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Regulating Autonomous Vehicles Amid Uncertainty

Nidhi Kalra

Image by H. Miller.

1. How safe should autonomous vehicles be?
2. How can we know how safe they are?
3. How do we design good autonomous vehicle policy?

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Uncertain

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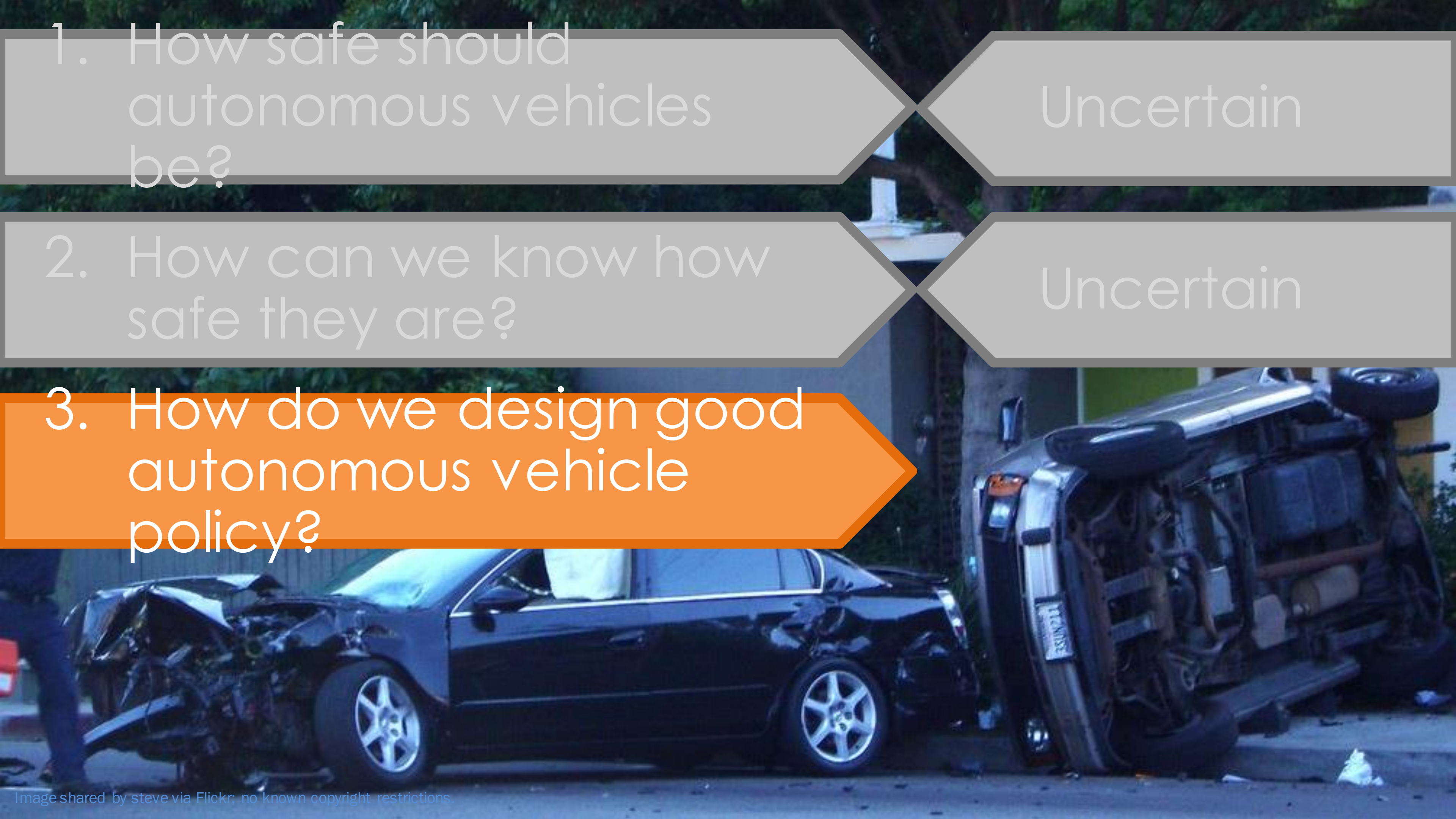
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Uncertain
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Uncertain
3. How do we design good autonomous vehicle policy?

