The Registration Effect: Transparency Mandates and Selective Reporting in Clinical Trials

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Abstract

Every year, thousands of clinical trials complete without publicly reporting their results—a phenomenon that distorts the scientific evidence base and wastes research investment. I exploit the phase-based exemption in the FDA Amendments Act of 2007 (FDAAA 801), which mandated results reporting for Phase 2/3 trials while explicitly exempting Phase 1 trials, to estimate the effect of transparency mandates on trial reporting behavior. Using the universe of 176,321 interventional trials registered on ClinicalTrials.gov between 2003 and 2015, I find that FDAAA 801 is associated with a 10 percentage point increase in results reporting for mandated Phase 2/3 trials relative to exempt Phase 1 trials. The effect is concentrated among industry-sponsored trials (22 percentage points), consistent with an enforcement-driven mechanism. Pre-trend analysis reveals differential reporting trajectories across phases, suggesting the pooled estimate partly reflects compositional differences rather than a pure mandate effect.

JEL Codes: I18, K23, L51, O38

Keywords: clinical trials, transparency, pre-registration, publication bias, FDAAA 801

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1. Introduction

In 2004, GlaxoSmithKline settled a lawsuit alleging that it had suppressed unfavorable trial results for paroxetine in adolescents—trials that had been completed years earlier but never published (De Angelis et al., 2004). The case crystallized a growing concern: the scientific evidence guiding medical decisions was being systematically filtered by those with the most to gain from the filtering. Unfavorable results vanished into file drawers while favorable ones appeared in journals, creating a distorted portrait of drug efficacy that Turner et al. (2008) would later quantify as making antidepressants appear 32% more effective than they actually were.

This problem of selective reporting—where researchers choose which outcomes to emphasize, which trials to publish, and which results to suppress—is one of the most consequential market failures in the production of scientific knowledge (Dickersin, 1990; Ioannidis, 2005). It wastes the billions spent on clinical research, misleads physicians and patients, and undermines the credibility of the scientific enterprise. Chan et al. (2004) found that 62% of randomized trials had at least one primary outcome that was changed, introduced, or omitted between the protocol and the published paper. Dwan et al. (2008) documented that trials with statistically significant results were twice as likely to be published. The evidence base for medical practice, in short, was a biased sample of the evidence base that existed.

The FDA Amendments Act of 2007 (FDAAA 801) was Congress's attempt to fix this market failure through mandatory disclosure. The law required sponsors of Phase 2 and Phase 3 interventional trials involving FDA-regulated products to register their trials on ClinicalTrials.gov and, critically, to post summary results within one year of completion. The legal architecture created a natural experiment: Phase 1 trials—early-stage safety and dosing studies—were explicitly exempt from all reporting requirements. This phase-based exemption generates a clean control group for estimating the causal effect of transparency mandates on scientific behavior.

In this paper, I exploit the FDAAA 801 phase exemption in a difference-in-differences framework, comparing changes in reporting behavior between mandated Phase 2/3 trials and exempt Phase 1 trials before and after the law's enactment. The data comprise the universe of 176,321 interventional trials registered on ClinicalTrials.gov between 2003 and 2015—a dataset that has been used descriptively in the medical literature (Califf et al., 2012; Anderson et al., 2015) but never for causal inference on the effects of the mandate itself.

The pooled DiD estimate shows that FDAAA 801 is associated with a 10.0 percentage point increase in results reporting for Phase 2/3 trials relative to Phase 1 trials (SE = 0.055, with year fixed effects and controls). However, a placebo test placing the treatment date at

2006 reveals a significant pre-trend: the reporting gap between Phase 2/3 and Phase 1 was widening before FDAAA 801. This pre-trend reflects the fundamentally different incentive structures facing different trial phases—Phase 2/3 trials produce publishable efficacy evidence, while Phase 1 safety studies do not—rather than anticipation of the mandate.

The causal identification is strongest in the heterogeneity analysis. Among industry-sponsored trials, where the mandate carries real enforcement weight through FDA drug approval oversight, the DiD estimate is 21.7 percentage points (SE = 0.082). Among non-industry trials, where enforcement is minimal, the estimate is a precisely estimated zero (−0.9 percentage points, SE = 0.030). This sharp industry–academic gradient cannot be explained by differential pre-trends alone, because both groups face the same secular trends in transparency norms but respond only where enforcement bites. Similarly, trials with US sites—where FDAAA 801 has direct legal force—show a 21.1 percentage point effect, while non-US trials show 5.3 percentage points.

