



Analyzing 24 Years of CVD

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Agenda

Process & data overview

Cases & messages over time

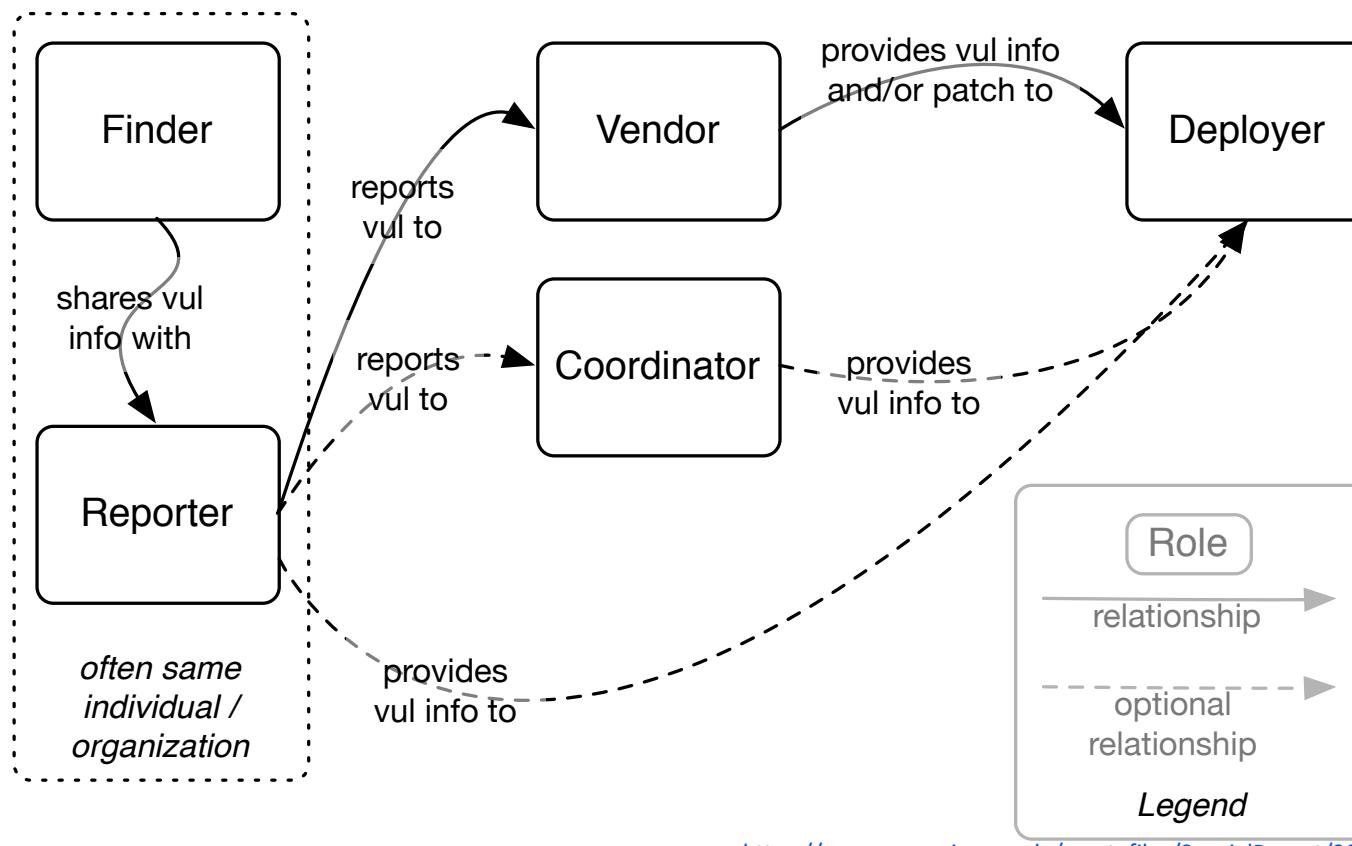
Case duration distribution

Case size distribution

When does the work happen?

Observations on Case Complexity

The CVD Process



https://resources.sei.cmu.edu/asset_files/SpecialReport/2017_003_001_503340.pdf

The Data

This is work in progress, all results are preliminary.

CERT/CC has been coordinating vulnerability disclosures since 1988.

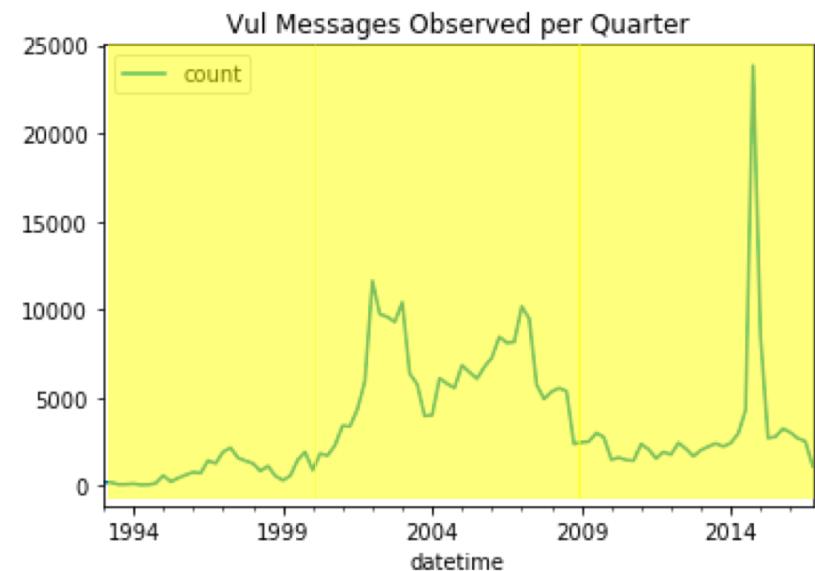
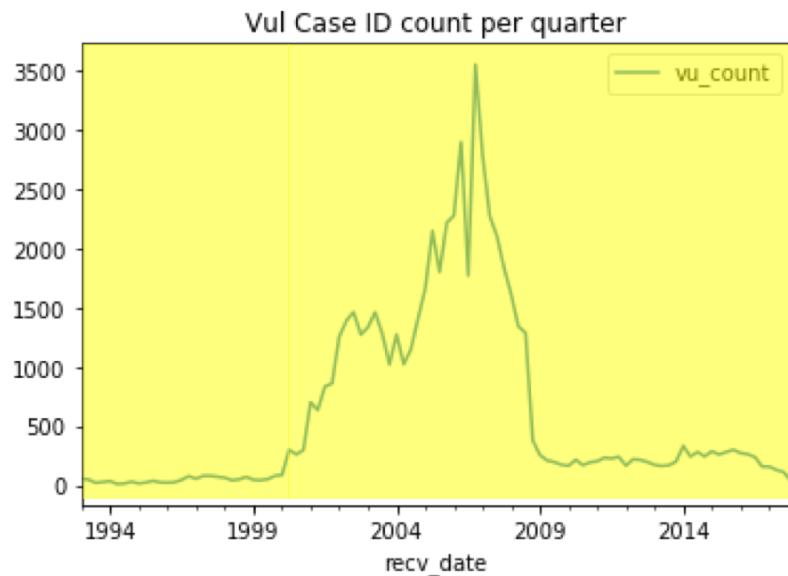
- Email-centered process, “hub and spoke” communication pattern
- Messages sent/received as proxy measure of coordination effort

