+234 (913) 329 4905
www.bioneurax.com
Info@bioneurax.com
Kabusa Gardens, Lokogoma, FCT, Abuja

MedNeura Platform: Technical Capabilities & Application Framework

Purpose

This document describes MedNeura's core technical capabilities and demonstrates how they can be configured to address diverse health priorities. It is designed for program designers, NGO partners, and funders who need to understand how MedNeura adapts to specific disease areas, populations, and operational contexts.

Executive Summary

MedNeura is a flexible AI-powered clinical intelligence platform that delivers structured medical guidance across voice, text, video, and file-based channels. It is built to work in low-resource settings with variable connectivity, supporting both direct beneficiary access (via phone hotlines and apps) and health worker-mediated care (via field tools and dashboards). The platform can be rapidly configured for specific health programs without requiring custom software development, making it suitable for maternal health, infectious disease, chronic care, emergency response, nutrition, and other priority areas.

1. Core Platform Capabilities

MedNeura operates across two connectivity tiers, ensuring that program reach is not limited by infrastructure.

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A. Internet-Connected Mode (Full AI System)

Used by community health workers (CHWs), clinic staff, and beneficiaries with smartphones or internet access.

Text Consultations

- Secure chat interface with AI-driven clinical guidance
- Structured questionnaires and checklists tailored to specific conditions
- Symptom logging and timeline tracking
- Multi-turn conversations that adapt based on user responses

Voice Consultations (Over Data)

- Real-time voice interaction with conversational AI
- Natural language understanding in local languages
- Hands-free operation for field settings or users with low literacy
- Session recording and transcription for quality assurance

Video Consultations

- Live visual assessment when bandwidth permits
- AI observation of physical signs (wounds, rashes, swelling, breathing patterns, jaundice)
- Real-time guidance for first aid or stabilization procedures
- Remote clinician oversight when available

Medical File Upload & Analysis

- Photos of wounds, rashes, physical findings, or medical documents
- Scanned or photographed lab results, prescriptions, and referral letters
- PDFs of medical records, growth charts, or vaccination cards
- AI-assisted analysis with structured outputs and clinical recommendations
- Flagging for human clinician review when ambiguity or risk thresholds are met

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CHW Dashboard & Field Tools

- Task assignment and follow-up scheduling
- Patient registry with visit history and clinical notes
- Referral tracking and outcome verification
- Offline data capture with automatic sync when connectivity returns
- Performance metrics and caseload monitoring

Consent Capture & Secure Storage

- Digital consent workflows with audio or signature capture
- Encrypted storage of personal health information
- Role-based access control for multi-stakeholder programs
- Audit logs for data access and modification

B. No-Internet Mode (Cellular Voice & USSD)

Used by beneficiaries with basic phones or in areas with poor data connectivity.

IVR Hotline with Program Code Entry

- Toll-free or low-cost voice hotline accessible from any phone
- Interactive voice prompts in local languages
- Program or NGO code entry for attribution and customization
- Decision tree navigation using keypad inputs

Focused Triage Protocols

- Short, clinically validated screening flows for danger signs
- Immediate advice or escalation instructions based on responses
- Pre-recorded messages for common health education topics
- Callback requests for users who need more time or assistance

Automated Task Generation

- High-risk calls automatically create CHW follow-up tasks
- Location and contact information captured for field visits
- SMS alerts sent to assigned health workers
- Integration with paper-based or offline workflows where needed

USSD Menus (Where Network Support Exists)

- Text-based menu navigation for users without data or app access
- Symptom checkers and appointment reminders
- Request CHW visit or clinic referral
- Low bandwidth and universally compatible with GSM networks

2. Cross-Cutting Use Cases

MedNeura's design allows it to support clinical decision-making across a wide range of health domains. Below are illustrative examples showing how the same platform capabilities apply to different program areas.

Acute Illness Triage

Scenario: A caregiver calls the hotline reporting fever and difficulty breathing in a child.

MedNeura Actions:

- IVR guides the caller through a structured assessment (fever duration, breathing rate, alertness, hydration)
- AI flags danger signs (fast breathing, lethargy, inability to drink)
- System provides immediate advice (keep child upright, give fluids, do not delay travel)
- Referral instructions sent via SMS with nearest facility details
- CHW task created for follow-up if referral is not completed within 6 hours

Relevant Domains: Malaria, pneumonia, diarrheal disease, sepsis, meningitis, typhoid, dengue.

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Chronic Condition Support

Scenario: A CHW visits a patient with diabetes and uses the app to assess foot health and medication adherence.

