Clinician Manual

Symptom Catcher Technical Guide & Clinical Utilization Manual

NeuroCatchers · Boston Neuromind LLC

v1.0 · 2026 | 31 AI Modules · 252 Items · 5-Lens Analysis

📑 Contents

1. System Overview & Philosophy

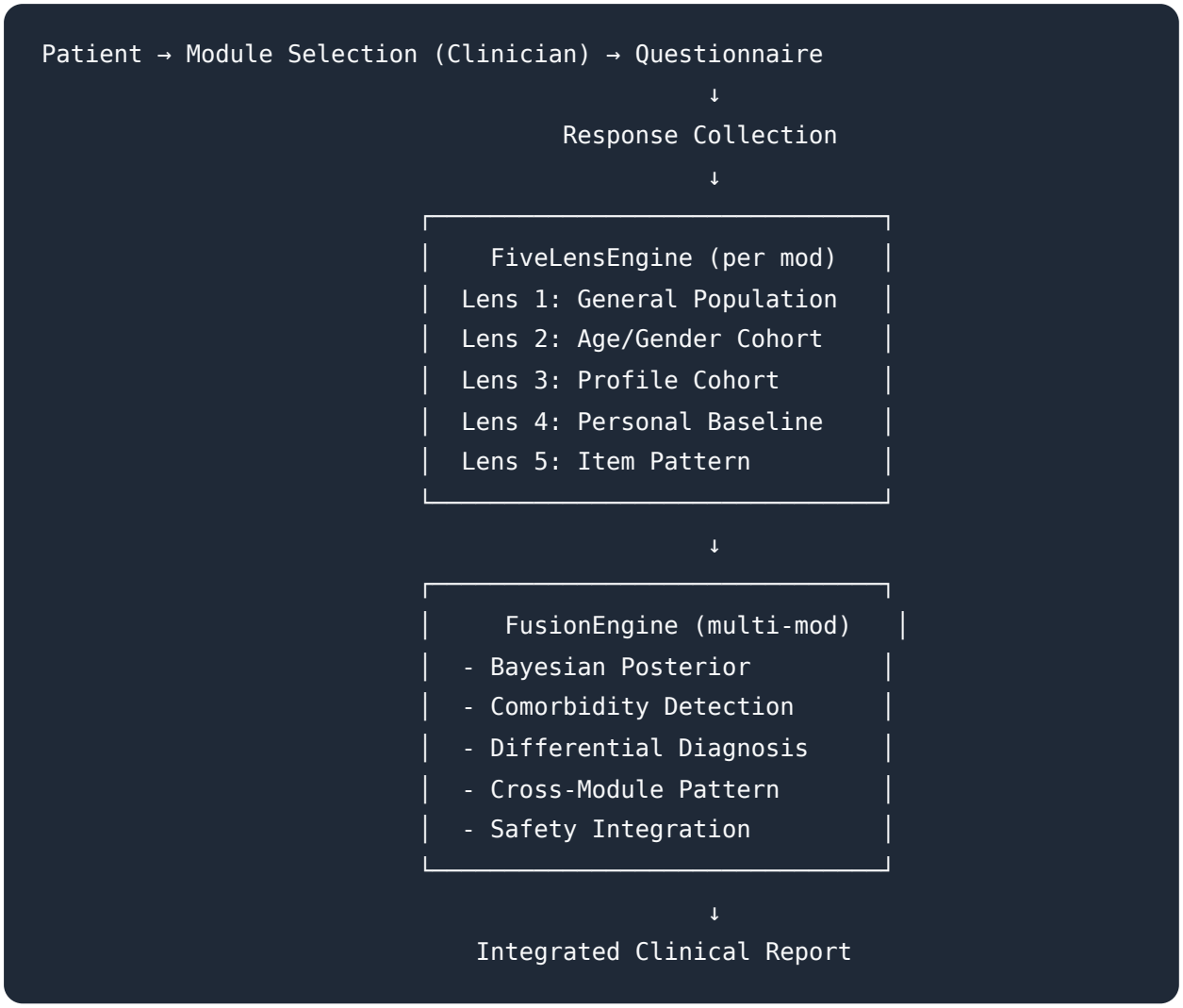
Design Philosophy

Symptom Catcher is designed to **"augment clinical insight with AI"**. Overcoming limitations of single-questionnaire tools:

- Provides **5-dimensional profile**, not single score
- Presents **integrated diagnostic context**, not individual diagnosis
- **Auto-detects** comorbidities and differentials
- **Integrates** with objective brain measurements (QEEG, ERP, HRV)

> 🎯 **Core Principle**
>
> AI does **NOT diagnose**. AI is a tool to support clinician decisions.
>
> - 🎯 AI: Pattern detection + screening + risk flagging + integrated analysis
> - 👨‍⚕️ Clinician: Diagnosis + treatment decisions + responsibility

System Architecture



2. 31 AI Modules in Detail

🟦 Mood Disorders (3)

MoodCatcher9
Major Depression (MDD)
9 items · ~4 min

ManiaCatcher7
Bipolar I Mania
7 items · ~4 min

HypomaniaCatcher6
Bipolar II Hypomania
6 items · ~3 min

🟧 Anxiety / OCD / Trauma (3)

AnxiCatcher7
GAD + Panic + Social Anxiety
7 items · ~3 min

TraumaCatcher20
PTSD / Complex PTSD
20 items · ~8 min

ObsessCatcher10
OCD + OCRD
10 items · ~5 min

🟪 Psychotic Spectrum (3)

PsychosisCatcher12
Schizophrenia Core Symptoms
12 items · ~6 min

SchizoaffectiveCatcher8
Schizoaffective Disorder
8 items · ~4 min

BriefPsychoticCatcher5
Brief Psychotic (incl. postpartum)
5 items · ~3 min

🟩 Neurodevelopmental / Cognitive (5)

AttendCatcher18 ⭐
Adult ADHD (BCN specialty)
18 items · ~8 min

AutismCatcher10
Adult ASD
10 items · ~4 min

LearningCatcher6 ⭐
Learning Disorders (BCN specialty)
6 items · ~3 min

TicCatcher5
Tic / Tourette
5 items · ~2 min

CognitiveDeclineCatcher8
MCI / Dementia Screening
8 items · ~3 min

🌙 Sleep Disorders (5)

InsomniaCatcher8
Insomnia
8 items

HypersomniaCatcher6
Hypersomnolence + Narcolepsy
6 items

SleepApneaCatcher7
OSA Screening
7 items

CircadianCatcher5
Circadian Rhythm Disorders
5 items

NightmareCatcher5
Nightmare Disorder + RBD
5 items

🍽️ Eating Disorders (3)

AnorexiaCatcher6
Anorexia Nervosa
6 items

BulimiaCatcher6
Bulimia Nervosa
6 items

BingeEatingCatcher5
Binge Eating Disorder
5 items

💊 Substance / Impulse (3)

AlcoholUseCatcher10
Alcohol Use Disorder
10 items

SubstanceUseCatcher8
General Substance Use
8 items

DisruptiveCatcher8
ODD / CD / IED
8 items

👤 Personality / Dissociative / Somatic (6)

BorderlineCatcher9
BPD (9 criteria)
9 items

NarcissisticCatcher7
NPD
7 items

AntisocialCatcher7
ASPD
7 items

AvoidDependCatcher8
AvPD / DPD
8 items

DissociativeCatcher8
DID / DPDR
8 items

SomaticCatcher8
SSD / IAD / FND
8 items

3. 5-Lens Analysis System

> 🔬 **Innovation Point**
> The same score has completely different clinical meanings depending on **who you compare against**. 5-Lens analyzes these simultaneously in multi-dimension.