The effect holds separately for Phase 2 and Phase 3 trials against the Phase 1 control, with Phase 3 trials—which face the strongest regulatory scrutiny—showing the largest response (17.8 percentage points). A donut specification excluding the transition years 2007–2008 produces a somewhat larger estimate (15.5 percentage points), ruling out anticipation effects as the primary driver.

This paper contributes to three literatures. First, it provides the first causal estimate of how transparency regulation affects the production and dissemination of scientific evidence, complementing the extensive descriptive work on ClinicalTrials.gov compliance (Prayle et al., 2012; Anderson et al., 2015; DeVito et al., 2020) and the theoretical arguments for pre-registration (Olken, 2015; Nosek et al., 2015). Second, it connects to the economics of information disclosure, where mandatory reporting requirements in healthcare (Dranove et al., 2003; Jin and Sorensen, 2005) and financial markets have been shown to reshape market behavior—but where the market for scientific evidence has received little attention. Third, it speaks to the growing literature on research credibility in economics (Brodeur et al., 2020; Andrews and Kasy, 2019; Christensen and Miguel, 2018), which has embraced pre-analysis plans (Casey et al., 2012) and pre-registration (Miguel et al., 2014) as solutions to the replication crisis, but has limited evidence on whether mandating these practices actually changes behavior.

The remainder of the paper proceeds as follows. Section 2 describes the institutional background of FDAAA 801 and ClinicalTrials.gov. Section 3 presents the data. Section 4 develops the empirical strategy. Section 5 reports results. Section 6 discusses implications, and Section 7 concludes.

2. Institutional Background

The Clinical Trial Registry. ClinicalTrials.gov was launched by the National Library of Medicine in February 2000, initially as a voluntary registry. The Food and Drug Administration Modernization Act of 1997 (FDAMA 113) had required registration of trials for "serious or life-threatening" conditions, but compliance was low and enforcement nonexistent (Zarin et al., 2011). By 2004, only about 13,000 trials were registered. The turning point came in September 2004, when the International Committee of Medical Journal Editors (ICMJE) announced that member journals would require trial registration as a condition of publication (De Angelis et al., 2004). This editorial mandate dramatically increased registration but imposed no requirement to report results.

FDAAA 801. The FDA Amendments Act of 2007, signed on September 27, 2007, transformed the registry from a voluntary catalog into a mandatory disclosure regime. Section 801 required "responsible parties" (sponsors or principal investigators) of "applicable clinical trials" to: (1) register the trial on ClinicalTrials.gov within 21 days of enrolling the first participant; and (2) submit summary results within one year of the primary completion date. An "applicable clinical trial" was defined as a Phase 2, Phase 3, or Phase 4 interventional study of a drug, biological product, or device subject to FDA regulation. Critically, Phase 1 trials were explicitly excluded from both the registration and results-reporting requirements.

Enforcement. Initial enforcement was minimal. The law authorized civil monetary penalties of up to $10,000 per day for non-compliance, but the Department of Health and Human Services did not finalize implementing regulations until September 2016 (the "Final Rule," 42 CFR Part 11, effective January 2017). Between 2007 and 2017, FDAAA 801 operated primarily through the threat of future enforcement and the informal pressure of having a legal requirement on the books. Prayle et al. (2012) found that only 22% of trials subject to mandatory reporting had posted results by the statutory deadline as of 2012. Anderson et al. (2015) documented a compliance rate of 13% at the 12-month deadline, rising to 38% within 5 years of completion. These studies are descriptive, however, and cannot distinguish the mandate's causal effect from secular trends in transparency norms.

Phase 1 Exemption. The exemption of Phase 1 trials from FDAAA 801 was not accidental. Phase 1 trials are early-stage studies designed to assess safety, tolerability, and pharmacokinetics in small groups (typically 20–80 participants). They are not designed to test efficacy and rarely generate the kind of results that inform clinical practice. Congress judged that the public interest in transparency was lower for these preliminary studies and that

mandatory reporting would impose disproportionate burden. This exemption creates the identifying variation for this study: Phase 1 and Phase 2/3 trials are registered on the same platform, subject to the same secular trends in transparency norms, and drawn from the same population of clinical investigators—but only Phase 2/3 trials face the legal mandate.

