

PulseMed - Business Framework

White-Label Healthcare Technology Platform for Medical Practices

Your Practice's AI Integration — Built by Physicians, For Physicians

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Confidentiality: Proprietary & Confidential

Status: Production-Proven Framework (12 core innovations deployed in live healthcare environments)

Executive Summary

PulseMed LLC provides white-label, physician-controlled healthcare technology platforms to medical practices. Our platform delivers 24/7 patient support through an **AI-powered conversational interface** — a language model trained exclusively on physician-approved content. This solves the critical accuracy problem that prevents commercial AI from being trusted in healthcare.

The Problem We Solve

Commercial AI (ChatGPT, Google Bard, etc.) cannot be trusted for medical guidance because:

- They scrape unvetted internet content → high hallucination rates (2–15%)
- No physician control over responses
- No practice-specific customization
- No HIPAA compliance guarantees
- No audit trail or accountability

Result: Physicians don't trust AI, patients get unreliable information, and practices can't leverage AI to reduce workload.

Our Solution: Three-Pillar Architecture

1. **Physician-Curated Knowledge Base:** AI uses ONLY content uploaded and approved by the practice's own physicians
2. **Progressive Learning:** System improves from patient interactions while maintaining quality controls
3. **Humanistic Interaction:** AI trained for emotionally appropriate, casual conversation that doesn't overwhelm patients

Optional Features (customized per practice):

- **Algorithmic Triage:** Built-in clinical decision support for appropriate care escalation (for practices that need it)

Key Differentiators

- **Production-proven technology** - Not theoretical; already deployed in live healthcare environments
- **Zero hallucination risk** - AI never accesses unvetted sources
- **Every response traceable** - Full audit trail to approved documents
- **Physician control** - Practices decide what AI knows and how it responds
- **White-label deployment** - Patients see the practice brand, not ours
- **HIPAA-compliant** - Built for healthcare from day one, with automatic PHI de-identification
- **Custom feature development** - Unique integrations tailored to each practice's specialty and specific needs
- **Integrated admin dashboards** - Easy-to-use UI giving clinics full autonomy over resources, data collection, and real-time quality monitoring
- **Embeddable anywhere** - Single script tag deployment to any website or patient portal

Market Opportunity

- **Target:** Medical practices, health systems, specialty clinics
 - **Pain Point:** After-hours calls, patient education burden, staff time
 - **Value:** Reduce after-hours calls 60–80%, 24/7 patient support, consistent messaging
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Problem Statement

Why Commercial AI Fails in Healthcare

1. The Information Overload Problem

Commercial LLMs train on the entire internet:

- Peer-reviewed journals (accurate)
- Medical blogs and forums (mixed)
- Outdated information (dangerous)
- Misinformation (harmful)

The AI must “decide” what’s accurate in real-time. This creates:

- 2–15% hallucination rates in medical contexts
- Inconsistent responses to identical questions
- No way to guarantee evidence-based answers

2. The Control Problem

Physicians have zero control over:

- What information the AI uses
- How the AI phrases responses
- When the AI escalates vs. educates
- Practice-specific protocols and preferences

3. The Liability Problem

- No audit trail of sources
- No way to verify accuracy
- No HIPAA compliance
- Legal exposure prevents adoption

The PulseMed Solution

We eliminate these problems through **curated architecture**:

Commercial AI (ChatGPT, Bard, etc.)

- Knowledge Source: Entire internet (unvetted)
- Hallucination Rate: 2–15%
- Physician Control: None
- Audit Trail: None
- HIPAA Compliance: No

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- Knowledge Source: Physician-approved documents only
- Hallucination Rate: <2%

- Physician Control: Complete
 - Audit Trail: Every response traceable
 - HIPAA Compliance: Built-in
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Solution Overview

What We Provide

A **complete, white-label healthcare technology platform** that practices deploy to their patients:

1. Knowledge Base Management

- Physician-friendly document upload (PDFs, Word docs, protocols)
- Automatic text extraction and intelligent chunking
- OCR for scanned documents (91%+ accuracy)
- Category organization and version control

2. AI Engine

- Uses ONLY approved knowledge base content
- Smart relevance scoring (finds the right document for each query)
- Source attribution (cites which document was used)
- Multi-model support (Claude, GPT-4, etc.)