Lens 1: General Population

- **Reference**: 15,000-subject normative DB mean ± SD
- **Output**: Z-score, Percentile
- **Clinical meaning**: "This patient is in the top ___% of the population"

Lens 2: Age-Gender Cohort

- **Reference**: Same age × gender group
- **Cohorts**: 18-29 M/F, 30-49 M/F, 50-64 M/F, 65+

- **Clinical meaning**: Age and gender context-reflected interpretation

Lens 3: Symptom Profile Cohort

- **Reference**: Patients with similar profile
- **Classification**: Emotional-dominant / Somatic / Cognitive / Mixed
- **Clinical meaning**: Auto-detection of Melancholic, Atypical, Mixed features

Lens 4: Personal Baseline

- **Reference**: Patient's own past scores
- **Output**: Δ (change), trend (worsening/improving/stable)
- **Clinical meaning**: Quantitative treatment response tracking

Lens 5: Item Pattern

- **Analysis**: Individual item patterns, not total score
- **Detection**: Dominant subscale, Extreme items, Clinical patterns
- **Clinical meaning**: Subtle clinical subtypes

4. Fusion Engine Principles

> 💡 **Core Innovation**
> Real patients don't have just one diagnosis. 60% of MDD have comorbid anxiety, 50% of ADHD adults have depression. Fusion Engine integrates these **mathematically**.

Bayesian Posterior Calculation

```
P(Dx | evidence) = P(evidence | Dx) × P(Dx) / P(evidence)

- P(Dx): Prior probability (prevalence)
- P(evidence | Dx): Probability of symptom pattern given diagnosis
- Posterior: Probability considering observed symptom pattern
```

Comorbidity Detection

- **21 comorbidity rates** embedded (literature-based)
- Major comorbid pairs:
  - MDD + GAD: 60%
  - ADHD + MDD (adult): 50%
  - PTSD + MDD: 48%
  - OCD + MDD: 30%
  - BPD + MDD: 83%

Differential Diagnosis Rules (7)

1. MDD vs Bipolar → Check past mania/hypomania
2. ADHD vs Cognitive Decline → Onset timing (childhood vs adulthood)
3. PTSD vs BPD → Trauma history, relationship instability
4. Schizophrenia vs Bipolar psychotic → Mood episode duration
5. Anxiety vs Bipolar → Energy level, sleep pattern
6. Depression vs Dementia → Cognitive decline pattern
7. Substance-induced vs Primary → Use history

5. Clinical Workflow

First Visit Recommended Flow

Step 1: Brief Initial Interview (5-10 min)
Chief complaint, history, family history → preliminary domain estimation

Step 2: Module Selection (1 min)
Check 2-5 modules based on chief complaint. Recommended combinations:

- Depression → MoodCatcher9 + ManiaCatcher7 (Bipolar DDx!) + AnxiCatcher7
- Anxiety → AnxiCatcher7 + MoodCatcher9 + TraumaCatcher20
- Attention → AttendCatcher18 + MoodCatcher9 + AnxiCatcher7 + CognitiveDeclineCatcher8
- Trauma history → TraumaCatcher20 + MoodCatcher9 + DissociativeCatcher8

- Psychosis → PsychosisCatcher12 + MoodCatcher9 + ManiaCatcher7

Step 3: Patient Self-Administered Survey (10-30 min)
Patient responds independently in quiet space. Clinician can do other tasks.

Step 4: AI Results Review (3-5 min)
Check: Safety banner → Rankings → Comorbidities → Recommendations

Step 5: Clinical Interview and Confirmation (20-30 min)
Review AI results with patient. Confirm with interview.

5.5. v2.2 Triage Methodologies

v2.2 Update: Clinicians and patients can now choose between 4 assessment methodologies based on their situation.

🎯 3 Role Selection

Entering Panel 4 (AI Module Selection), first select **who is running the assessment**:

Role	Use Case	UI
🧑 **Patient Direct**	Patient self-administers on tablet/computer	Natural conversation + AI auto-suggestion
👨‍⚕️ **Therapist Companion**	Clinician conducting live session with patient	Question list generator + print/email
⚙️ **Expert Manual**	Clinician directly selects 31 modules	Original v10 UI preserved

🔬 4 Assessment Methodologies

⭐ Hybrid (Best Accuracy) — Boston Neuromind Default

- **Method**: Evidence-based validated scales (70%) + AI conversation analysis (30%) integrated
- **Time**: 15-25 min
- **Advantage**: Highest accuracy + pattern recognition
- **Recommended for**: All patients (especially when BNM operates directly)
- **Evidence**: Synergy of DSM-5-TR validated scales + AI pattern recognition

📚 Evidence Only (Traditional Method)