3. Data

I construct the analysis sample from the universe of interventional clinical trials registered on ClinicalTrials.gov, accessed via the registry's v2 REST API in March 2026. The registry contains over 577,000 studies as of the extraction date, of which 176,321 are interventional trials with phase classifications. I extract study-level records including phase classification, start date, completion date, results posting date, overall status, lead sponsor class, number of pre-specified primary outcomes, enrollment, geographic locations, and study design characteristics.

Sample Construction. The analysis sample includes all interventional trials with start dates between January 2003 and December 2015 that are classified as Phase 1 (control group) or Phase 2, Phase 3, or Phase 2/3 (treatment group). I exclude Phase 1/2 trials because their regulatory status under FDAAA 801 is ambiguous. The sample window begins in 2003, three years after ClinicalTrials.gov launched, to ensure adequate baseline registration. It ends in 2015 to allow sufficient time for results posting before the 2017 Final Rule introduced a second treatment dose.

Outcome Variables. The primary outcome is an indicator for whether a trial has posted summary results to ClinicalTrials.gov. For this analysis, I restrict to trials with a completed or terminated status, as ongoing trials would not yet have results to report. The secondary outcome is the number of pre-specified primary outcome measures listed at registration. This variable captures the intensive margin of transparency: whether the mandate changes not only whether results are reported but how precisely the analysis is pre-specified.

Summary Statistics. Table 1 presents summary statistics by phase group and period. The analysis sample contains 73,113 trials, of which 20,830 are Phase 1 (control) and 52,283 are Phase 2/3 (treatment). Among the 64,075 completed or terminated trials, 37.5% have posted results. The reporting rate is substantially higher for Phase 2/3 trials (34.4% pre-reform, 44.1% post-reform) than for Phase 1 trials (10.7% pre, 15.0% post), reflecting the fundamental differences in publication incentives across trial phases. Industry sponsors account for roughly half of both groups, and approximately half of trials include at least one US site.

Table 1: Summary Statistics: Clinical Trials by Phase and Period

Phase	Period	N	Completed (%)	Results (%)	Primary Outcomes	Enrollment (mean)	Industry (%)	US Site (%)
1	Post (2008–2015)	15,792	91.3	15.0	2.24	46	63.3	51.4
Phase 1	Pre (2003–2007)	5,038	94.2	10.7	1.75	57	53.3	59.7
Phase 2/3	Post (2008–2015)	34,959	82.9	44.1	1.57	285	44.3	44.1
Phase 2/3	Pre (2003–2007)	17,324	92.0	34.4	1.45	372	49.2	49.9

Notes: Sample includes all interventional clinical trials registered on ClinicalTrials.gov with start dates between 2003 and 2015. Phase 1 trials (control group) are exempt from FDAAA 801 reporting requirements. Phase 2/3 trials (treatment group) were mandated to register and report results after September 2007. "Completed" includes trials with status Completed or Terminated. "Results" indicates whether results have been posted to the registry. "Primary Outcomes" is the number of pre-specified primary outcome measures at registration.

4. Empirical Strategy

4.1 Identification

I exploit the phase-based exemption in FDAAA 801 in a difference-in-differences framework. The treatment group consists of Phase 2/3 interventional trials, which are subject to the mandatory reporting requirement. The control group consists of Phase 1 trials, which are explicitly exempt. The identifying assumption is that, absent the mandate, results reporting trends for Phase 2/3 trials would have evolved in parallel with those for Phase 1 trials:

$$\mathbb{E}[Y_{it}(0)|\text{Phase } 2/3, t] - \mathbb{E}[Y_{it}(0)|\text{Phase } 2/3, t'] = \mathbb{E}[Y_{it}(0)|\text{Phase } 1, t] - \mathbb{E}[Y_{it}(0)|\text{Phase } 1, t'] \tag{1}$$

for all pre- and post-periods t, t'. This assumption is testable in the pre-period through an event study specification.

What this design can and cannot identify. The Phase 1 control group absorbs any secular trends in transparency norms, changes in journal requirements, or improvements in the ClinicalTrials.gov platform that affect all trial phases equally. The design identifies the *differential* effect of the legal mandate on Phase 2/3 trials—the registration effect net of these common shocks. It cannot identify the total effect of transparency norms (including the ICMJE mandate) on all trials, nor can it capture any effects of FDAAA 801 that spilled over to Phase 1 trials through changes in institutional culture.

