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# Lay person explanation of WGS

- Understanding of Whole Genome Sequencing on a scale of 1 (never heard of it) to 5 (I'm an expert)
- Human Genome Project
  - Early 2000s

# What it means

Pre-1995

- Gray Hyundai Sonata

1995-2015

- MD license plate 6ay1??

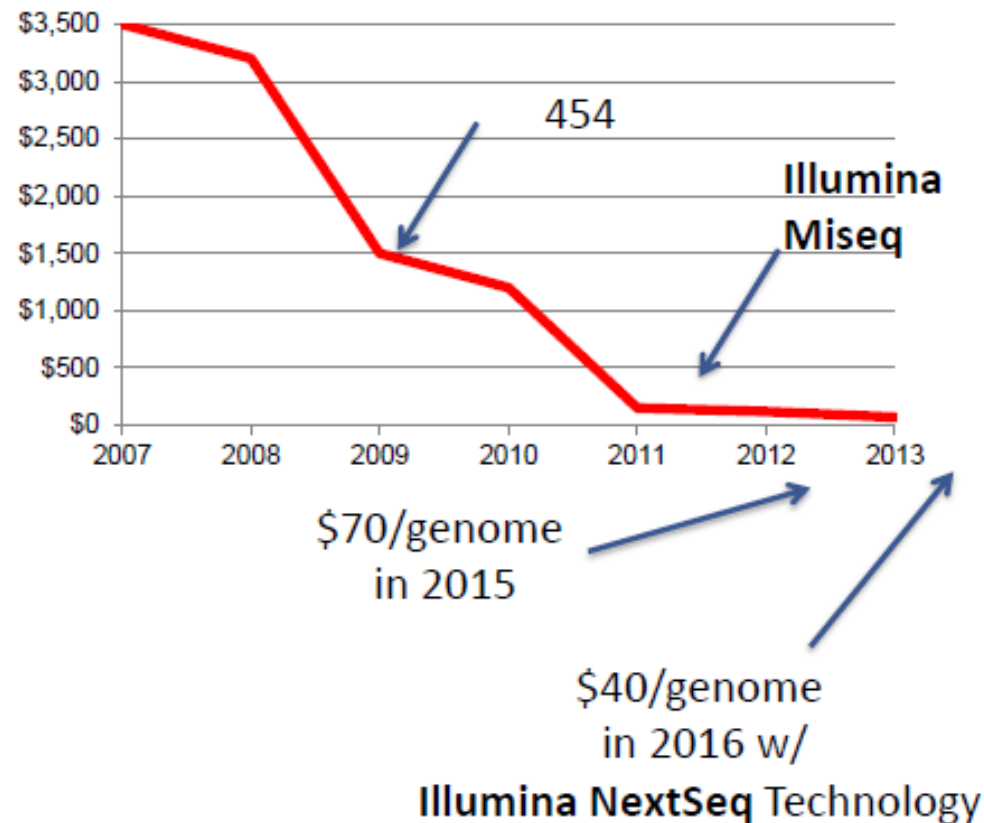
Present

- VIN ABC123DEF456

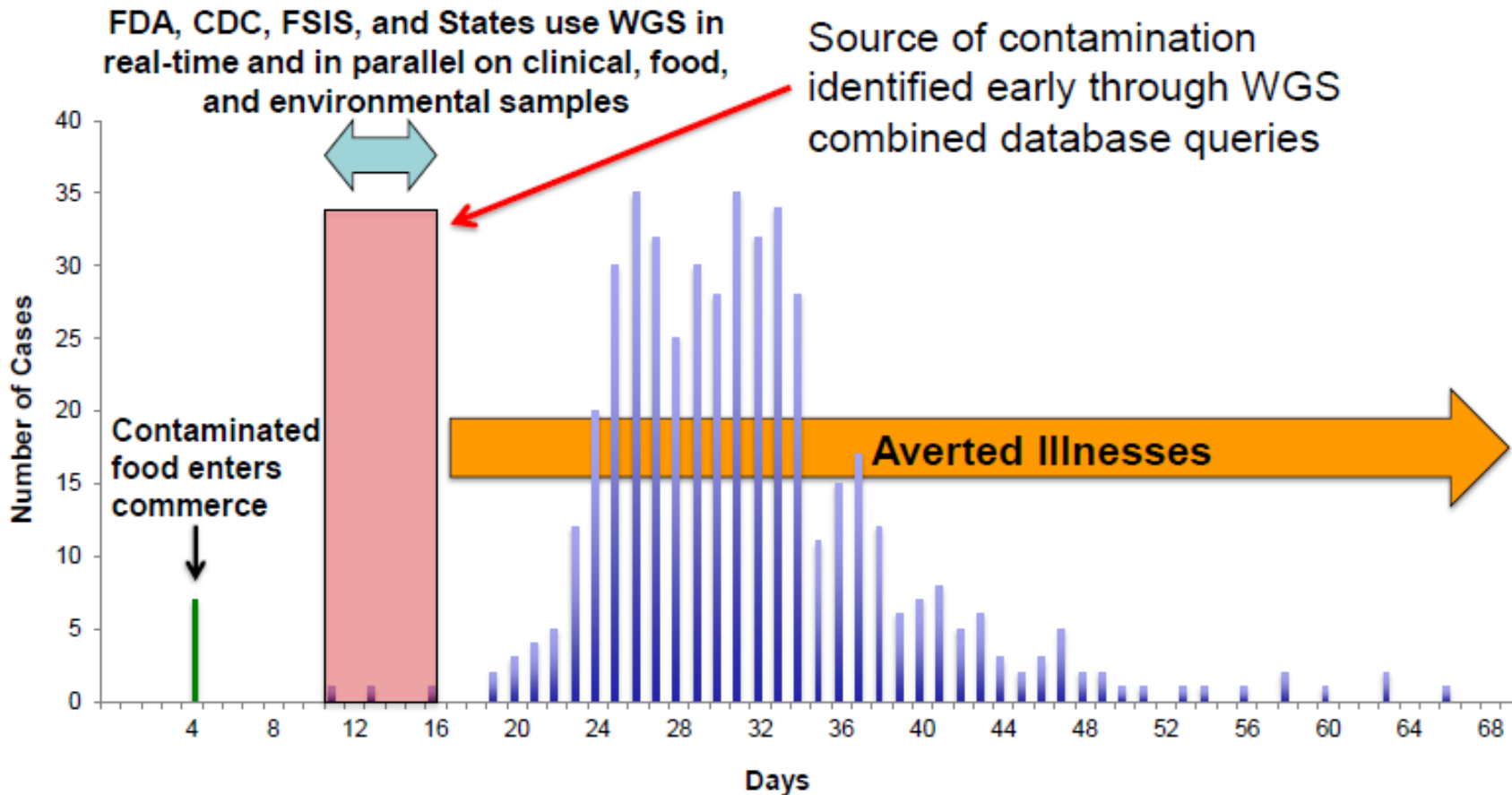
# Is WGS a viable solution?

- Cost
- Increasing ease of operation
- Database longevity
- Comparable times to conventional pipelines
- Sample prep
  - Identical for all pathogens
- Cost savings
  - Resistance, subtyping, virulence factors, more...
- New applications
  - tracking, regulatory/compliance actions, historical trends, more...