MedNeura Actions:

- CHW uploads photo of a foot wound
- AI analyzes image for signs of infection, ulceration, or poor healing
- System prompts structured questions about blood sugar control, medication supply, and diet
- Recommendations provided for wound care, medication adjustments, or referral
- Follow-up visit scheduled automatically with reminders sent to both CHW and patient

Relevant Domains: Diabetes, hypertension, asthma, epilepsy, HIV, tuberculosis, sickle cell disease.

Preventive Care & Health Education

Scenario: A mother calls the hotline to ask about vaccination schedules and nutrition for her infant.

MedNeura Actions:

- IVR provides age-appropriate vaccination reminders and locations of immunization sessions
- Voice or text module delivers feeding guidance (exclusive breastfeeding, introduction of solids, dietary diversity)
- System logs interaction and sends SMS reminders before next vaccine due date
- If growth monitoring data is uploaded, AI flags malnutrition risk and suggests CHW visit

Relevant Domains: Immunization programs, nutrition, family planning, antenatal care, water/sanitation behavior change.

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Emergency Response & Stabilization

Scenario: A bystander at a road accident uses the app to get guidance while waiting for an ambulance.

MedNeura Actions:

- Video consultation allows AI to observe the scene and victim's condition
- Real-time voice guidance walks the user through ABC assessment (airway, breathing, circulation)
- Instructions provided for bleeding control, shock positioning, and spinal precautions
- If connectivity allows, session is escalated to a remote clinician for live support
- Location shared automatically with emergency dispatch or ambulance service

Relevant Domains: Trauma, obstetric emergencies, snakebite, poisoning, burns, drowning, cardiac arrest.

Health Worker Training & Clinical Decision Support

Scenario: A newly trained CHW encounters an unfamiliar presentation and needs guidance during a home visit.

MedNeura Actions:

- CHW opens app and selects "clinical support" mode
- Describes symptoms via voice or text
- AI provides differential diagnosis and suggests next steps
- Links to training materials or protocols relevant to the case
- Session logged for supervision and mentorship review

Relevant Domains: Capacity building, task-shifting programs, telemedicine, quality improvement.

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3. Modular Deployment Options

MedNeura can be deployed in multiple configurations depending on program design, existing infrastructure, and target population.

Option 1: Standalone Hotline

Best For: Rapid deployment, mass awareness campaigns, populations with limited smartphone access.

Configuration:

- Toll-free or subsidized phone number
- IVR flows customized to program priorities
- SMS follow-up messages
- Call data exported to partner dashboards

Examples: National health information lines, disease outbreak hotlines, donor-funded public education campaigns.

Option 2: CHW-Enabled Field Program

Best For: Community-based health programs with trained health workers.

Configuration:

- CHWs equipped with smartphones or tablets running the MedNeura app
- Beneficiary registration and consent captured in the field
- Full access to text, voice, video, and file upload features
- Referral coordination and outcome tracking
- Supervisor dashboards for performance monitoring

Examples: Community case management, integrated community health programs, mobile health teams.

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Option 3: Clinic Integration

Best For: Health facilities seeking to improve triage, reduce wait times, or extend services.

Configuration:

- MedNeura deployed on clinic tablets or computers
- Pre-consultation triage to prioritize urgent cases
- Clinical decision support for providers during consultations
- Integration with facility registers or electronic medical records
- Queue management and patient flow optimization

Examples: Primary health centers, district hospitals, specialized clinics (TB, HIV, NCD).

Option 4: Public Health Campaign Support

Best For: Time-bound interventions like vaccination drives, outbreak response, or seasonal programs.

Configuration:

- Temporary hotline or USSD shortcode
- Campaign-specific messaging and protocols
- Real-time data collection for monitoring coverage and adverse events
- Geo-tagged data for identifying under-served areas

Examples: Mass drug administration, immunization campaigns, malaria net distribution, COVID-19 response.

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4. Customization Framework

MedNeura is designed to be adapted without requiring extensive software development. Program teams work with BioNeuraX to configure the platform to their specific needs.

Clinical Protocol Adaptation

What Can Be Customized:

- Triage algorithms and decision trees based on national or international guidelines
- Danger sign definitions and escalation thresholds
- Treatment recommendations aligned with local formularies and essential medicine lists
- Language and terminology to match local expressions and health beliefs
- Consent scripts and data collection forms to meet ethical and regulatory requirements

Process:

- BioNeuraX provides a protocol template based on best practices
- Partner clinical team reviews and adapts content
- Joint validation and testing with health workers and community members
- Iterative refinement based on pilot feedback

Data Collection & M&E Alignment

What Can Be Customized:

- Indicators captured during consultations (e.g., age, location, symptoms, referral outcome)
- Export formats compatible with partner reporting systems (Excel, CSV, DHIS2, REDCap)
- Dashboard views filtered by geography, time period, or program code
- Anonymization rules to protect privacy while enabling program evaluation

