bosch*.

Finally, there's one more thing to mention—the reason the trailer started and finished with catastrophic statements about a dirty bomb. Because even if it's not the focus of the season, it's the focus of society, and the producers knew that they could reel in a lot more viewers with the possibility of massive casualties from radiation sickness than from a simple (or even a complex) murder plot. Even if Amazon didn't exploit the radiation angle as much as they could have in the season, they certainly exploited it in the trailer.

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