

NEUROLOGY THERAPEUTICS DEAL LANDSCAPE

A Study of Licensing, Collaboration, and Acquisition Strategies from 2021 to 2026(Till Date)

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INTRODUCTION & BACKGROUND

The Global Pharmaceutical Industry

u{2022} Global pharma revenues reached ~USD 1.48 trillion in 2022, projected to surpass USD 2 trillion by decade-end

u{2022} Average cost of bringing a new drug to market: 12 years and USD 2.6 billion

u{2022} Companies increasingly prefer to acquire innovation rather than develop in-house

u{2022} Deal structures include acquisitions, licensing agreements, reverse mergers, and SPACs

u{2022} Headline deal values can be misleading upfront payments are often much smaller than total deal value

WHY NEUROLOGY?

u{2022} Encompasses Alzheimer's, epilepsy, Parkinson's, depression, stroke, MS, ALS, addiction & more

u{2022} Neurological diseases are world's #1 cause of disability and #2 cause of death (WHO)

u{2022} Over 1 billion people worldwide suffer from neurological disorders

u{2022} US cost of Alzheimer's alone exceeded USD 345 billion in 2023

u{2022} 94% of drugs entering Phase I in neurology never reach approval highest failure rate

u{2022} Game-changers: Zolgensma (gene therapy), CGRP antibodies (migraine), Lecanemab (Alzheimer's)

u{2022} AI and digital health transforming neurological diagnosis and monitoring

PROBLEM STATEMENT

Despite significant deal activity in neurology, surprisingly little published research systematically analyzes this deal activity.

u{2022} Most studies address pharma deals across ALL therapeutic areas without neurology-specific depth

u{2022} Existing research examines single aspects (e.g. M&A premium) without linking indication, technology platform, or rare disease status

u{2022} The 2021-2026 period was far from normal:

- Resurgence of scientific promise for Alzheimer's
- Digital health surge fueled by COVID-19
- AI-driven drug discovery
- Wave of M&A consolidation among mid-cap pharma

u{2022} No comprehensive, deal-level analysis pulling all forces together with granular data exists

RESEARCH OBJECTIVES

1. Track and analyze the volume of neurology deals per year (2021-2026)
2. Chart the distribution of deal types acquisitions, reverse mergers, option deals
3. Analyze deal activity across technology platforms (small molecules, gene therapy, AI)
4. Determine the number of transactions for each neurological condition
5. Examine financial terms deal values, upfront payments, and milestone structures
6. Compare valuations for rare vs. non-rare disease deals
7. Identify the most active players in the neurology deal landscape
8. Generate actionable recommendations for pharma, investors, policy & analysts

LITERATURE REVIEW KEY INSIGHTS

DEAL LANDSCAPE

Hay et al. (2014): Licensing most frequent by count, acquisitions dominated by value.
Schuhmacher et al. (2016): Growing deal complexity with layered milestone schedules.
Drug dev cost: USD 2.6 billion per approved drug.

NEUROLOGY-SPECIFIC

Pangalos et al.: 94% CNS Phase I failure rate.
Cummings et al. (2022): Post-aducanumab deal surge.
Taylor et al. (2023): Mental health assets growing in the neurology deal mix post-COVID.

RARE DISEASE & ORPHAN DRUGS

Sharma et al. (2019): Statistically significant valuation premiums for orphan drug assets.
EvaluatePharma (2023): Orphan drugs to be ~20% of global Rx sales by 2028.
Strong incentives: 7-yr exclusivity, tax credits.

DIGITAL HEALTH & AI

Topol (2019): AI outperforms doctors in diagnostic roles across multiple specialties.
Miyagishima et al. (2021): Digital health deal financial structures differ from traditional drugs.
COVID-19 accelerated digital adoption.