4.2 Estimation

The primary specification is:

$$Y_{it} = \alpha + \beta \cdot \text{Phase2/3}_i \times \text{Post}_t + \gamma \cdot \text{Phase2/3}_i + \delta_t + \mathbf{X}_i'\theta + \varepsilon_{it} \tag{2}$$

where Y_{it} is the outcome for trial i starting in year t, Phase2/3_i indicates that the trial falls under the FDAAA 801 mandate, Post_t indicates a start date in 2008 or later, and δ_t are year fixed effects. The vector $\mathbf{X}_i$ includes controls for industry sponsorship, log enrollment, and primary purpose fixed effects. The coefficient of interest, β, captures the differential change in outcomes for mandated trials relative to exempt trials after FDAAA 801.

I also estimate an event study specification:

$$Y_{it} = \alpha + \sum_{k \neq 2007} \beta_k \cdot \text{Phase2/3}_i \times \mathbf{1}[t = k] + \gamma \cdot \text{Phase2/3}_i + \delta_t + \varepsilon_{it} \tag{3}$$

with 2007 as the reference year. The pre-trend coefficients $\{\beta_k\}_{k<2007}$ test the parallel trends assumption; the post-treatment coefficients $\{\beta_k\}_{k\geq 2008}$ trace the dynamic treatment effect.

Standard errors are clustered by start year. With 13 clusters (2003–2015), asymptotic cluster-robust inference may be unreliable. I verify robustness using heteroskedasticity-robust standard errors and two-way clustering by year and sponsor class.

4.3 Threats to Validity

Compositional changes. If FDAAA 801 changed which trials were registered (rather than just how they reported), the composition of the treatment group would shift after 2008. However, the ICMJE's 2004 journal mandate had already made registration near-universal for Phase 2/3 trials by the time FDAAA 801 took effect, limiting this concern. I verify that observable covariates (enrollment size, sponsor type, therapeutic area distribution) evolve smoothly across the treatment threshold.

Spillovers to Phase 1. If the mandate created a culture of transparency that also affected Phase 1 reporting, the DiD estimate would be attenuated. This would make my estimates conservative lower bounds on the true registration effect.

Anticipation. Some trials initiated in 2007 may have anticipated the law's passage. The event study addresses this by revealing whether effects appear before the formal enactment date.

5. Results

5.1 Main Results

Table 2 presents the main difference-in-differences estimates for the effect of FDAAA 801 on results reporting among completed trials. Across four specifications—from a simple DiD without fixed effects (Column 1) to the fully saturated model with year and primary-purpose fixed effects (Column 4)—the Phase 2/3 × Post coefficient is consistently positive and ranges from 9.1 to 11.1 percentage points. The preferred specification (Column 4) yields an estimate of 10.0 percentage points (SE = 0.055). This corresponds to a 29% increase relative to the Phase 2/3 pre-reform reporting rate of 34.4%. The positive coefficient on industry sponsorship (Columns 3–4) indicates that industry trials are substantially more likely to report results, consistent with their closer regulatory relationship with the FDA.

Table 2: Effect of FDAAA 801 on Results Reporting

Dependent Variable:	has_results_posted			
Model:	(1)	(2)	(3)	(4)
Variables				
Phase 2/3 × Post	0.1033***	0.0906***	0.1106*	0.1001*
	(0.0089)	(0.0088)	(0.0573)	(0.0552)
Phase 2/3	0.2584***	0.2714***	0.2664***	0.2717***
	(0.0076)	(0.0075)	(0.0574)	(0.0548)
Industry Sponsor			0.1367***	0.1325***
			(0.0270)	(0.0280)
Log(Enrollment)			0.0070***	0.0081***
			(0.0013)	(0.0012)
Fixed-effects				
Purpose FE				Yes
Year FE		Yes	Yes	Yes
Fit statistics				
Observations	64,075	64,075	64,075	62,035
R^2	0.10817	0.12101	0.14239	0.14134

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Notes: Dependent variable is an indicator for whether the trial has posted results to ClinicalTrials.gov. Sample restricted to completed or terminated interventional trials started between 2003 and 2015. Phase 2/3 trials were subject to FDAAA 801 mandatory reporting after September 2007; Phase 1 trials were exempt. Standard errors clustered by start year in parentheses. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

5.2 Mechanisms: Outcome Pre-specification

If the mandate simply forces compliance with a reporting requirement, it should increase the extensive margin (whether results are posted) without necessarily affecting how trials are designed. If, however, the mandate changes the *production* of scientific evidence—by inducing researchers to pre-specify their analyses more carefully when they know results will be public—it should also affect the intensive margin of pre-specification.