- **Method**: Only validated standard questionnaires (BPS-90 + 31 modules full items)
- **Time**: 20-30 min
- **Advantage**: Most conservative, pure evidence-based
- **Recommended for**: Research purposes, insurance documentation, AI-hesitant patients

🤖 AI Only (Quick Method)

- **Method**: AI conversation + key items only (3-5 per module)
- **Time**: 5-10 min
- **Advantage**: Time-efficient, initial screening
- **Recommended for**: Emergency triage, preliminary assessment, time-constrained situations
- **Caution**: Screening purposes only, not diagnostic

📧 Print + Email Distribution (Asynchronous)

- **Method**: Send questions via print or email to patient, collect responses
- **Time**: Asynchronous (patient's convenience)
- **Advantage**: Pre-session preparation, patient fills at home
- **Recommended for**: Pre-consultation prep, repeat assessments, remote patients

🖨️ Print Feature Usage

1. Select Therapist role → Enter patient context → Click "Generate Question List"
2. Click **"🖨️ Print"** button at top-right of generated question list
3. New window opens with printable PDF format
4. Includes 3 blank lines below each question for written answers
5. DSM-5 criteria shown with each question (clinical reference)

6. Windows: `Ctrl+P` / Mac: `Cmd+P` to print or save as PDF

📧 Email Feature Usage

1. After "Generate Question List", click **"📧 Email"** button
2. Default mail app opens automatically (Outlook, Apple Mail, Gmail, etc.)
3. Subject and question body auto-populated
4. Blank answer lines included below each question
5. Clinician enters patient's email → Send
6. Patient replies with answers, or brings to next session
7. **Note**: For long question sets (over 2000 chars), automatically switches to clipboard copy mode

⚖️ Evidence-Based Asset Preservation Philosophy

Core Principle: v2.2 **never discards** any existing evidence-based assets.

- 31 AI modules — DSM-5-TR + original research structure preserved
- BPS-90 — Full biopsychosocial 90-item model retained
- All cohort data — 10,000+ normative database maintained
- Critical Factor Scanner — Safety-first approach unchanged

AI serves as **augmentation, not replacement**. Clinicians can always use "Evidence Only" mode for traditional methodology.

🔐 Admin Mode — Boston Neuromind Only

Evidence weight adjustment and default methodology settings are **admin-only**. Not visible in standard clinician UI.

Admin Permissions:

- Set default methodology (HYBRID/AI_ONLY/EVIDENCE_ONLY)
- Restrict available methodologies per clinic
- Adjust module weights when new meta-analyses are published
- Example: If 2026 PHQ-9 meta-analysis supports higher weight → mood_catcher_9 weight 1.0 → 1.2

B2B Licensing Scenario: Licensed clinics can select their own default methodology (e.g., conservative clinics = EVIDENCE_ONLY, busy clinics = AI_ONLY).

🖥️ Windows / Mac Compatibility

v2.2 works fully on both Windows and Mac environments:

- **Windows**: Chrome, Edge, Firefox supported. Automatic UTF-8 BOM added for Korean file downloads to prevent character corruption.
- **Mac**: Safari, Chrome, Firefox supported. `-webkit-print-color-adjust` applied for accurate Safari print colors.
- **3-level Clipboard Fallback**: Modern API → execCommand → Manual modal (works on any browser).
- **Email**: Uses mailto web standard (no separate configuration needed).
- **Printing**: CSS `break-inside: avoid` + `page-break-inside: avoid` both applied (includes older browsers).

🧬 Content 3-Tier Synthesis (v2.2 Core Technology)

Addressing the coverage concern: "Can we cover 30+ diagnostic combinations?" → The 3-Tier system covers all cases.

Tier 0: Critical Factor Scanner (Safety First)

Always runs first — Every input text is immediately checked for safety concerns.

- **Tier 3 patterns**: Suicidal ideation, self-harm, hallucinations, overdose → CRITICAL, immediate clinician intervention
- **Tier 2 patterns**: Benzo+Alcohol combos, Stimulant+Depression, Pregnancy+Medication → Caution
- On detection: conversation pauses, safety-first flow activates

Tier 1: Keyword Pattern Matching (Fast, Always Works)

Baseline — Multilingual keyword patterns for all 31 modules.