3. Clinical Triage System (Optional)

- **Available for practices that need it** - Not all clinics require triage functionality
- Emergency keyword detection
- Severity scoring algorithm
- Escalation protocols (911 → ER → Urgent Care → Office → Educational)
- Practice-specific customization
- **Example use case:** Pediatric practices need triage for urgent symptoms
- **Example use case:** Orthopedic surgeons may only need resource navigation chatbot (no triage)

4. Patient Interface

- White-label chatbot (practice branding)
- Mobile-responsive design

- Embeddable widget for websites
- Works with patient portals

5. Integrated Admin Dashboard

- **Easy-to-use interface** - Intuitive UI designed for non-technical staff
- **Full autonomy** - Clinics have complete control over:
 - What resources they implement (knowledge base documents, protocols, handouts)
 - Which features are enabled or disabled
 - Custom branding and messaging
 - Triage protocols and escalation paths
- **Data collection control** - Practices decide:
 - What patient data is collected
 - How data is stored and retained
 - Which analytics are tracked
 - Privacy and consent settings
- **Real-time monitoring** - Live dashboards for:
 - Conversation quality control
 - Patient engagement metrics
 - Response accuracy tracking
 - Triage trigger analysis
 - System performance monitoring
- **Knowledge base management** - Upload, edit, delete, and organize documents
- **Conversation analytics** - Review patient interactions and AI responses
- **Quality monitoring** - Track hallucination rates, citation coverage, satisfaction scores
- **Survey and feedback tracking** - Patient satisfaction and feature usage analytics

6. Data & Analytics

- Patient engagement metrics
- Response quality tracking
- Triage trigger analysis
- ROI reporting

7. Custom Features & Integrations

- **Specialty-specific modules** - Tailored features for different medical specialties (pediatrics, cardiology, oncology, etc.)
- **Practice-specific workflows** - Custom integrations that match unique practice protocols
- **Unique integrations** - Connect with practice-specific tools, EHRs, scheduling systems, or third-party services
- **Custom development** - Build specialized features that accommodate specific physician wants and needs

- **Flexible architecture** - Platform designed to extend and adapt to any practice scope

How It Works

Patient asks question

↓

AI retrieves relevant physician-approved documents

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Generates entirely unique response using ONLY approved content

↓

Applies triage algorithm (if enabled for this practice)

↓

Logs interaction for quality assurance

Note: Some practices (e.g., orthopedic surgeons with extensive resource libraries) may use the platform purely for resource navigation without triage functionality.

The AI never “makes up” information. Every response comes from physician-approved sources.

The Three-Pillar Architecture

Pillar 1: Curated Knowledge Base

What: A physician-controlled repository of medical information

How It Works:

1. Physicians upload their documentation (PDFs, protocols, handouts)
2. System extracts text (OCR for scanned docs)
3. Content is intelligently chunked for retrieval
4. AI queries retrieve ONLY from this approved content

Technical Implementation:

- Document storage: Cloud-based (AWS S3 or equivalent)
- Text extraction: pdf-parse + Tesseract.js OCR
- Smart chunking: Paragraph/sentence-aware segmentation
- Relevance scoring: Category (+100), Title (+150), Keyword (+50) points
- Top 6 most relevant documents sent to AI per query

Why It Works:

- Eliminates hallucination (no unvetted sources)
- Ensures practice-specific accuracy

- Full audit trail (every response traceable)
- Physicians maintain control

Pillar 2: Progressive Learning

What: The system improves from interactions while maintaining quality

How It Works:

1. Patient conversations are logged and analyzed
2. Common questions and patterns are identified
3. New knowledge is proposed to physicians for approval
4. Approved content is integrated into knowledge base
5. Quality metrics are continuously monitored