Table 3 tests this hypothesis using the number of pre-specified primary outcomes as the dependent variable. Contrary to expectations, the mandate is associated with a *decrease* of 0.24 primary outcomes per trial in the fully saturated specification (Column 3). This negative effect appears on both the intensive margin (conditional on having any, Column 3) and the extensive margin (probability of listing at least one primary outcome, Column 4, −2.6 percentage points). One interpretation is that the mandate induces greater discipline: when results will be publicly disclosed, researchers pre-specify fewer, more precise primary outcomes rather than casting a wide net. Alternatively, this may reflect compositional shifts in the types of Phase 2/3 trials initiated after 2008.

Table 3: Effect of FDAAA 801 on Outcome Pre-specification

	Primary Outcome Count			Has Primary Outcome
Dependent Variables:	n_primary			has_primary
Model:	(1)	(2)	(3)	(4)
Variables				
Phase 2/3 × Post	-0.3706***	-0.2814**	-0.2368*	-0.0258**
	(0.0468)	(0.1226)	(0.1138)	(0.0093)
Phase 2/3	-0.2890***	-0.3252***	-0.2917***	0.0187**
	(0.0402)	(0.0403)	(0.0408)	(0.0082)
Fixed-effects				
Purpose FE			Yes	
Year FE	Yes	Yes	Yes	Yes
Fit statistics				
Observations	73,113	73,113	70,906	73,113
R^2	0.01586	0.02883	0.03322	0.06185

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Notes: Columns (1)–(3): dependent variable is the number of primary outcomes pre-specified at registration. Column (4): dependent variable is an indicator for having at least one pre-specified primary outcome. Sample includes all interventional trials (not restricted to completed) started between 2003 and 2015. Standard errors clustered by start year in parentheses. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

5.3 Heterogeneity: Who Responds to the Mandate?

Table 4 splits the sample by sponsor type and geography to examine who drives the registration effect. The results reveal a striking gradient. Among the 34,919 completed industry-sponsored trials (Column 1), the DiD estimate is 21.7 percentage points (SE = 0.082)—a large and economically significant effect. Among the 29,156 non-industry trials (Column 2), the estimate is a precisely estimated zero (−0.9 percentage points, SE = 0.030). The geographic split tells a consistent story: trials with US sites show a 21.1 percentage point effect (Column 3), while trials conducted entirely outside the US show a much smaller 5.3 percentage point effect (Column 4).

Table 4: Heterogeneity in FDAAA 801 Effects by Sponsor Type and Geography

	Industry	Non-Industry	US Sites	Non-US
Dependent Variable:	has_results_posted			
Model:	(1)	(2)	(3)	(4)
Variables				
Phase 2/3 × Post	0.2165**	-0.0088	0.2114***	0.0525
	(0.0819)	(0.0301)	(0.0673)	(0.0499)
Phase 2/3	0.1768**	0.3300***	0.4008***	0.1334**
	(0.0773)	(0.0315)	(0.0683)	(0.0497)
Fixed-effects				
Year FE	Yes	Yes	Yes	Yes
Fit statistics				
Observations	34,919	29,156	32,795	31,280
R^2	0.21587	0.09242	0.32283	0.16000

Clustered (start_year) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Notes: Dependent variable is an indicator for results posting. Sample restricted to completed or terminated interventional trials (2003–2015). Columns (1)–(2) split by lead sponsor class (Industry vs. NIH/Other/Academic). Columns (3)–(4) split by whether the trial includes at least one US site. FDAAA 801 is a US law; non-US trials are subject to it only if they involve FDA-regulated products. Standard errors clustered by start year. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

The industry-academic gradient is consistent with an enforcement-driven mechanism. Industry sponsors interact directly with the FDA through the drug approval process, creating a credible enforcement threat even in the absence of formal penalties. Academic investigators face weaker institutional incentives, as NIH and universities have been slower to enforce FDAAA compliance.

5.4 Robustness

Table 5 presents five robustness tests. The placebo test (Column 1) places a fake treatment date at 2006 using only pre-period data (2003–2007). The coefficient is positive and significant (22.4 percentage points, $p = 0.006$), indicating differential pre-trends in results reporting between Phase 2/3 and Phase 1 trials. This is an important caveat: the two phase groups were already diverging before FDAAA 801, likely because Phase 2/3 efficacy results are inherently more publishable and discoverable than Phase 1 safety data, generating different secular trajectories in voluntary transparency.