Federal Motor Vehicle Safety Standards (FMVSS) pose a barrier to deploying some types of AVs

- FMVSS specify car design, construction, performance, and durability requirements
- Many innovative AV designs (e.g., no human driver) would not comply with FMVSS

NHTSA offers exemptions to FMVSS for development of innovative safety features

But NHTSA limits exposure to risk by requiring certain conditions.

Safety

Developers must demonstrate equivalent safety between conforming and non-conforming vehicles

Credit: Brady Holt

Quantity

Developers may obtain exemption for only 2,500 vehicles per year

Credit: automobileitalia

“Practical Autonomous Vehicle Exemptions” or “PAVE Act” proposes raising FMVSS exemptions from 2,500 to **100,000 vehicles/exemption/year.**

Does this make sense?

Neither the letter nor the spirit of the exemption process works when applied to AVs

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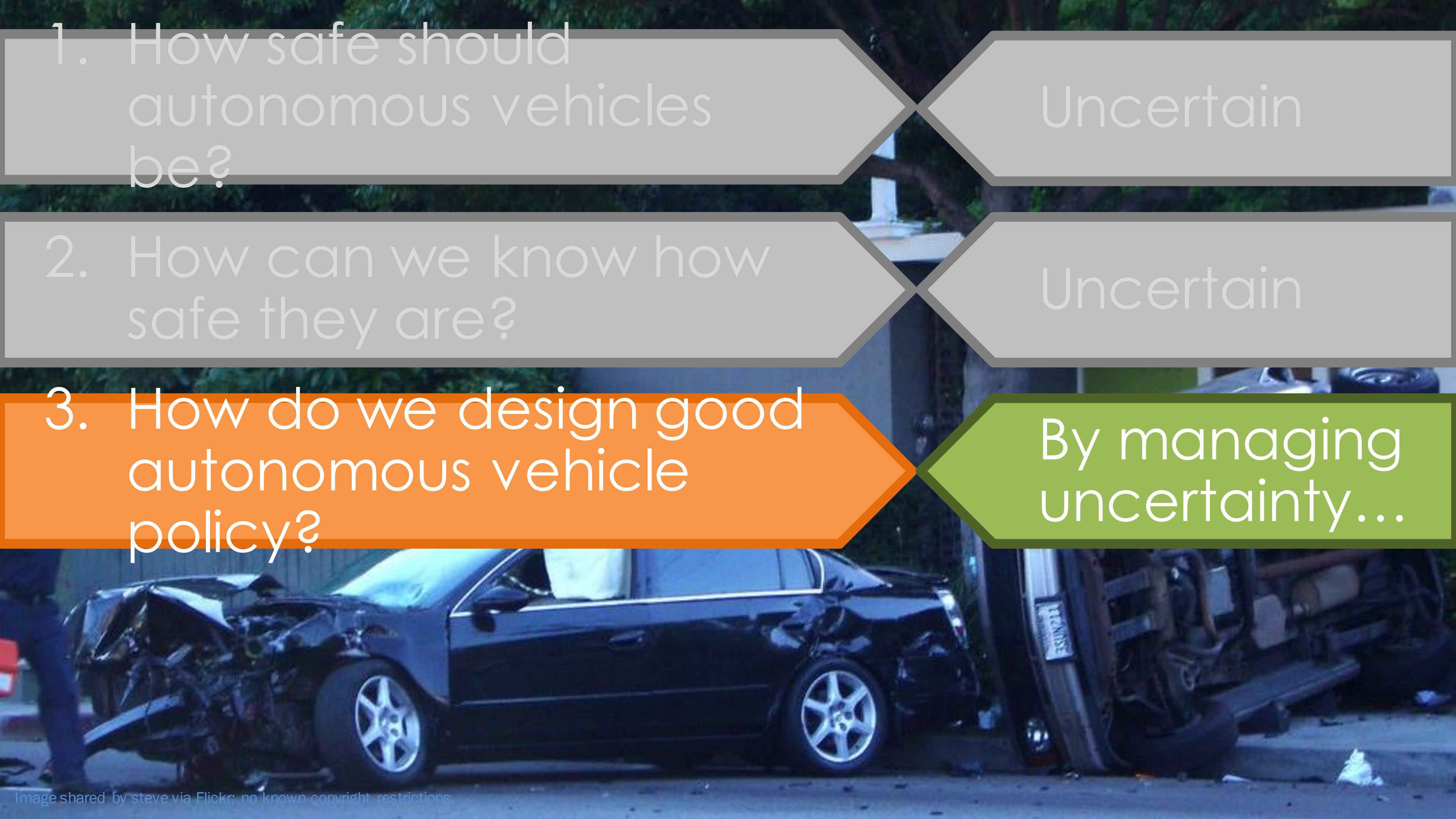
Need to demonstrate that an autonomous vehicle can drive itself safely