RESEARCH GAPS: No comprehensive neurology-specific deal analysis (2021-2026) | No systematic rare disease premium quantification | Digital/AI deal analysis missing

METHODOLOGY

RESEARCH DESIGN

Descriptive-analytical, retrospective secondary data analysis. Cross-sectional + longitudinal approach.

DATA SOURCE

Proprietary pharma deal intelligence database. 406 neurology-linked deals. Period: Jan 2021 - Apr 2026. Global scope.

STATISTICAL METHODS

Frequency counts and % distributions. Mean, min, max for continuous vars. Trend analysis (year-wise). Comparative analysis.

KEY VARIABLES ANALYZED

u{2022} Deal Type (Acquisition, Reverse Merger, Option Deal)	u{2022} Total Deal Value (USD M)
u{2022} Primary Therapeutic Area	u{2022} Upfront Cash / Equity (USD M)
u{2022} Primary Indication	u{2022} Total Milestones (USD M)
u{2022} Primary Technology Platform	u{2022} Rare Disease Designation
u{2022} Stage at Signing	u{2022} Number of Assets per Deal

INCLUSION CRITERIA

u{2022} Neurology as primary or contributing therapeutic area	u{2022} All deal types included
u{2022} Global scope no geographic restrictions	u{2022} Financial disclosure analyzed separately (44% disclosed)

KEY METRICS AT A GLANCE

406

Total Deals
(2021-2026)