Database log of email sent/received by cert@cert.org about VU#nnnn and VR-nnn cases

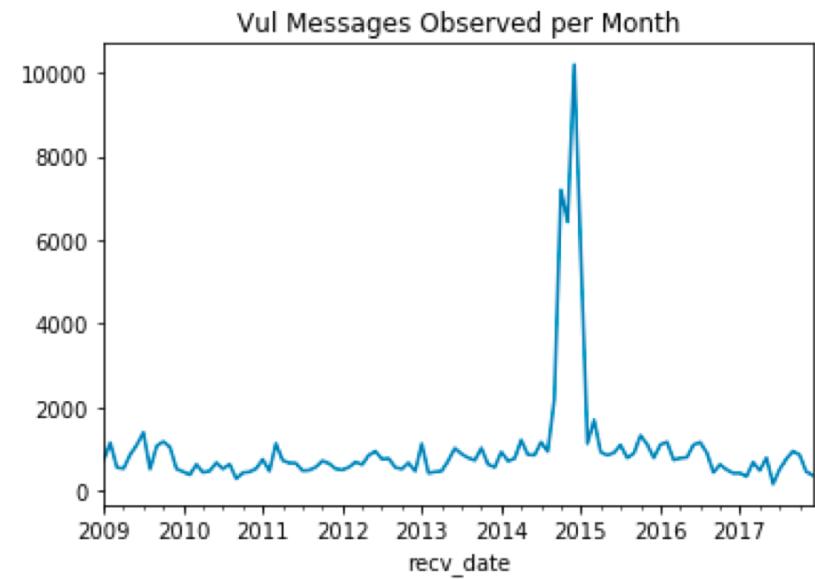
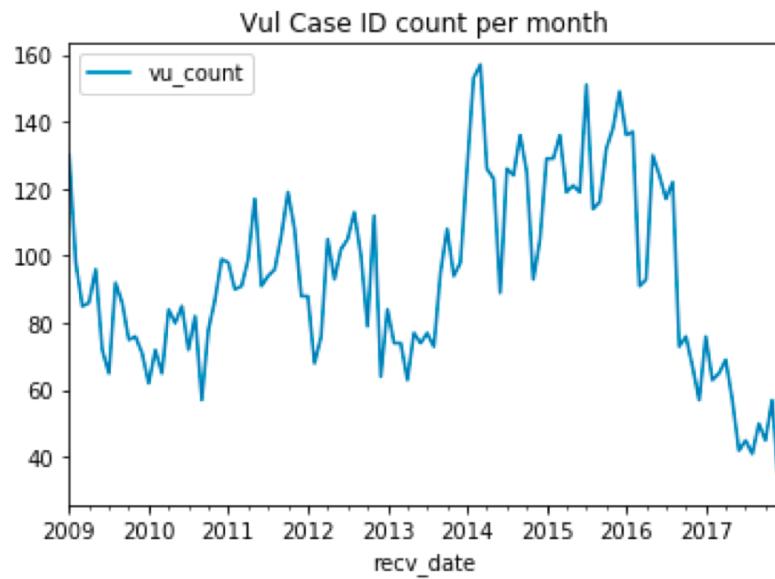
- Spans 1993-2017 (24 years)
- 350k+ CVD-related email messages observed
- 46k+ CVD cases observed
- 2,300+ years of CVD embargo*

*sum across all domain-level participants

Cases, Messages per Quarter 1994-2017

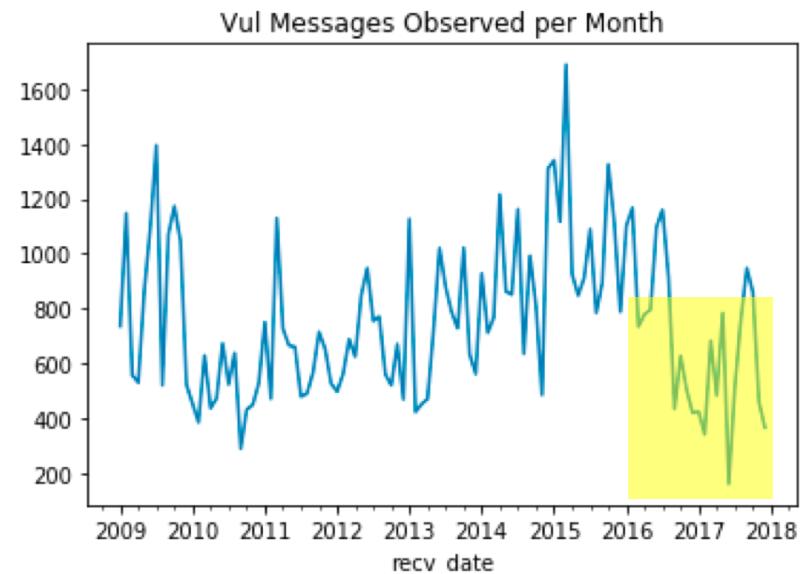
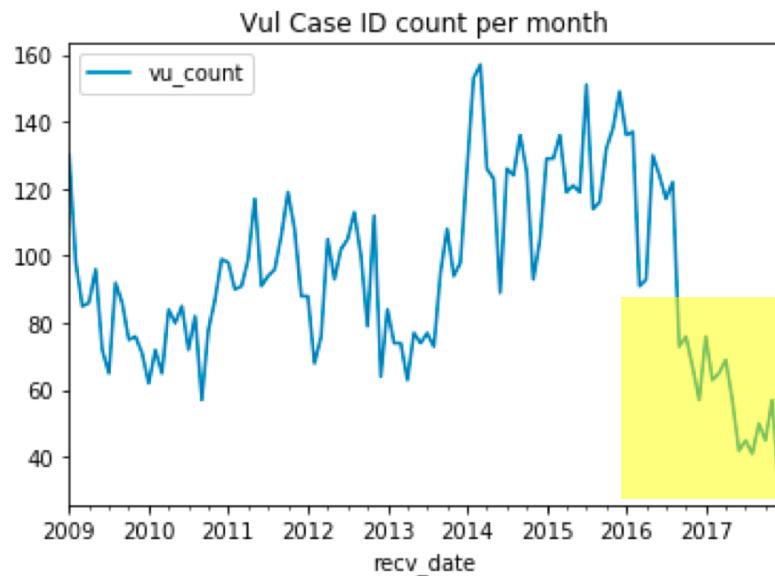