- No definition of AV safety
- No practical way to demonstrate safety prior to deployment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Uncertain
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3. How do we design good autonomous vehicle policy?
By managing uncertainty…
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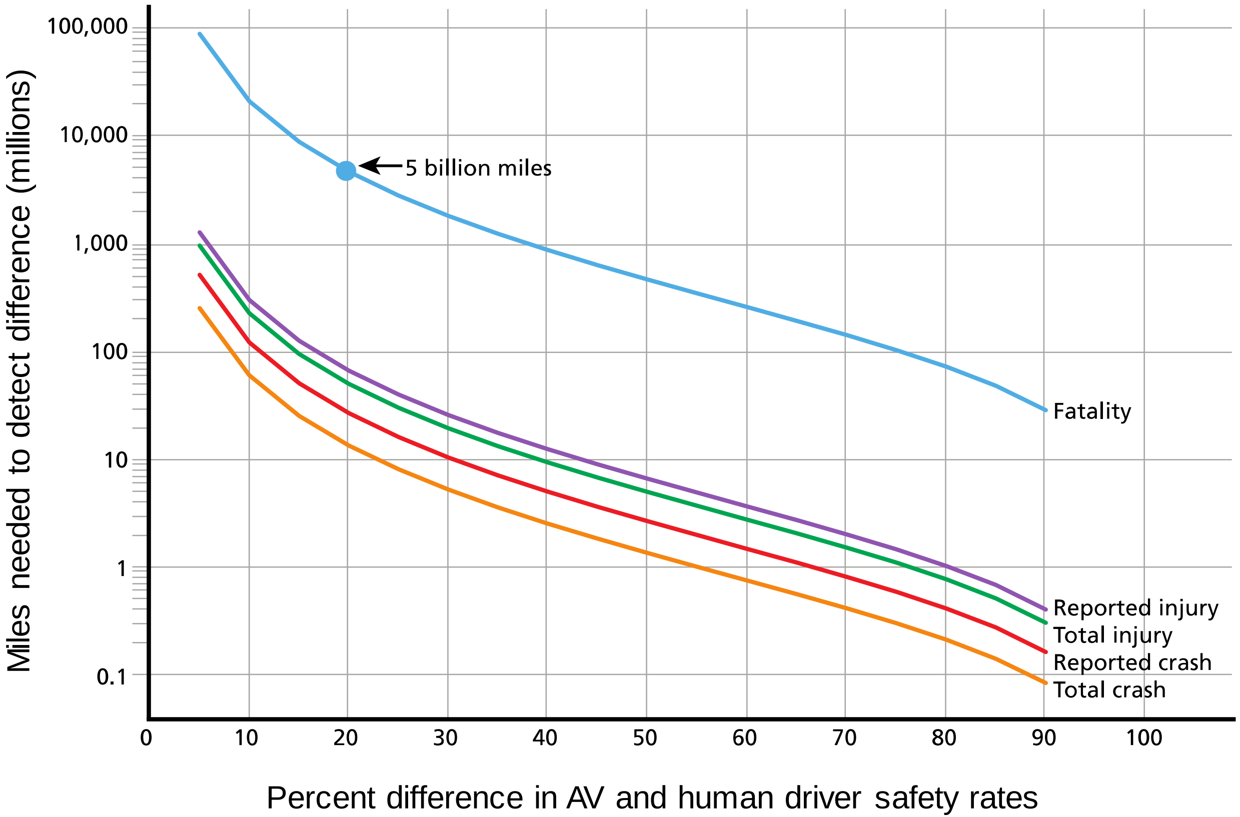
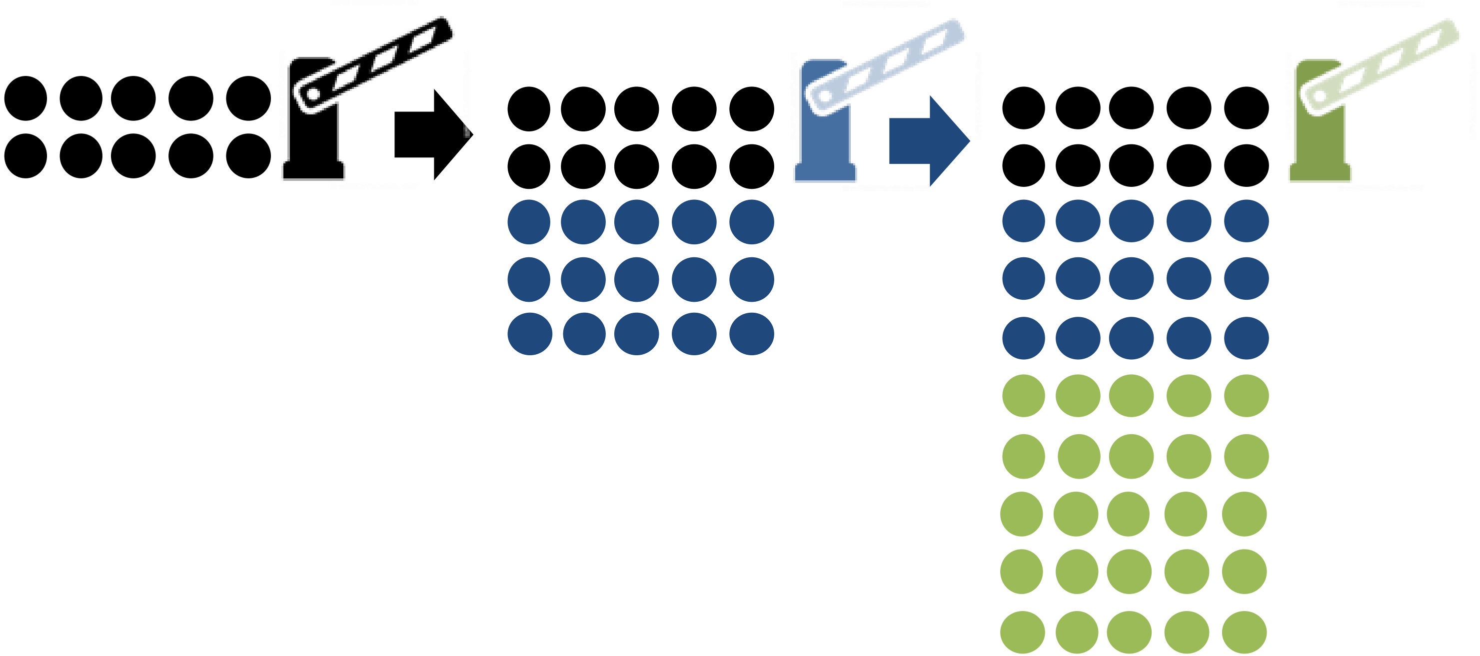
There is a tradeoff between risk and reducing uncertainty