- Korean + English keywords supported simultaneously
- Score calculation: matched keyword count × position weight
- Top 4 modules suggested (after ≥2 conversation turns)
- Works without Claude API (offline resilience)

Tier 2: Claude API Reasoning (Deep Analysis)

Claude's strength — DSM-5-TR-based deep reasoning + context understanding.

- Full patient narrative context analysis
- Subtle pattern detection (e.g., atypical depression, complex PTSD)
- JSON-structured output (message + suggested_modules + reasoning + critical_flag)
- Natural language response in Korean/English

Tier 3: Synthesis (Integration — v2.2 Core Innovation)

Intelligently combines Tier 1 + Tier 2 results:

- Weighted score aggregation (Tier 1: 40%, Tier 2: 60%)
- Agreement calculation — when both systems recommend same modules, **confidence +15% boost**
- On disagreement: reasoning explains why (explainable AI)
- Critical flag detected → confidence minimum 80% (safety priority)
- Final output: top 4 modules + confidence + reasoning + flags

📊 Confidence Score Interpretation

Score	Meaning	Recommended Action
0.90-0.98	Very High	Proceed with AI recommendation as is
0.70-0.89	High	Quick clinician review then proceed
0.50-0.69	Medium	Additional clinical interview recommended
0.00-0.49	Low	Consider switching to Evidence Only mode

6. Results Interpretation Guide

Safety Banner (Highest Priority!)

> 🚨 **Safety Risk Auto-Detected**

Green: Safe · Amber: Caution · Red: Immediate Evaluation

Diagnosis Rankings

- **Primary (1st)**: Posterior > 50% = High confidence
- **Secondary (2nd)**: 15-50% = DDx needed or comorbidity
- **3rd-5th**: 5-15% = Consider further exploration

5-Lens Interpretation

Z-score Range	Interpretation	Recommendation
Z < 1.0	Normal range	Monitor
1.0 ≤ Z < 2.0	Mild elevation	Watch, reassess
2.0 ≤ Z < 3.0	Moderate elevation	Clinical eval, consider treatment
Z ≥ 3.0	Severe elevation	Immediate intervention

7. Safety Protocols

🆘 **Required Actions When Suicide Risk Detected**

1. Do NOT interrupt interview immediately — stay with patient
2. Assess risk level (ideation/plan/means/intent)
3. Develop safety plan (Safety Planning Intervention)
4. If needed, ER referral or hospitalization
5. Establish follow-up before next appointment

Crisis Resources (Provide to Patient)

- 🇺🇸 **988** - Suicide & Crisis Lifeline
- 🇰🇷 **1393** - Suicide Prevention

- **1577-0199** - Mental Health Crisis

8. QEEG / ERP / HRV Integration (Boston Neuromind Specialty)

⚡ **Exclusive 3-System Combination**

- **Thought Technology (BioGraph Infiniti)**: NFB + multimodal BFB
- **Mitsar EEG + Neuroguide**: 19-channel QEEG
- **HBImed + HBI Database**: Kropotov ERP

AI Module × Objective Measurement Integration

AI Module	QEEG Marker	ERP Marker	HRV Marker
AttendCatcher18	Theta/Beta ↑	P300 ↓	Reduced regulation
MoodCatcher9	Alpha asymmetry	P200 change	HRV ↓
AnxiCatcher7	Beta ↑	N200 ↑	LF/HF imbalance
TraumaCatcher20	Alpha ↓	P300 change	HRV severely ↓
PsychosisCatcher12	Alpha peak ↓	P300 ↓↓	-

9. Limitations & Cautions

⚠️ **Limitations of This Tool**

- AI does not diagnose — clinical judgment essential
- Normative DB is generalized (individual differences exist)
- Self-report limitations (malingering, poor insight)
- Cultural context limits (development culture bias)

- Screening tool, not for standalone diagnosis

Appropriate Use

- ✅ Initial screening
- ✅ Treatment progress tracking
- ✅ Comorbidity consideration
- ✅ Clinical decision support
- ❌ Standalone diagnosis
- ❌ Legal/administrative purposes

10. References

Core References

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