Cases, Messages per Month 2009-2017

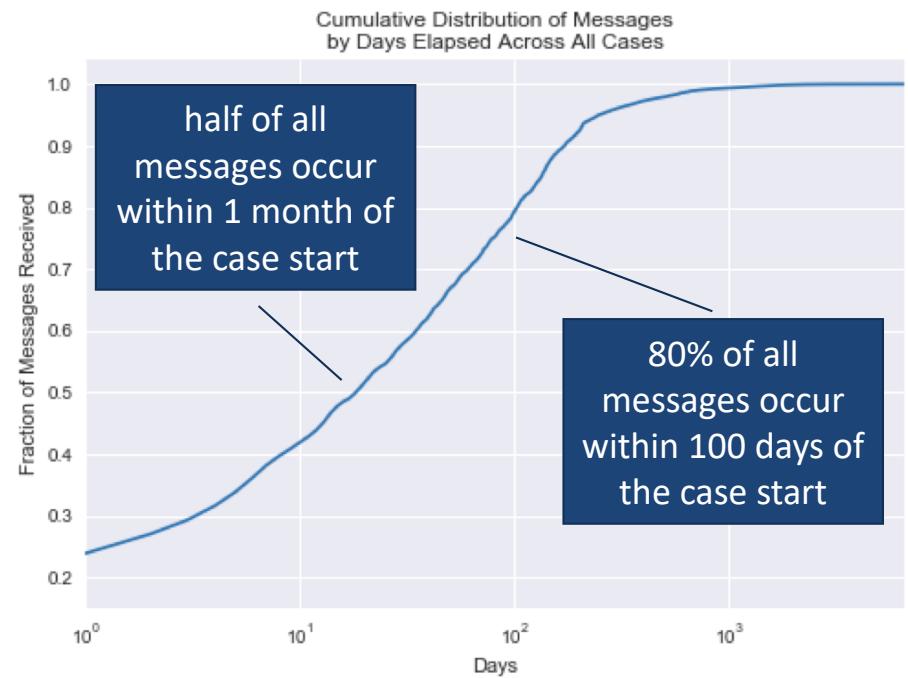
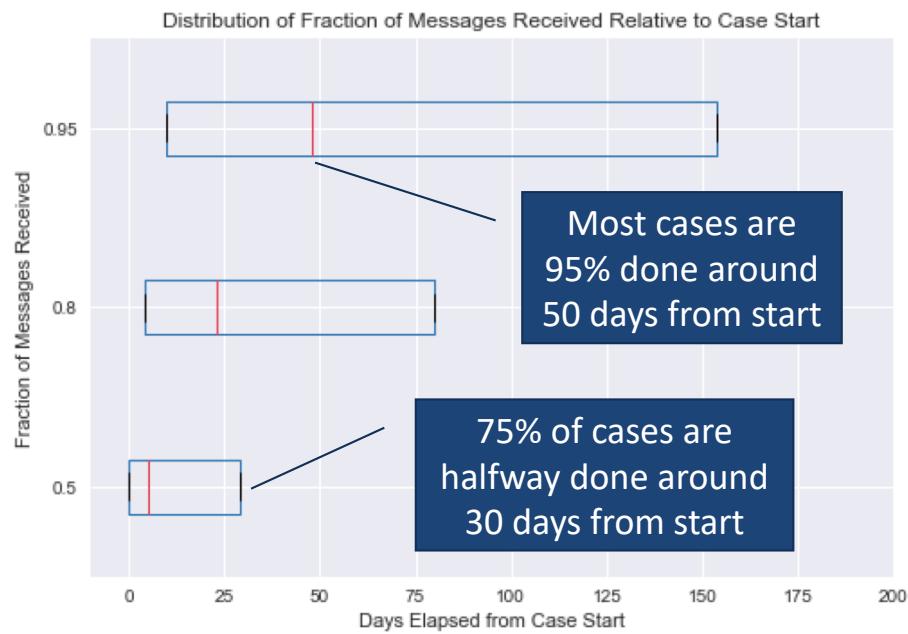


Cases, Messages per Month 2009-2017

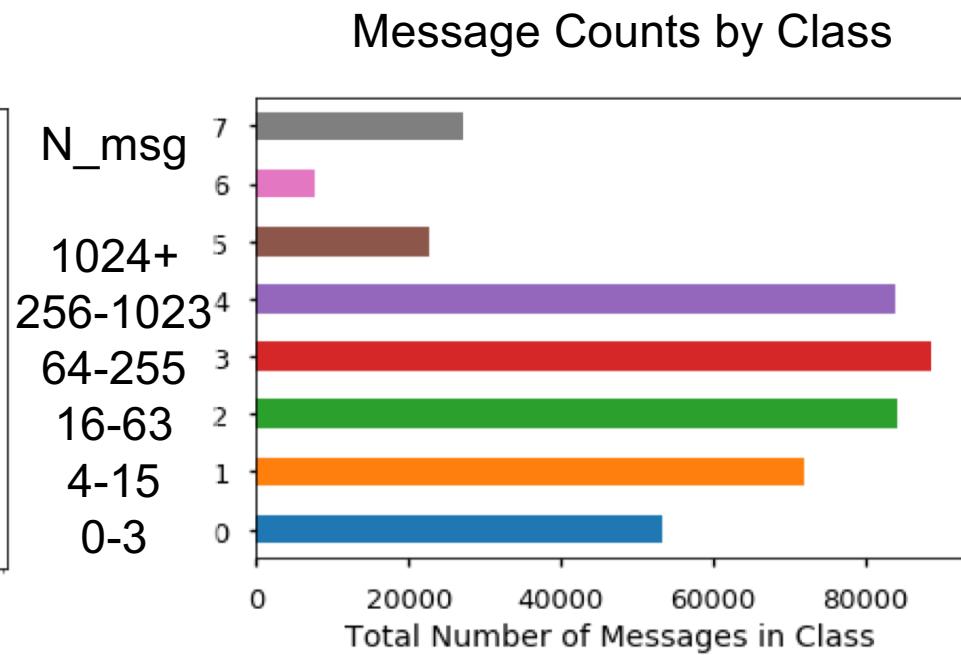
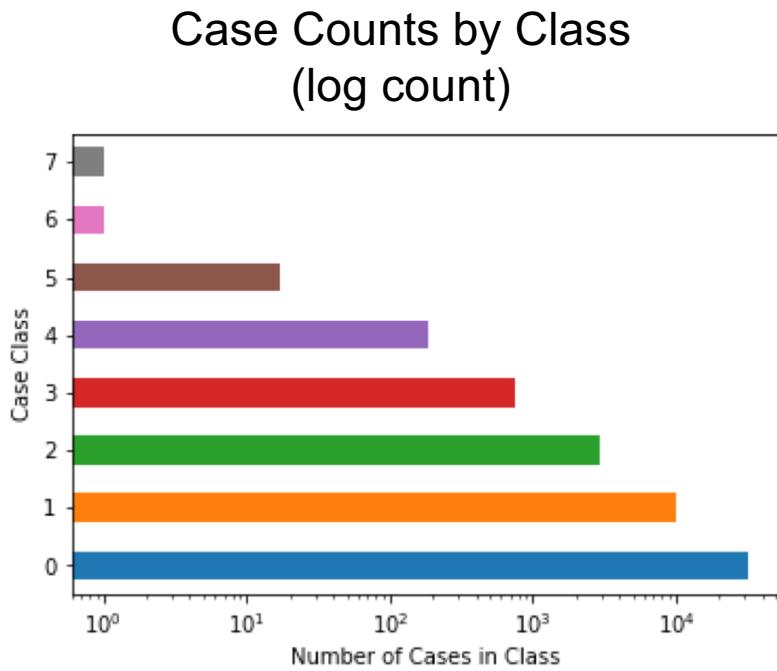
(Same chart, but remove VU#582497)