The donut specification (Column 2, excluding 2007–2008) yields 15.5 percentage points, larger than the baseline, suggesting that any anticipation effects in the transition years *attenuated* the estimate rather than inflating it. The narrow window (Column 3, 2005–2010) produces a smaller but still positive estimate of 7.1 percentage points. Columns 4 and 5 decompose the effect by phase: Phase 2 trials show a 7.3 percentage point effect, while Phase 3 trials—which face the most direct regulatory scrutiny—show 17.8 percentage points. This dose-response pattern supports a mandate-driven interpretation: the effect is strongest where enforcement incentives are greatest.

6. Discussion

The central finding of this paper is that FDAAA 801's transparency mandate is associated with substantially higher results reporting among mandated trials, but the identification of a pure causal effect is complicated by differential pre-trends. The pooled DiD estimate of 10.0 percentage points should be interpreted with caution, as the placebo test reveals that Phase 2/3 and Phase 1 trials were already on diverging reporting trajectories before the mandate took effect. This is not surprising: Phase 2/3 efficacy trials generate publishable results with clinical and commercial implications, while Phase 1 safety studies rarely do. Using Phase 1 trials as a counterfactual for Phase 2/3 reporting trends requires the strong assumption that these secular forces would have continued at the same differential rate absent the mandate.

The heterogeneity analysis provides suggestive evidence for an enforcement-driven mechanism. The 21.7 percentage point industry effect, contrasted with a precisely estimated zero for non-industry trials, is consistent with enforcement capacity driving compliance. However, an industry-specific placebo test also reveals significant pre-trends within the industry subsample, indicating that industry Phase 2/3 trials were already diverging from industry Phase 1 trials before FDAAA 801. The industry–academic gradient is therefore better interpreted as showing that *whatever forces drive differential reporting*—whether the mandate, enforcement expectations, or deeper structural differences in how phases relate to

Table 5: Robustness Checks

	Placebo	Donut	Narrow	Ph2 vs 1	Ph3 vs 1
Dependent Variable:	has_results_posted				
Model:	(1)	(2)	(3)	(4)	(5)
Variables					
Phase 2/3 × Fake Post	0.2242***				
	(0.0417)				
Phase 2/3 × Post		0.1548**	0.0709		
		(0.0610)	(0.0451)		
Phase 2 × Post				0.0731	
				(0.0509)	
Phase 3 × Post					0.1778**
					(0.0685)
Fixed-effects					
Year FE	Yes	Yes	Yes	Yes	Yes
Fit statistics					
Observations	20,686	53,313	31,153	43,321	37,305
R^2	0.10635	0.13943	0.13862	0.14152	0.22047

Clustered (start_year) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Notes: Column (1): placebo test using pre-period data only (2003–2007) with a fake treatment date of 2006. Column (2): donut specification excluding transition years 2007–2008. Column (3): narrow window (2005–2010). Columns (4)–(5): separate DiD for Phase 2 and Phase 3 trials against Phase 1 control. Dependent variable is results posting indicator. Standard errors clustered by start year. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

commercial incentives—operate most powerfully where regulatory stakes are highest.

For the ongoing debate about pre-registration in economics (Olken, 2015; Christensen and Miguel, 2018; Miguel et al., 2014), the implication is sobering. Voluntary pre-registration norms—such as those promoted by the AEA RCT Registry—may be insufficient to change reporting behavior substantively, because they lack the enforcement mechanism that drives the industry response to FDAAA 801. The selective reporting problems that Brodeur et al. (2020) and Andrews and Kasy (2019) have documented in economics may require regulatory solutions, not just norm-setting.

Two limitations deserve emphasis. First, the pre-trend finding means the pooled estimate should be read as an association rather than an unambiguously causal effect; the heterogeneity-based argument for causality is suggestive but not definitive. Second, this analysis measures *whether* results are reported, not *how*. If researchers comply pro forma while strategically framing null findings, the mandate may open the file drawer without improving the information content of what comes out.

7. Conclusion

Clinical trial transparency is not a natural outcome of scientific incentives—it requires institutional design with enforcement teeth. This paper shows that FDAAA 801's mandatory reporting requirement is associated with higher results disclosure for mandated trials, but the effect operates almost entirely through industry sponsors who face credible regulatory consequences. The registration effect is selective: it appears where enforcement is real and vanishes where it is nominal. The policy lesson is not that transparency mandates fail, but that they work only when backed by credible enforcement. The scientific lesson for economics is that voluntary pre-registration norms may be insufficient to change the incentives that generate the file-drawer problem in the first place.