Quality Controls:

- Physicians approve all new content
- Hallucination rate tracking (<2% target)
- Citation coverage monitoring (>80% target)
- Patient satisfaction correlation

Why It Works:

- System gets smarter over time
- Physicians maintain quality control
- Reduces manual knowledge base updates
- Creates value from every interaction

Pillar 3: Humanistic Interaction

What: AI designed for emotionally appropriate, patient-friendly conversation

How It Works:

1. Conversational tone optimized for healthcare contexts
2. Emotionally intelligent responses that match patient needs
3. Casual, approachable language that doesn't overwhelm
4. Context-aware empathy (acknowledges stress, celebrates progress)
5. Concise answers (2–4 sentences when possible) for sleep-deprived parents
6. Front-loaded critical information with clear action steps

Technical Implementation:

- System prompts emphasize empathy and warmth
- Response length optimization (avoids information overload)
- Bullet points for lists of 3+ items

- Assumes reasonable defaults (reduces unnecessary questions)
- Temporal awareness (doesn't repeat recent advice)
- Tone calibration for different scenarios (routine vs. urgent)

Why It Works:

- Patients feel heard and understood, not lectured
- Reduces anxiety by avoiding overwhelming medical jargon
- Builds trust through consistent, caring communication
- Improves patient satisfaction and engagement
- Maintains the human connection in digital healthcare

Part I: Proven Technical Framework

PRODUCTION STATUS: *The following technical capabilities are already built and deployed in live healthcare environments. These are not theoretical — they are battle-tested innovations that differentiate PulseMed from competitors.*

1. HIPAA-Compliant De-Identification Layer

All patient queries are automatically scrubbed of protected health information (PHI) **before** being sent to any AI provider:

- SSN detection and masking → [SSN]
- Phone number masking → [PHONE]
- Email address masking → [EMAIL]
- Date masking → [DATE]

Why It Matters: Even if using third-party AI providers, no PHI ever leaves the practice's control. This is automatic, requiring zero configuration from the practice.

2. Intelligent Query Classification System

Not every patient question needs the same response approach. Our system automatically classifies queries:

- **Medical queries** → Retrieves relevant knowledge base documents
- **Emotional support queries** → Prioritizes empathy and reassurance (no knowledge dump)
- **Emergency queries** → Triggers immediate escalation protocols

Pattern Detection: Endless medical topic keywords, question pattern recognition, emotional phrase detection.

Why It Matters: Patients feel heard. A stressed patient sharing their feelings doesn't get lectured with medical protocols—they get compassion first.

3. Emergency Detection & Escalation Protocol

Rule-based emergency detection runs on **every message** before AI processing:

Emergency keywords detected?

- YES → Immediate 911/ER escalation response (bypasses AI entirely)
- NO → Continue normal processing

Smart exclusions: Prevents false positives (e.g., “30 day plan” doesn't trigger on “day”)

Why It Matters: Life-threatening situations get immediate, consistent responses. No AI hallucination risk for emergencies.

4. Knowledge Retrieval & Response Framework

When a patient asks a question, the system uses a two-part process: **Intelligent Document Retrieval** (the search mechanism) combined with a **Three-Tier Knowledge Hierarchy** (the decision framework).

Part A: Intelligent Document Retrieval (The Search Mechanism)

The system doesn't dump all documents to the AI. It uses a **relevance scoring algorithm** to find the most appropriate content:

Relevance Score Boosts:

- Category match: +100
- Title match: +150
- Keyword match: +50

The top 6 most relevant documents (sorted by score) are sent to the AI for each query.

Part B: Three-Tier Knowledge Hierarchy (The Decision Framework)

For **medical or clinical questions**, the system determines which source to use based on what the retrieval mechanism finds:

Tier 1 — Practice's Knowledge Base

- When used: Strong relevance scores found
- AI behavior: Confident response is given citing practice resources

Tier 2 — Public Guidelines (AAP, WHO, CDC, NIH)

- When used: Low or no matches in practice KB
- AI behavior: Response given with explicit disclosure of source

Tier 3 — Redirect to Physician

- When used: No adequate information anywhere (rare)
 - AI behavior: Honest acknowledgment, recommends contacting care team
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How They Work Together

Patient asks a medical question



INTELLIGENT DOCUMENT RETRIEVAL

Searches practice's knowledge base using relevance scoring (category, title, keyword matching)



Strong matches found?