How long do cases last?

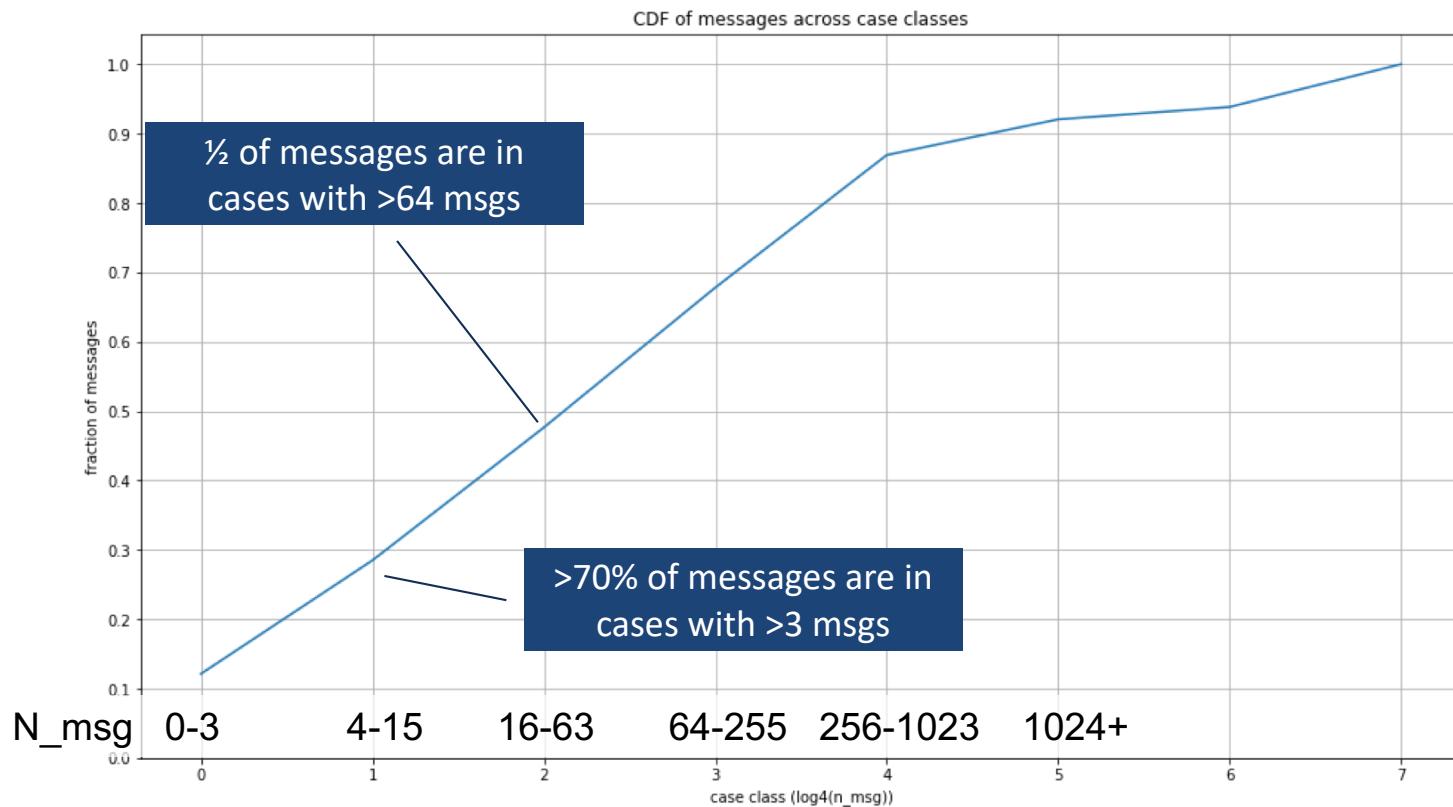


Case Sizes

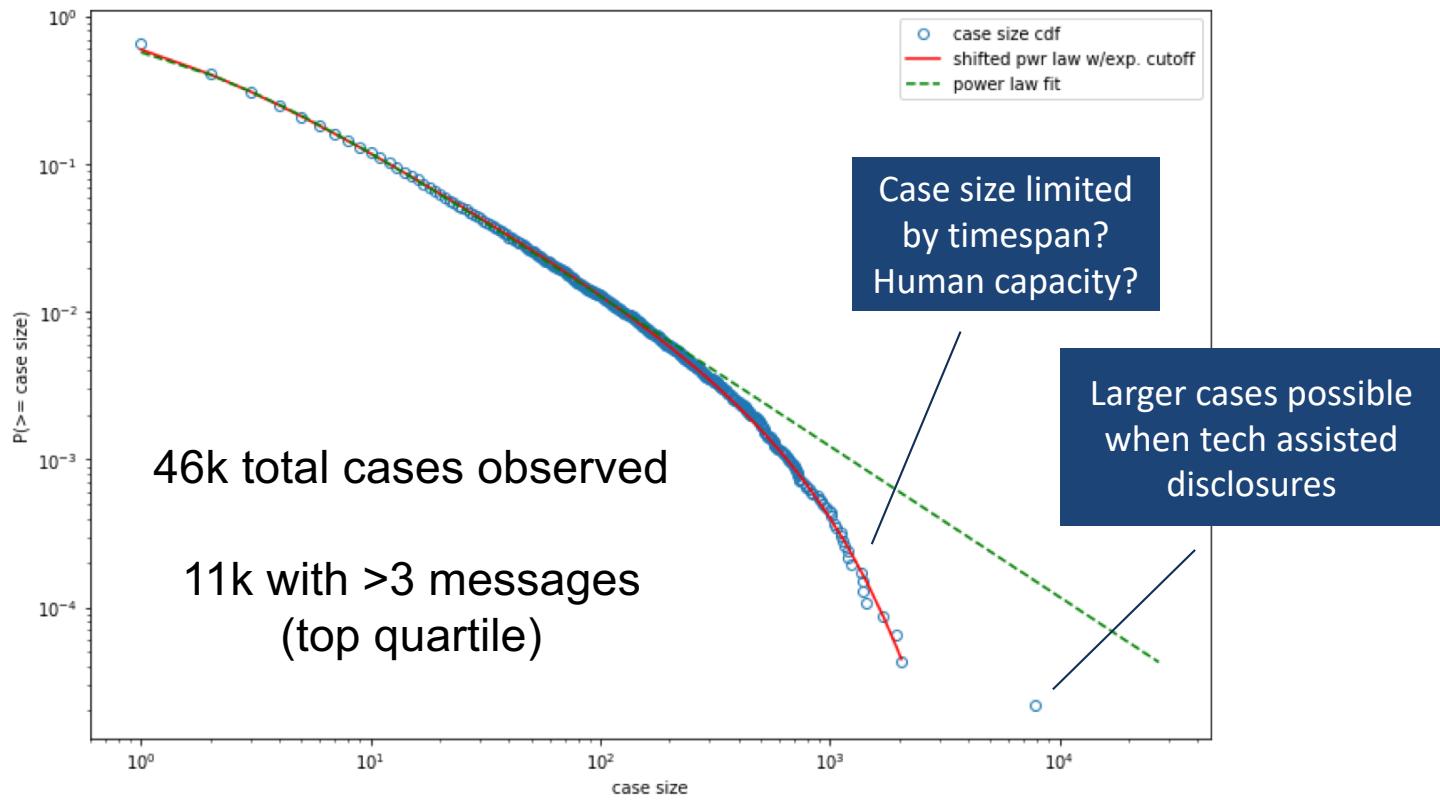