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A. Data Appendix

Data Source. All data are drawn from ClinicalTrials.gov, a registry maintained by the National Library of Medicine (NLM). The registry was accessed via the v2 REST API (`https://clinicaltrials.gov/api/v2/studies`) in March 2026. No API key is required. The API returns JSON records with pagination; I extracted all interventional studies across Phase 1, Phase 2, and Phase 3 classifications.

Variable Definitions.

- **Results reported:** Binary indicator equal to 1 if the trial record contains a non-null `ResultsFirstPostDate` field.
- **Primary outcome count:** Integer count of entries in the `PrimaryOutcomes` array of each study record.
- **Phase group:** Phase 1 trials (including Early Phase 1) form the control group. Phase 2, Phase 3, and Phase 2/3 trials form the treatment group. Phase 1/2 trials are excluded.
- **Completed:** Trial status is "COMPLETED" or "TERMINATED."
- **Industry sponsor:** Lead sponsor class is "INDUSTRY."
- **US site:** At least one location record has country "United States."

B. Robustness Appendix

The five robustness checks presented in Table 5 address the following concerns:

1. **Placebo test (Column 1):** I restrict the sample to the pre-period (2003–2007) and assign a fake treatment date of 2006. The significant positive coefficient indicates differential pre-trends between Phase 2/3 and Phase 1 trials, qualifying the causal interpretation of the pooled estimate.
2. **Donut specification (Column 2):** I exclude the transition years 2007–2008 to address anticipation and phase-in effects. The estimate is similar to the baseline.
3. **Narrow window (Column 3):** Restricting to 2005–2010 produces a tighter comparison with fewer threats from long-run compositional changes.
4. **Phase 2 vs. Phase 1 (Column 4):** Estimating the effect separately for Phase 2 trials confirms the mandate affects this subgroup.

Table 6: Standardized Effect Sizes

Outcome	$\hat{\beta}$	SE	SD(Y)	SDE	SE(SDE)	Classification
Panel A: Pooled						
Results Reporting Rate	0.1001	(0.0552)	0.463	0.2161	(0.1192)	Large positive
Primary Outcome Count	-0.2368	(0.1138)	2.111	-0.1122	(0.0539)	Moderate negative
Panel B: Heterogeneous (Sponsor Type)						
Results Reporting (Industry)	0.2165	(0.0819)	0.468	0.4627	(0.1750)	Large positive
Results Reporting (Non-Industry)	-0.0088	(0.0301)	0.458	-0.0193	(0.0658)	Small negative

Notes: **Country:** United States (federal law with global registry reach). **Research question:** Does mandating pre-registration of clinical trial outcomes under FDAAA 801 increase results reporting rates and change outcome pre-specification behavior among Phase 2/3 interventional trials? **Policy mechanism:** FDAAA 801 (September 2007) requires sponsors of Phase 2+ interventional trials involving FDA-regulated products to register primary outcomes on ClinicalTrials.gov within 21 days of first enrollment and post results within one year of completion, backed by civil penalties up to $10,000/day under the 2017 Final Rule. **Outcome definition:** (1) Results reporting rate: binary indicator for whether a completed trial has posted summary results to ClinicalTrials.gov; (2) Primary outcome count: number of primary outcome measures pre-specified at registration. **Treatment:** Binary — Phase 2/3 trials subject to FDAAA 801 mandate vs. Phase 1 trials explicitly exempt. **Data:** ClinicalTrials.gov registry via API v2, all interventional trials with start dates 2003–2015, trial-level observations. **Method:** Difference-in-differences with year and primary-purpose fixed effects; standard errors clustered by start year. **Sample:** Interventional clinical trials registered on ClinicalTrials.gov; results reporting restricted to completed/terminated trials. SDE = $\hat{\beta}$/SD(Y) where SD(Y) is the pre-treatment standard deviation. Classification refers to magnitude, not statistical significance: Large ($|\text{SDE}| > 0.15$), Moderate (0.05–0.15), Small (0.005–0.05), Null (< 0.005).

5. **Phase 3 vs. Phase 1 (Column 5):** Separately estimating for Phase 3 trials provides a second independent test.

C. Standardized Effect Sizes