123%

Deal Volume
Growth

90.9%

Acquisitions
Share

USD 243B

Total Disclosed
Deal Value

USD 1,360M

Average Deal
Value

98%

Rare Disease
Premium

20%+

Digital Health
& AI Share

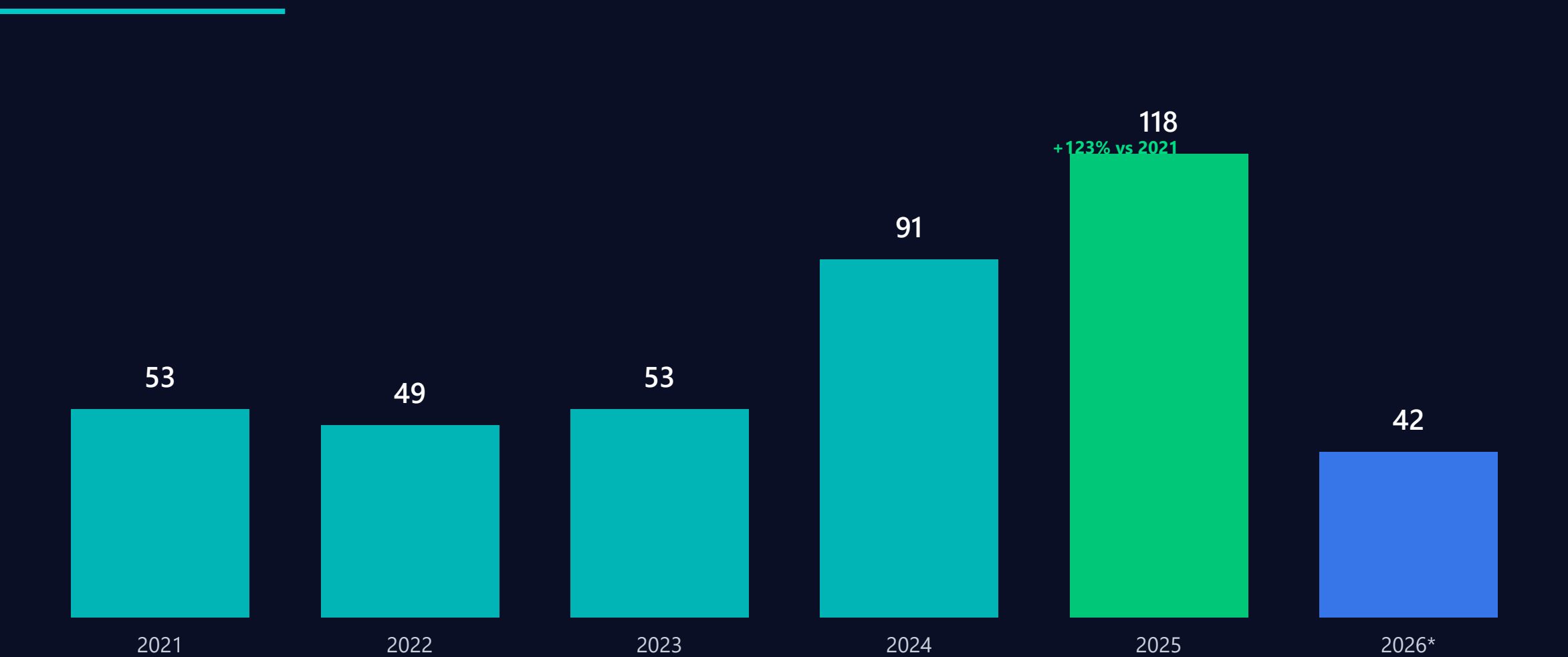
USD
27,800M

Largest Single
Deal

KEY HIGHLIGHTS

- u{2022} Deal volume surged from 53 (2021) to 118 (2025) a 123% increase
- u{2022} Average deal value grew from USD 633M (2021) to USD 2,153M (2026) ~240% increase
- u{2022} Rare disease deals averaged USD 2,436M vs USD 1,229M for non-rare 98% premium
- u{2022} Small molecules dominated at 24.1%, but digital health (13.1%) + AI/ML (7.1%) = 20%+
- u{2022} 179 of 406 deals (44.1%) had disclosed financial terms
- u{2022} 72.4% of deals involved single assets; 26.8% multiple assets

DEAL VOLUME TREND (2021-2026)



Stable 2021-2023 (49-53 deals/yr) | Major acceleration from 2024 (91 deals) | Peak in 2025 (118 deals)
2026 on pace to match/exceed 2025 (42 deals in Jan-Apr alone) | * 2026 data is Jan-Apr only

DEAL TYPE DISTRIBUTION

90.9%

ACQUISITIONS

369 out of 406 deals were structured as outright acquisitions

8.9%

Reverse Mergers (36 deals)

0.2%

Acquisition Option (1 deal)