$$\text{"Case class"} = \log_4(n_messages)$$

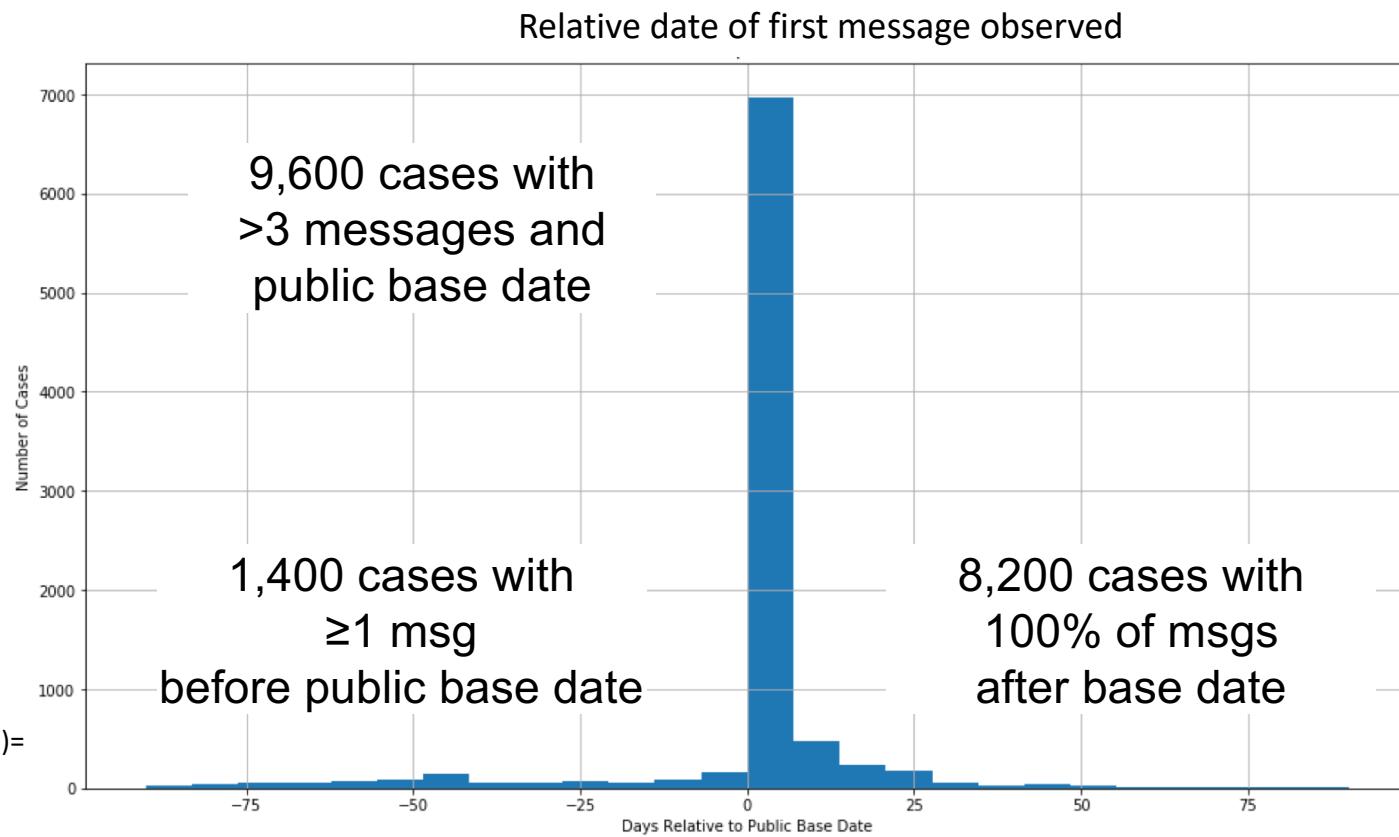
Workload Distribution By Case Size



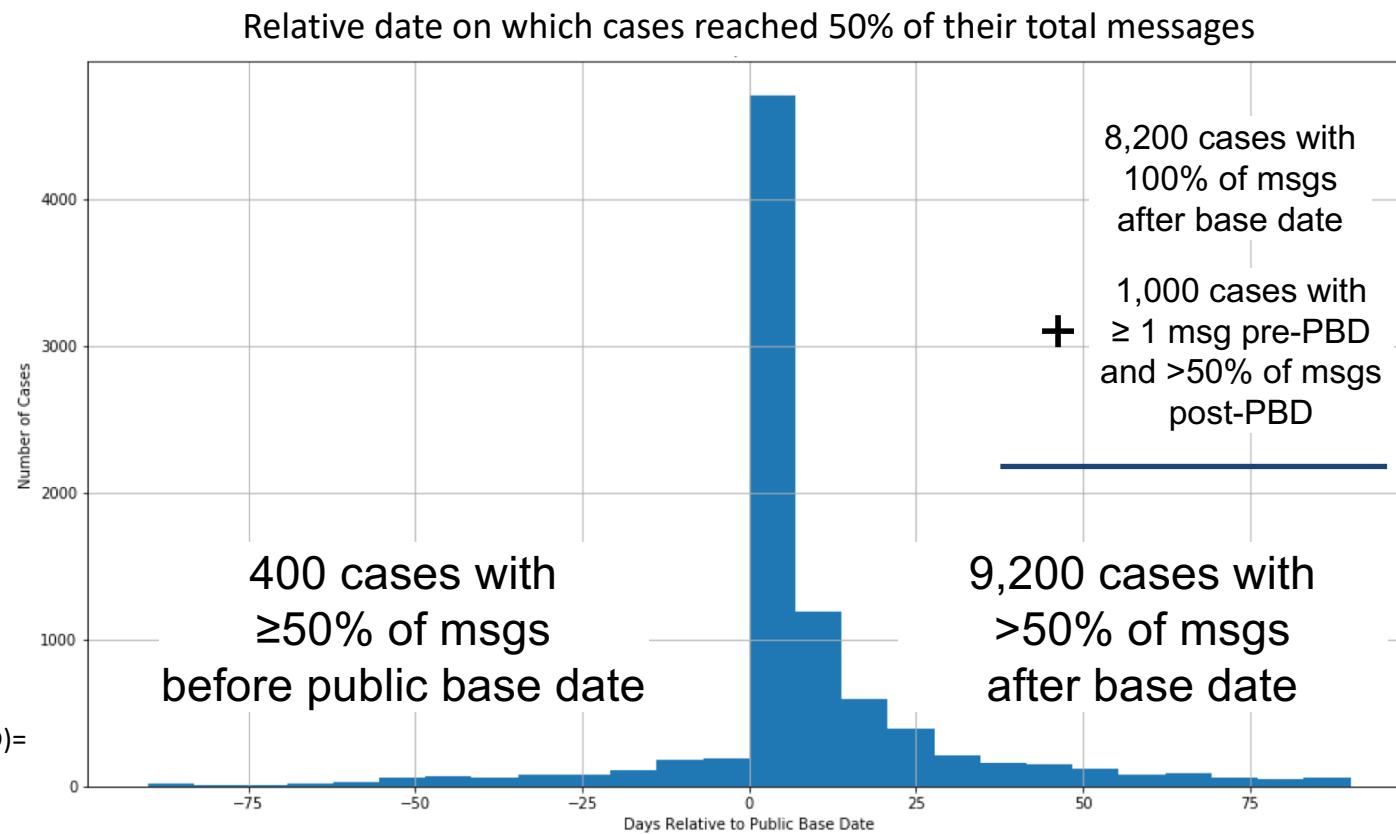