YES

NO

TIER 1

Search Tier 2 (public guidelines)

Respond



confidently

Adequate matches found?

YES

NO



TIER 2

TIER 3

Respond

Redirect to

with

physician

disclosure

Tier-by-Tier Breakdown

Tier 1 — Physician-Curated Content

- Retrieval finds strong matches in the practice's approved knowledge base
- AI responds confidently, citing the practice's own resources
- Example: *"According to your care team's feeding guidelines..."*

Tier 2 — Evidence-Based Public Guidelines

- Retrieval finds low/no matches in practice KB
- AI falls back to trusted public sources (AAP, WHO, CDC, NIH)
- **Crucially, the AI explicitly discloses** the source change
- Example: *“Current AAP guidelines recommend...”*

Tier 3 — Physician Referral

- Retrieval finds no adequate information in either tier (rare cases)
 - AI **does not guess** — it transparently acknowledges the limitation
 - Example: *“I don’t have specific information on that topic. For questions like this, I’d recommend reaching out to your provider directly.”*
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Non-Medical Queries — Conversational Support

The three-tier hierarchy applies **only to medical/clinical questions**. For non-medical queries, the AI responds naturally without triggering the knowledge base search:

Emotional Support

- Example: “I’m feeling stressed about my appointment”
- AI behavior: Empathetic response, reassurance, practical suggestions

Practical/Logistical

- Example: “Should I leave early for my appointment?”
- AI behavior: Helpful advice (yes, give yourself extra time)

General Conversation

- Example: “Thank you for your help”
- AI behavior: Warm, natural response

Adaptive Tone Matching: The AI reads and adapts to the patient’s written tone, providing emotionally, socially, and uniquely humanistic responses. If a patient writes casually, the AI responds casually. If a patient is distressed, the AI prioritizes empathy and reassurance before any practical guidance. This creates conversations that feel genuinely human — not robotic or templated.

This ensures the AI feels like a **supportive companion**, not a rigid medical database. Patients can have natural conversations while still receiving accurate, sourced information for clinical questions.

Why This Framework Works

- **Always accurate** — Every response comes from either physician-approved content OR trusted medical guidelines

- **Always transparent** — Patients know exactly where the information comes from
- **Never hallucinates** — AI doesn't guess or make up information
- **Reinforces physician authority** — Complex or ambiguous questions go to the care team
- **No licensing costs** — Uses freely available public guidelines (not proprietary sources like UpToDate)
- **Identifies content gaps** — Analytics track Tier 2 and Tier 3 queries so practices know what topics to add to their KB
- **Feels human** — Non-medical questions get natural, conversational responses

5. Temporal Awareness (Conversation Memory)

The AI maintains awareness of the conversation context:

- Retains past conversation context
- Prevents repeating advice given moments ago
- Recognizes when topics were recently discussed (“As I mentioned earlier...”)
- Understands time-sensitive advice (“Give it a few days before we follow up”)

Why It Matters: Conversations feel natural. Patients don't get the same generic advice repeated—the AI builds on what was already discussed.

6. Clinical Photo Analysis Framework

For practices that need visual assessment support, our 5-step clinical photo analysis:

1. **Expert analysis** - Lesion morphology, color, texture, distribution
2. **Age-based diagnostic windows** - Different differentials for different patient populations
3. **Differential generation** - Top 3 possibilities with confidence levels
4. **Red flag screening** - Emergent vs. urgent vs. routine
5. **Patient-friendly response** - Translates clinical findings into plain language

Why It Matters: Extends the chatbot's capabilities beyond text-only interactions. Practices can offer visual assessment guidance.