Cost per bacterial genome

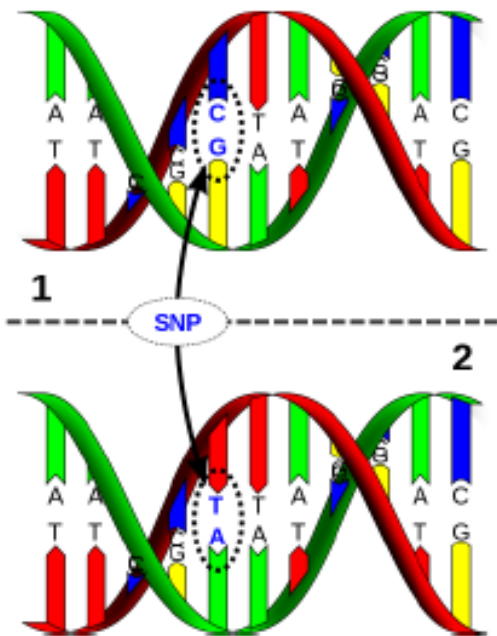


## TARGET: Timeline for Foodborne Illness Investigation Using Whole Genome Sequencing

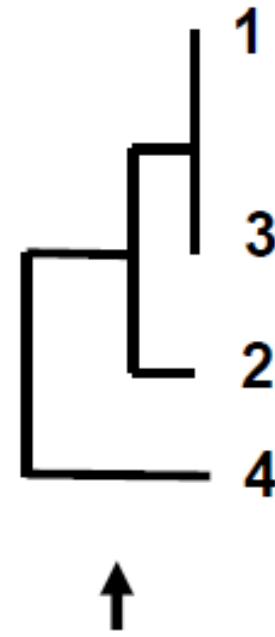


# SNP analysis

**SNP:** single nucleotide polymorphism



Isolate 1	GAT
Isolate 2	GTT
Isolate 3	GAT
Isolate 4	TTA



# No food is safe from WGS!

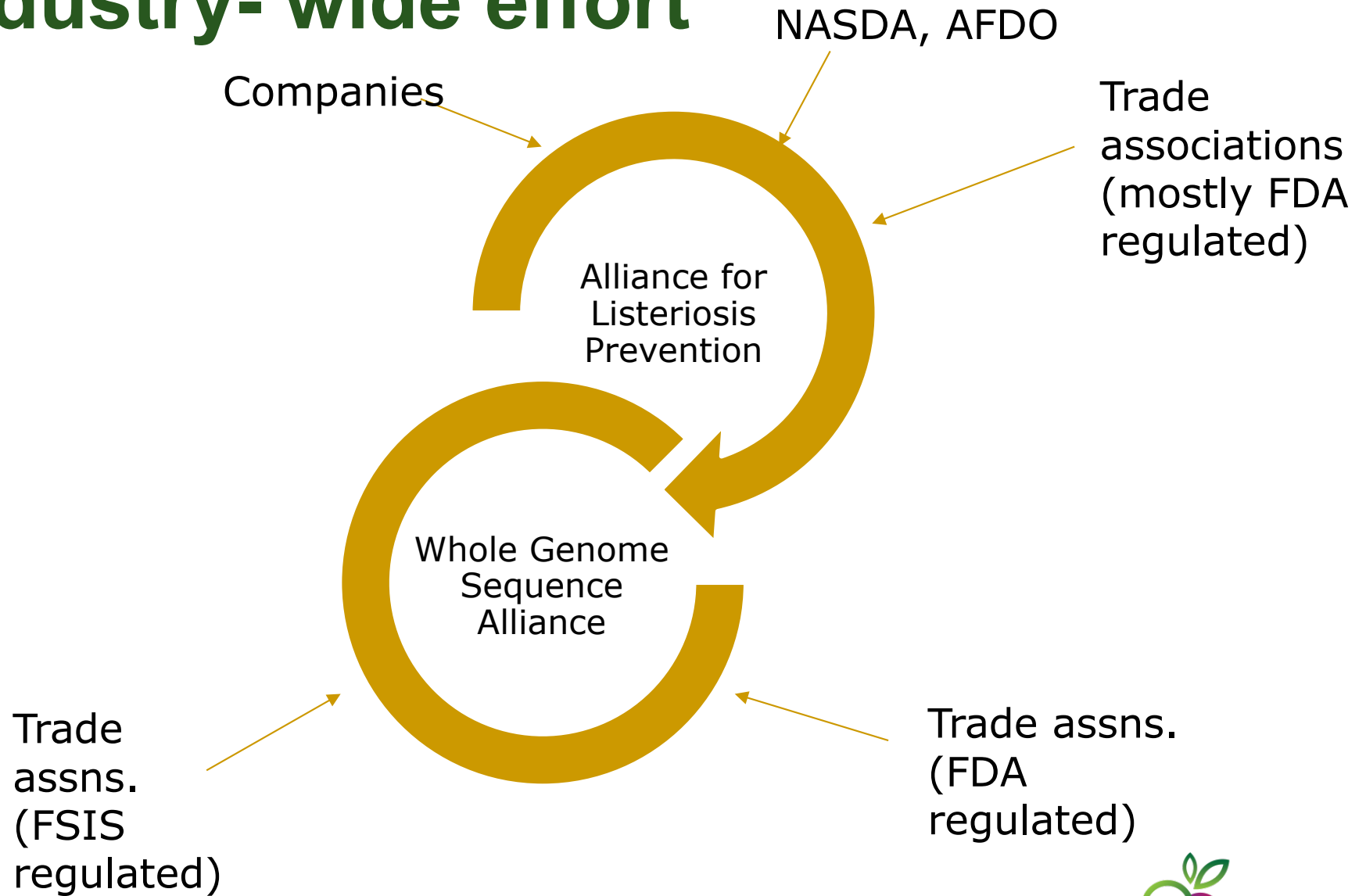
- Database
  - *Salmonella* (antibiotic resistance)
  - *Listeria monocytogenes*
  - Plans to grow database of other pathogens

# 4 agencies involved

- FDA
- USDA FSIS
- CDC
- NCBI (of NIH)



# Industry- wide effort



# Common concerns

- Equivalency of methods (FDA's use of SNPs and CDC's use of WgMLST-based approach)
- Standardization of wet and dry test methods occurred?
- Plans to “sunset” PFGE and prerequisites for reliance on WGS?
- Compliance policy guide to govern the use of WGS
- How is epidemiological information used in conjunction with WGS during an outbreak investigation?

- Retrospective analyses and potential future regulatory action
- Should private companies be encouraged to use WGS methodology?
- Collaboration with local, state, or other federal agencies or programs, *e.g.*, NARMS, on WGS activities?
- International standards around WGS (*e.g.*, within Codex Alimentarius)?

- Flow of WG sequence information to different databases (e.g., what governs whether a sequence will be uploaded to GenomeTrakr, PulseNet etc.?)
- What is the status of an MOU or other inter-departmental agreement?
- Limitations of WGS?

# Agency interaction

- Meat and poultry industry- spring 2016
- IFSH meeting- fall 2016
- CAFPA/ ASM meeting winter 2016
  
- Numerous webinars and smaller meetings

# We want more!

- Nov 2016: requested public meeting
  - FSIS: planning meeting for summer/fall (look out for FR notice)
- Discussion with Pew Charitable Trust to host Food Safety Collaborative Forum
- May 22-23 IFSH WGS

# Summary

- WGS is here to stay
  - High fidelity method
  - Still gathering more data & understanding how to interpret it

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# Questions?

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