Case Size-Frequency



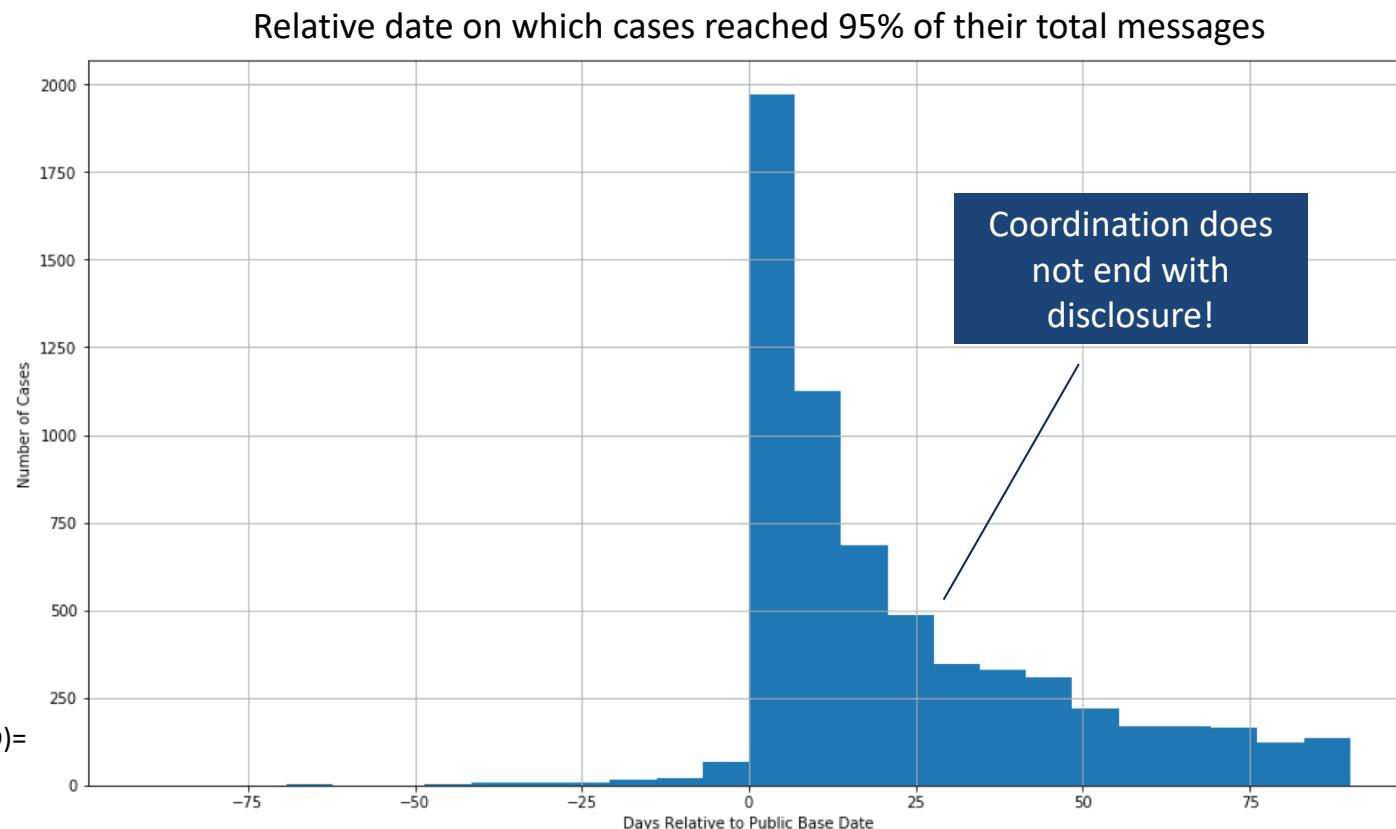
Case Start Relative to Date Public



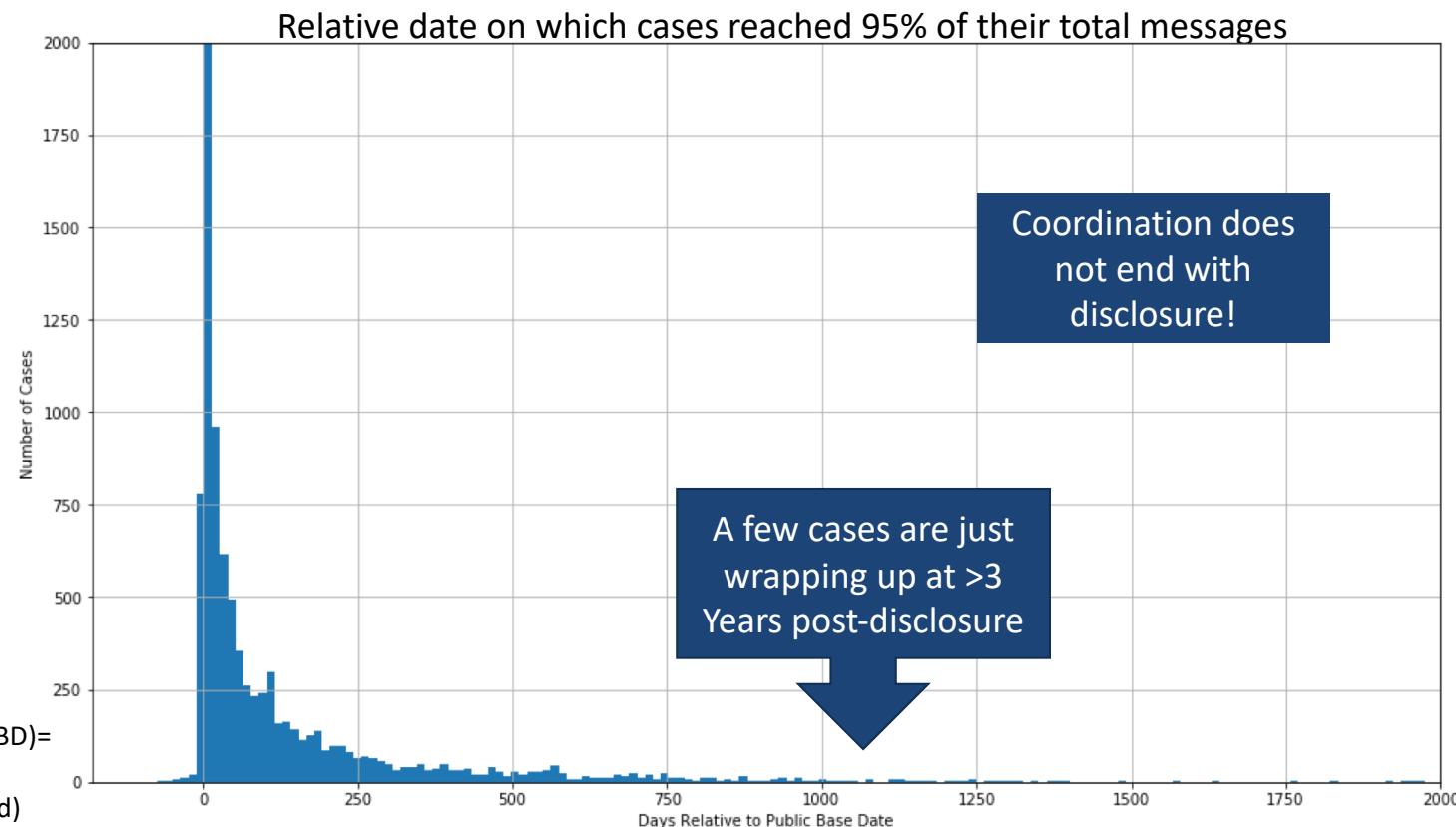