WHY ACQUISITIONS DOMINATE

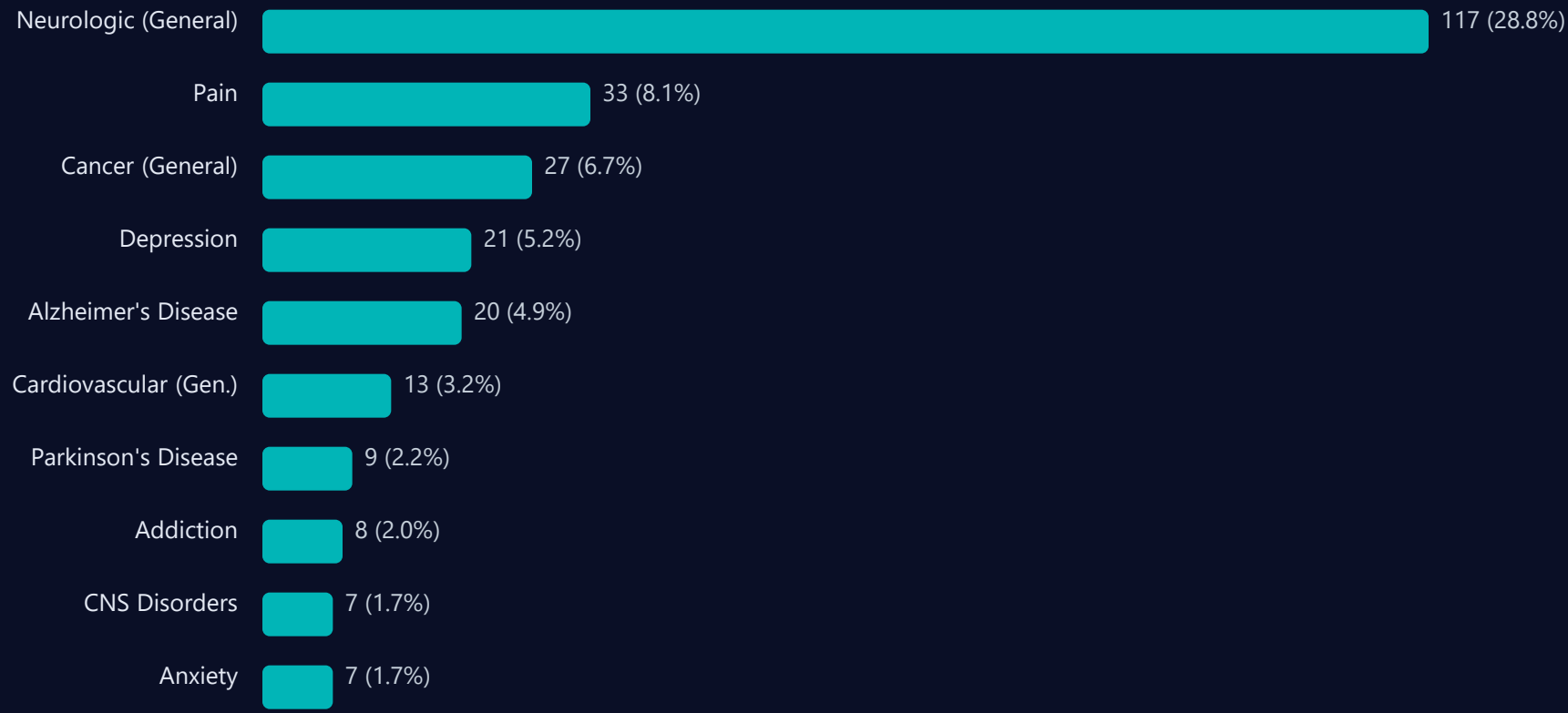
u{2022} 178 commercial-stage service acquisitions (43.8%) inflate the acquisition share

u{2022} Post-2021 consolidation pressure: Large-cap pharma facing impending patent cliffs

u{2022} Neurology's high clinical failure rates make licensing unattractive buyers want full control

u{2022} Defensive strategy: Outright purchase prevents competitors from accessing same technology