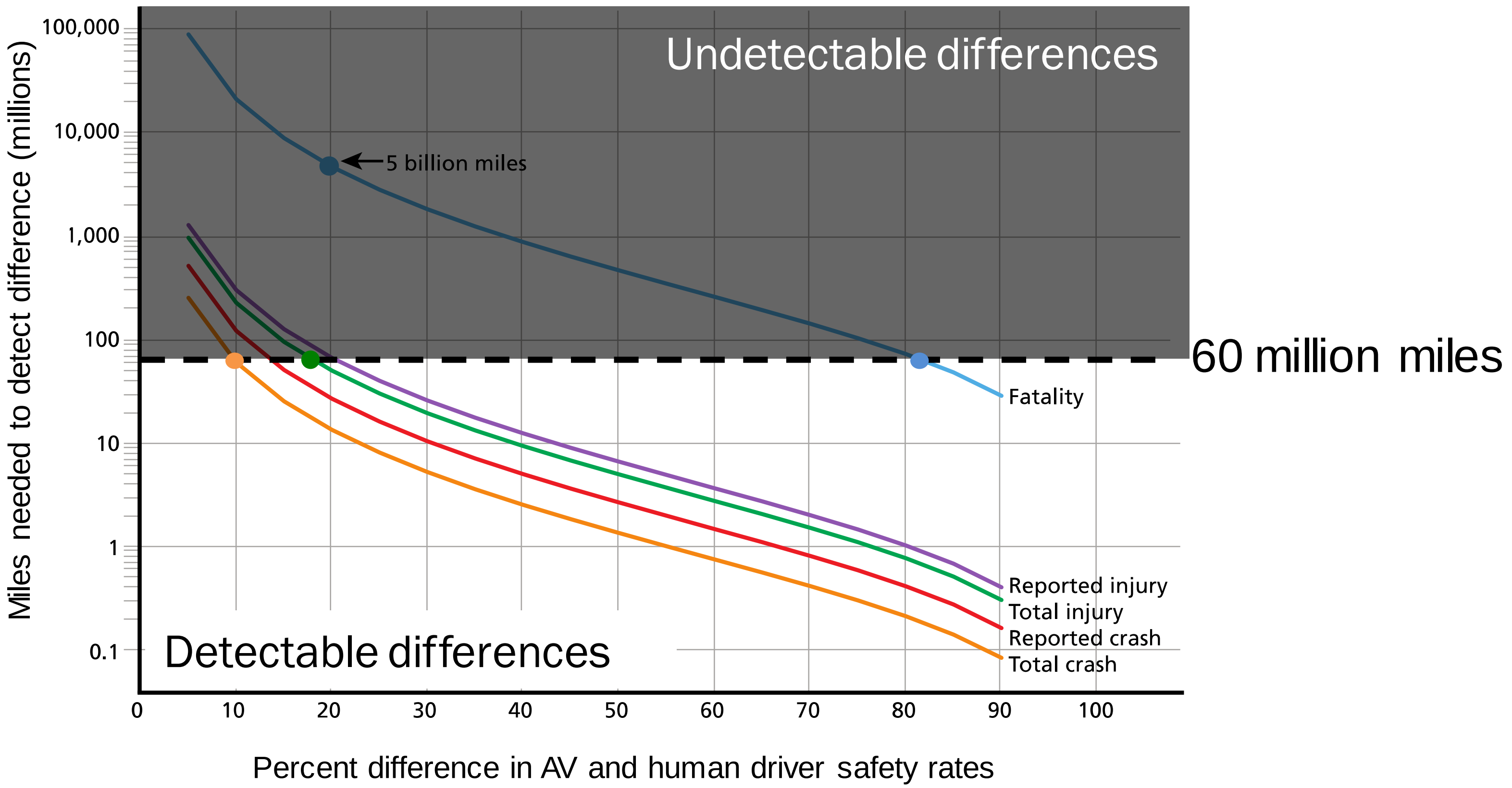


Kalra, Nidhi and Susan Paddock. Driving to Safety: How Many Miles of Driving Would It Take to Demonstrate Autonomous Vehicle Reliability?. Santa Monica, CA: RAND Corporation, 2016. https://www.rand.org/pubs/research_reports/RR1478.html.

What if regulations were designed with this risk-information tradeoff in mind?