Case Midpoint Relative to Date Public



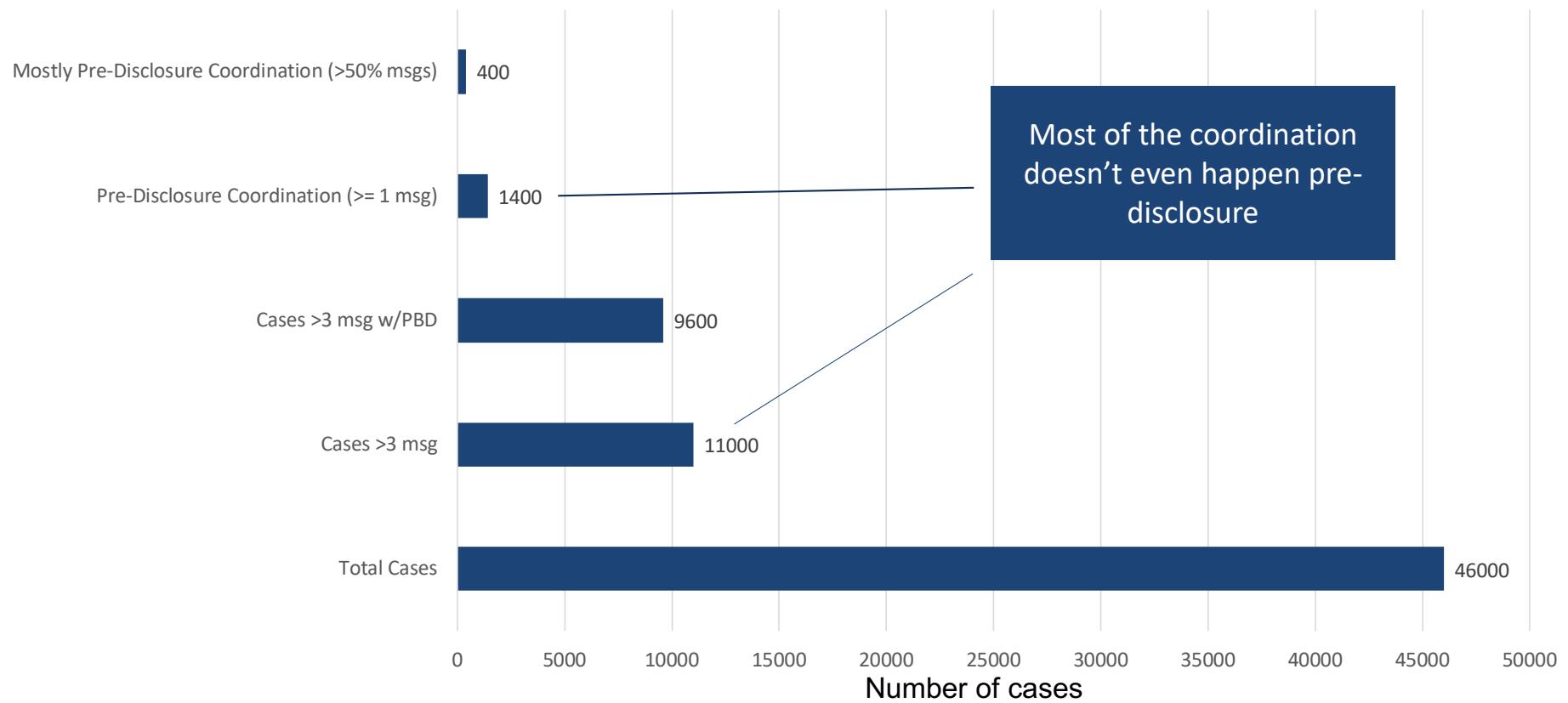
Case End (Effective) Relative to Date Public