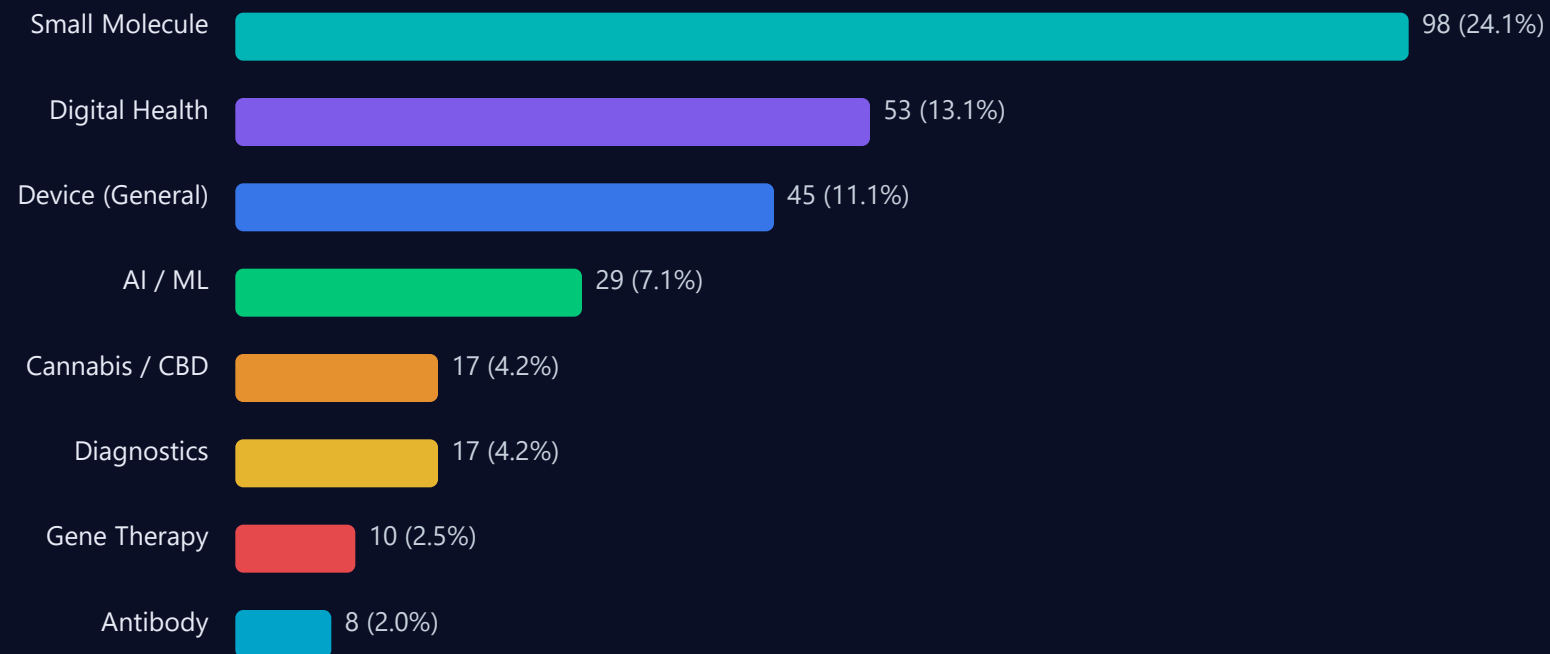
TOP PRIMARY INDICATIONS BY DEAL COUNT



KEY INSIGHTS

u{2022} Depression (5.2%) and Anxiety (1.7%) reflect growing psychiatry-neurology amalgamation post-COVID
u{2022} Alzheimer's (4.9%) and Parkinson's (2.2%) = 29 deals driven by new mechanistic strategies
u{2022} Pain remains a major commercial target (33 deals, 8.1%)

TECHNOLOGY PLATFORM DISTRIBUTION



KEY FINDING: THE TECHNOLOGY SHIFT

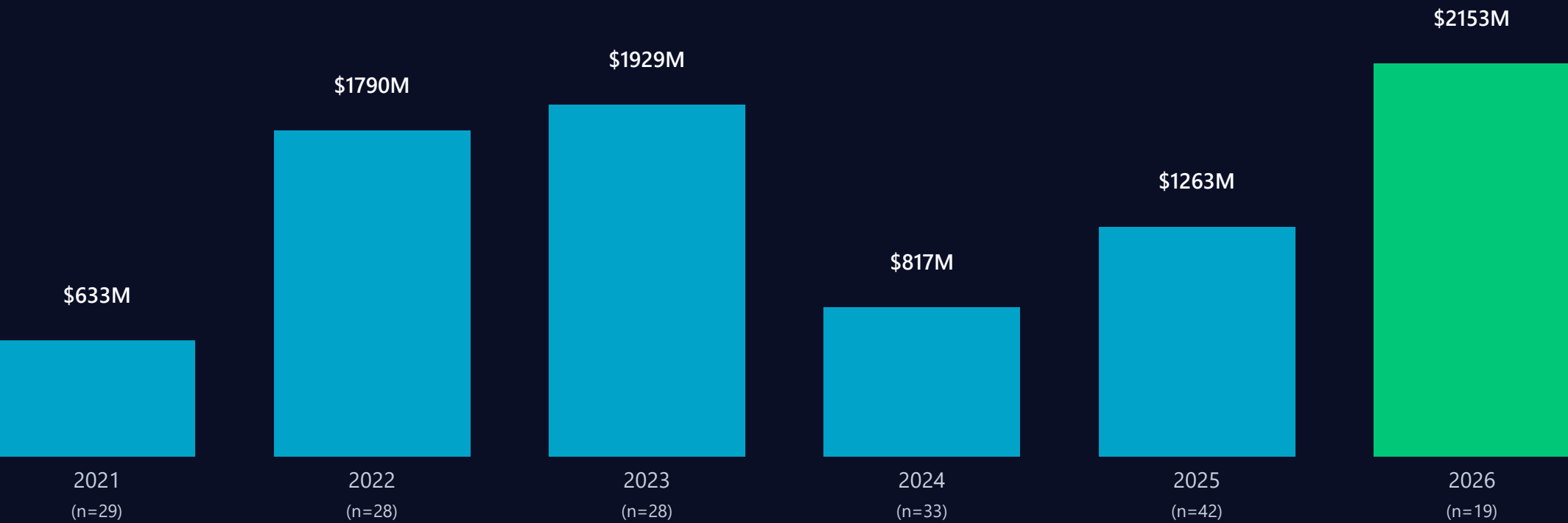
u{2022} Small molecules still dominate (24.1%) but Digital Health + AI/ML = 20%+ of all deals