This tradeoff can be understood mathematically



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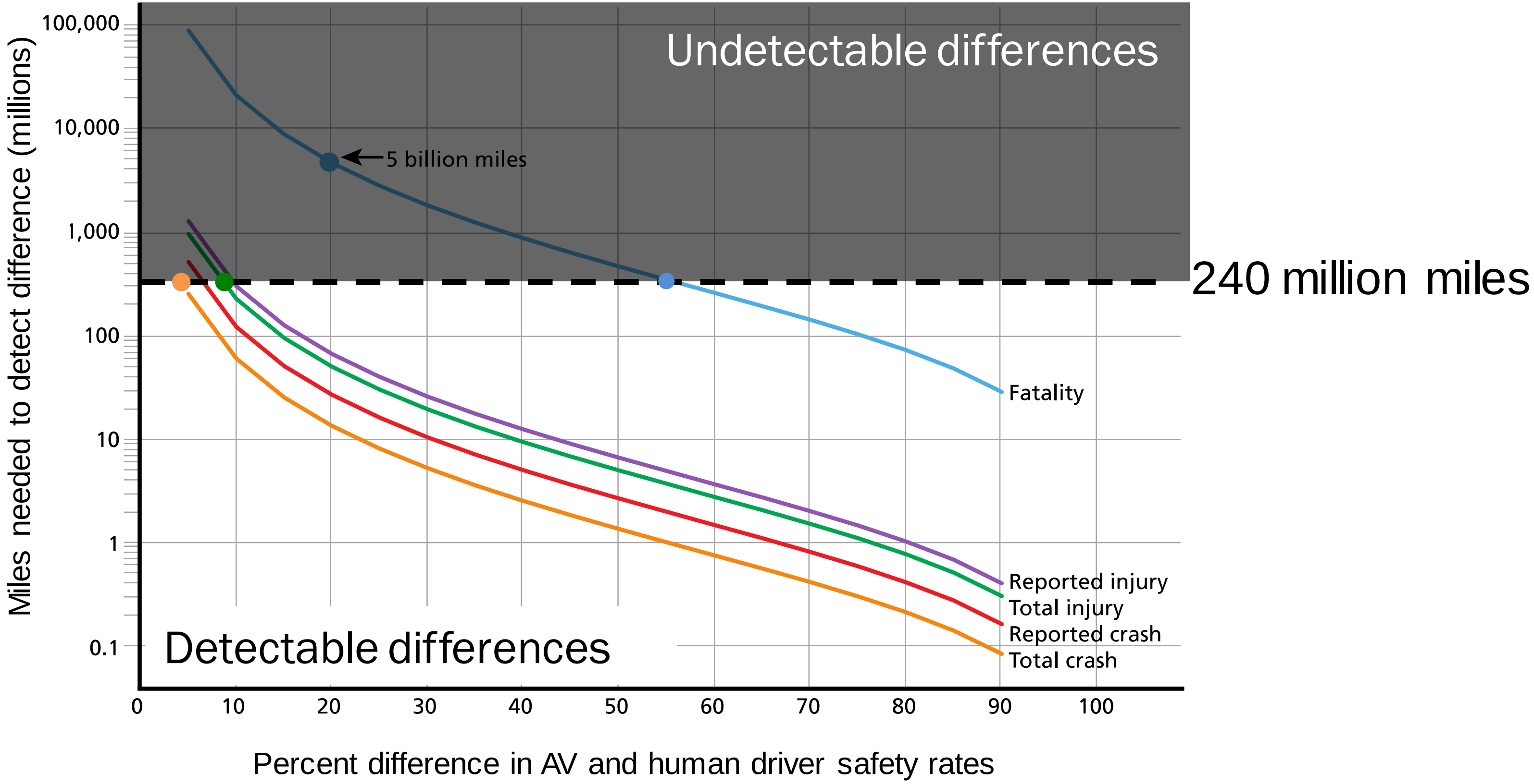

Bottom line

- When faced with great uncertainty, it is almost impossible to get regulations right the first time
- Policies that manage uncertainty could enable innovation, while balancing the tradeoff between risk and information
- A graduated approach additionally helps avoid the problem of the horse and the barn door

Image by H. Miller.