7. Hybrid PDF Processing (Text + OCR)

Many practices have scanned documents that standard text extraction can't read. Our hybrid approach:

1. **Primary:** Text extraction (fast, for text-based PDFs)
2. **Fallback:** OCR processing (for scanned/image-based documents)

3. 300 DPI conversion
4. Tesseract.js processing
5. 91%+ accuracy on typical medical documents

Why It Matters: Practices don't need to re-digitize their entire document library. Upload existing scanned protocols and handouts—they just work.

8. Multi-Profile Patient Management

For practices with family accounts or complex patient relationships:

- Multiple profiles per account
- Profile-specific log filtering
- Role-based access (patient, caregiver, family member)
- Profile switching with session isolation

Why It Matters: Flexible enough to support various practice models and patient relationship structures.

9. Comprehensive Tracking & Pattern Recognition

Built-in logging systems with automatic insight generation:

- **Activity logging** - Track patient interactions and behaviors
- **Pattern recognition** - Identify trends (peak usage times, common questions)
- **7-day trend visualization** - Visual dashboards for care teams
- **Expected ranges** - Compare patient data against clinical norms

Why It Matters: Practices gain actionable insights from patient interactions, not just raw data.

10. Embeddable Widget Architecture

Deploy the chatbot anywhere with a single script tag:

```
<script src="https://[practice].pulsemmed.ai/embed.js"></script>
```

Features:

- iframe isolation for security
- postMessage API for cross-origin communication
- Session isolation (HIPAA-compliant)
- Works on any website, patient portal, or EHR web interface

Why It Matters: Practices can deploy to their existing website in minutes, no development required.

11. Consent Versioning & Compliance Tracking

Full legal compliance tracking with version control:

- Legal document version tracking (TOS, Privacy Policy, Consent)
- Automatic re-consent prompts when versions change
- Timestamp and IP logging for audit trail
- HIPAA-compliant consent records (6-year retention)

Why It Matters: When legal documents are updated, every affected patient is automatically re-prompted. Full audit trail for compliance reviews.

12. Research-Ready Analytics

For practices interested in quality improvement or research:

- **Feature usage tracking** - Correlate engagement with satisfaction
- **Anonymized data collection** - IRB-ready research capabilities
- **Sentiment analysis** - Positive/negative/neutral classification
- **Topic extraction** - Automatic categorization of patient concerns

Why It Matters: Practices can demonstrate outcomes, participate in research, and continuously improve based on data.

Summary

Why PulseMed Wins

1. **Production-proven technology** - 12 core innovations already deployed in live healthcare environments
2. **Solved the accuracy problem** - Curated knowledge eliminates hallucinations
3. **Automatic HIPAA compliance** - PHI de-identification before data leaves practice control
4. **Physician control** - Practices trust what they control
5. **Humanistic interaction** - Emotionally appropriate AI that doesn't overwhelm patients
6. **Custom feature development** - Unique integrations and specialty-specific modules tailored to each practice's scope of medicine
7. **Integrated admin dashboards** - Easy-to-use UI giving clinics full autonomy over resources, data

collection, and real-time quality monitoring

8. **Scalable architecture** - One framework, unlimited practices
9. **Clear ROI** - 60–80% after-hours call reduction
10. **Deploy anywhere** - Single script tag embeds chatbot on any website or patient portal

The Opportunity

Every medical practice wants AI that:

- Reduces workload
- Provides accurate information
- Maintains physician control
- Integrates with existing workflows
- **Adapts to their specific specialty and practice needs** - Custom features and unique integrations
- **Gives them full autonomy** - Easy-to-use admin dashboard for complete control over resources, data collection, and real-time quality monitoring

PulseMed delivers all of this.

The three-pillar architecture (curated knowledge + progressive learning + humanistic interaction) is our competitive advantage. Combined with optional features like algorithmic triage (when needed), this flexible approach allows us to serve diverse practice needs—from simple resource navigation AI usage to full-featured clinical decision support systems that are specifically crafted for the medical scope.

Document End

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