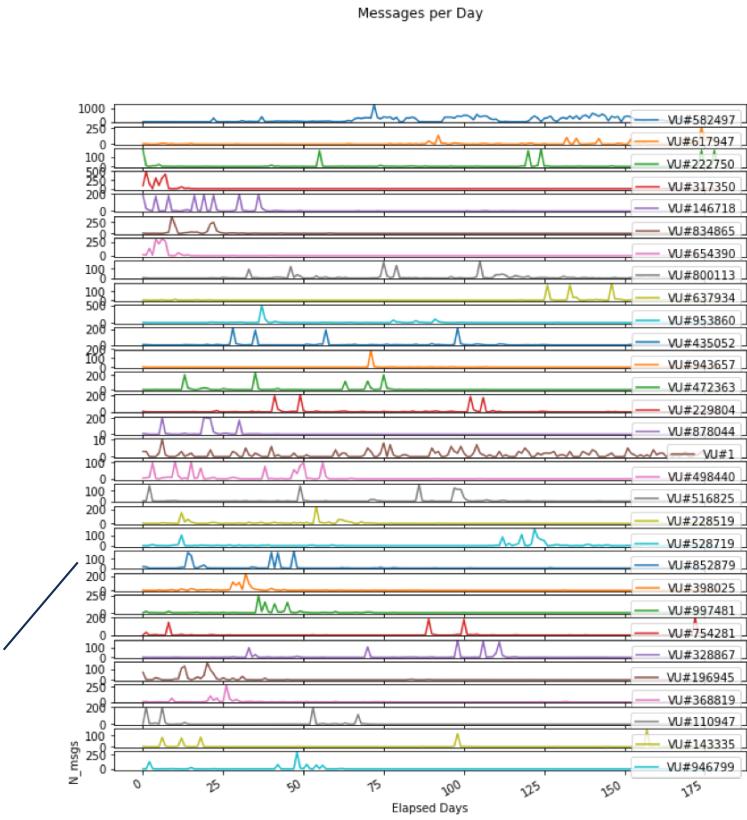
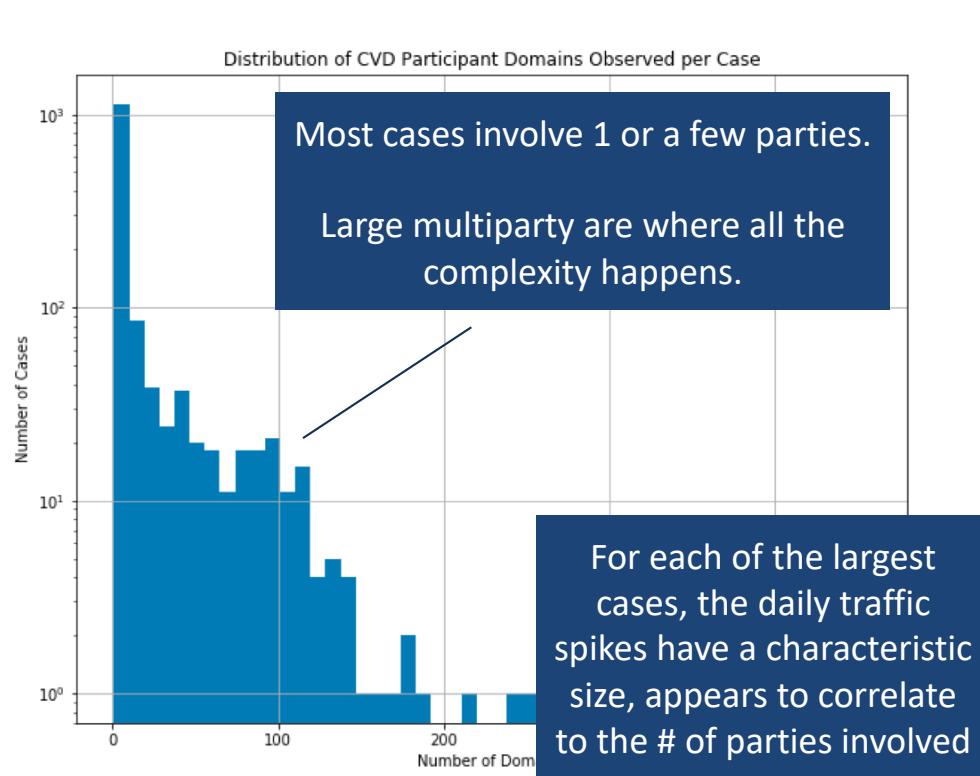
Case End (Effective) Relative to Date Public



Case Breakdown



Underlying Mechanism for Case Size: Multiparty



Limiting Factors for Case Size

Factor	Potential causes of limit
Timespan	<ul style="list-style-type: none">• Vendor responsiveness to creating patches (<i>This is a good thing!</i>)• Attention span of orgs before other work takes precedent• Reporters sometimes under inflexible timelines
Identifying affected vendors	<ul style="list-style-type: none">• What products contains libfoo?• What vendors are affected by a vul in libfoo?• What vendors implemented this protocol?
Number of vendors involved	<ul style="list-style-type: none">• Contact management (acquisition & maintenance)• Communication channel efficiency (hub & spoke, tools)• How many people can keep a secret for how long?

These are all about *efficiency* and *efficacy* of vulnerability response processes, driven by information *availability* and *utility*.

Parting Thoughts

CVD doesn't end with public disclosure.

- Most of the coordination work actually happens *after* public disclosure

“Average case” is not a useful concept for capacity planning

- Large cases are rare, but dominate the day-to-day work

Case complexity is driven by the number of participants involved

Case sizes appear to be limited by organizational factors

- There might be an upper limit to how big a coordination can be before it's better to just go public

Got Data?

- This is ongoing research work at CERT
- We are looking for CVD metadata from other orgs
- Minimum required: (*Case ID, Message Timestamp*)
- Contact us if you have data you can share.

Contact Info

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