u{2022} This would have been unheard of just 5 years ago neurology deal-making has expanded beyond traditional drug modalities

u{2022} Gene Therapy (2.5%), Cell Therapy (0.7%), RNA (0.5%) = ~3.7% expected to grow significantly

DEAL VALUE ANALYSIS

Average Deal Value by Year (USD Million)



DEAL VALUE SUMMARY (179 Disclosed Deals)

Total Value: USD 243,418M
Average: USD 1,360M | Max: USD 27,800M | Min: USD 0.46M
~240% growth in average deal value (2021 to 2026)

UPFRONT vs MILESTONES

Avg. Upfront Cash: USD 1,427M (146 deals)
Avg. Upfront Equity: USD 196M (51 deals)
Avg. Total Milestones: USD 268M (61 deals)
Most deals = outright acquisitions (full payment)

RARE vs NON-RARE DISEASE DEALS

98% PREMIUM

Rare Disease Valuation Premium

RARE DISEASE DEALS

Total Deals: 38 | Disclosed: 26
Average Deal Value: USD 2,436M

Examples: Eli Lilly/Centessa (USD 7,800M - Narcolepsy)
Bain Capital/Mitsubishi Tanabe (USD 3,300M - NMOSD)

NON-RARE DISEASE DEALS

Total Deals: 321 | Disclosed: 141
Average Deal Value: USD 1,229M

Represents the bulk of neurology
deal-making activity

DRIVERS OF THE RARE DISEASE PREMIUM

- u{2022} Orphan Drug Act incentives: 7-year market exclusivity, tax credits, priority FDA review
- u{2022} Premium pricing potential small patient populations but high revenue per patient
- u{2022} Limited competitive threat from generics/biosimilars within exclusivity period
- u{2022} Concentrated patient populations reduce clinical trial costs
- u{2022} By 2028, ~20% of global Rx drug sales expected to be orphan drugs (EvaluatePharma)

STAGE AT SIGNING & ASSET ANALYSIS

STAGE AT DEAL SIGNING

Commercial/Service: 178 (43.8%)
Approved: 51 (12.6%)
Device - Any: 48 (11.8%)
Phase II: 29 (7.1%)
Phase III: 22 (5.4%)
Diagnostic: 20 (4.9%)
Platform/Discovery: 20 (4.9%)
Preclinical/IND: 20 (4.9%)
Phase I: 18 (4.4%)

TOP ACQUIRERS BY DEAL COUNT

PAX Health LLC	6 deals	HOPE Therapeutics	3 deals
Boston Scientific Corp.	5 deals	Medtronic Inc.	3 deals
AbbVie Inc.	5 deals	Lantheus Holdings	3 deals
XRHealth	4 deals	Biogen Inc.	3 deals
Eli Lilly and Co.	3 deals	GE Healthcare	3 deals

ASSETS PER DEAL



Eli Lilly deployed the most capital despite fewer deals: Centessa (USD 7,800M) + Ventyx (USD 1,200M)

DISCUSSION KEY INTERPRETATIONS

DEAL VOLUME SURGE

Post-pandemic cash reserves + expiring blockbuster patents created urgency to replenish pipelines.
Regulatory successes (lecanemab, Zolgensma) broke the 'graveyard' image of CNS investments.

ACQUISITION DOMINANCE

Buyers want full control in neurology due to high clinical trial complexity. Defensive strategy prevents competitors from accessing same technology. Licensing is unattractive given failure rates.

RARE DISEASE PREMIUM

98% premium driven by Orphan Drug Act incentives, premium pricing, and assured market exclusivity. Validates that regulatory incentives directly influence corporate deal-making behaviour.

DIGITAL HEALTH & AI DISRUPTION

20%+ of deals in digital health + AI = a fundamental shift. Traditional pharma firms acquiring tech startups to fill capabilities gap. Expected to grow significantly in coming years.

LIMITATIONS

- u{2022} Only 44% (179/406) of deals had disclosed financial terms bias towards larger, visible transactions
- u{2022} Study captures deal-signing data only does not track clinical outcomes or ROI
- u{2022} Smaller private transactions may be underrepresented
- u{2022} Longitudinal outcome tracking would require a different study design over a longer period

RECOMMENDATIONS

FOR PHARMACEUTICAL COMPANIES

- u{2022} Move quickly licensing may lose to outright acquisition by competitors
- u{2022} Create dedicated neurology scouting teams
- u{2022} Target Phase II assets for optimal risk-value balance
- u{2022} Prioritize rare disease segment for highest valuations and clear regulatory pathways

FOR INVESTORS & ANALYSTS

- u{2022} Digital Health + AI startups are emerging as prime acquisition targets
- u{2022} Companies combining biotech + ML represent high-growth opportunities
- u{2022} Always look beyond headline deal value analyze upfront cash vs milestone ratio
- u{2022} Rare disease assets offer strong ROI potential

FOR POLICY MAKERS

- u{2022} Orphan Drug Act is working 98% premium validates regulatory incentives
- u{2022} Monitor to ensure non-rare high-burden conditions (Alzheimer's, stroke) are not under-resourced
- u{2022} Explore tax/exclusivity incentives for high-burden, non-rare neurological disorders

FUTURE RESEARCH DIRECTIONS

- u{2022} Track 2021 deals: How many acquired assets reached clinical objectives by 2026?
- u{2022} Study failure rates of acquired assets vs in-house developed drugs
- u{2022} Geographic analysis: US vs European vs Asian target company valuations
- u{2022} Impact of AI on drug discovery timelines

CONCLUSION

The neurology therapeutics deal landscape between 2021 and 2026 reflects a period of intense consolidation, technology diversification, and growing interest in rare neurological diseases.

98%

Rare disease valuation premium validates orphan drug incentives and drives strategic investment

20%+

Digital Health + AI deal share marks a fundamental shift in neurology deal-making

90.9%

Acquisition dominance reflects large-cap preference for outright ownership and control

u{2022} Neurology has emerged from the clinical trial 'graveyard' to become one of the most vibrant, well-funded, and competitive areas of healthcare business

u{2022} 406 deals, USD 243 billion in disclosed value, 123% volume growth the data tells the story of an industry in transformation

u{2022} The convergence of demographic pressure, breakthrough science, and AI is reshaping how pharmaceutical companies build their neurology portfolios

These deal flows speak volumes about where medicine is going.

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Full list of 44 references available in the dissertation document

THANK YOU

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Questions & Discussion