Process:

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- BioNeuraX maps partner M&E framework to MedNeura data structure
- Custom reports and dashboards configured for program needs
- Training provided on data interpretation and use for decision-making

Branding & User Experience

What Can Be Customized:

- Voice prompts and app interface language
- NGO or government branding (logos, colors, messaging)
- Program-specific phone numbers and shortcodes
- Welcome messages and health education content

Process:

- Partner provides branding assets and content preferences
- BioNeuraX implements and tests customized interface
- User acceptance testing with representative beneficiaries and health workers

Integration with Existing Systems

What Can Be Integrated:

- Health information systems
- Patient registries and unique identifiers
- Referral networks and facility databases
- SMS gateways and notification systems
- Payment platforms for user fees or incentives (where applicable)

Process:

- BioNeuraX assesses technical compatibility and data sharing agreements
- API connections or data exchange protocols established
- Pilot integration with a subset of users before full rollout

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5. Sample Adaptation Scenarios

The following scenarios illustrate how MedNeura can be tailored to specific program priorities.

Tuberculosis Case Finding & Treatment Support

Program Goal: Improve TB case detection and treatment adherence in hard-to-reach communities.

MedNeura Configuration:

- IVR hotline with cough screening (duration, sputum production, night sweats, weight loss)
- High-risk callers directed to sputum collection points with SMS instructions
- CHW app includes treatment adherence tracking and side effect monitoring
- Video consultations for assessing medication reactions or chest condition
- Referral dashboard tracks patients from symptom screening through diagnosis and treatment completion

Key Features Used: Voice triage, CHW task assignment, file upload (lab results, X-rays), adherence tracking, referral coordination.

Nutrition & Growth Monitoring

Program Goal: Reduce child malnutrition through early detection and community-based management.

MedNeura Configuration:

- CHWs upload photos of children for visual assessment of visible wasting, edema, or pallor
- Growth chart data (weight, height, MUAC) entered during field visits

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- AI flags acute malnutrition and triggers referral to nutrition programs
- Caregivers receive SMS reminders for feeding practices and follow-up appointments
- Hotline provides nutrition counseling and recipes using locally available foods

Key Features Used: Image analysis, structured data entry, automated alerts, SMS reminders, voice education.

Hypertension & Cardiovascular Disease Management

Program Goal: Expand access to NCD screening and long-term care in underserved populations.

MedNeura Configuration:

- Clinic-based triage uses MedNeura to assess cardiovascular risk factors (family history, smoking, diet, exercise)
- Blood pressure readings logged during each visit with trend analysis
- Medication adherence tracked via SMS check-ins or app-based reminders
- Video consultations for patients unable to travel for routine follow-up
- Dashboard alerts for patients overdue for appointments or with uncontrolled readings

Key Features Used: Structured assessments, longitudinal tracking, medication reminders, video follow-up, care gap alerts.

Snakebite & Envenomation Response

Program Goal: Reduce snakebite mortality through rapid identification and pre-hospital care guidance.

MedNeura Configuration:

- Emergency hotline provides immediate first aid instructions (immobilization, calm victim, avoid tourniquets)
- Photo upload of snake (if available) for species identification

- Visual assessment of bite site via video to estimate severity
- Nearest antivenom facility identified and alerted
- Transport coordination and pre-arrival notification to receiving hospital

Key Features Used: Emergency protocols, image recognition, video assessment, facility referral, real-time alerts.

Family Planning & Reproductive Health

Program Goal: Increase contraceptive uptake and address side effects that lead to discontinuation.

MedNeura Configuration:

- Hotline provides information on contraceptive options, effectiveness, and availability
- CHWs use app to counsel clients on method choice and address misconceptions
- Follow-up check-ins via SMS or voice to assess satisfaction and side effects
- Video consultations for managing side effects or switching methods
- Referral for long-acting methods or complications

Key Features Used: Voice and text counseling, decision aids, follow-up reminders, video consultations, referral tracking.

Emergency Obstetric Care

Program Goal: Reduce maternal deaths through early recognition of complications and timely referral.

MedNeura Configuration:

- Hotline screens pregnant women for danger signs (bleeding, severe headache, convulsions, reduced fetal movement)
- CHWs conduct structured antenatal assessments with risk scoring
- Visual assessment for pallor, edema, or jaundice via video or photo

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- Immediate referral instructions and facility alerts for high-risk cases
- Postpartum follow-up for infection, bleeding, or mental health concerns

Key Features Used: Danger sign triage, visual assessment, risk stratification, referral coordination, postpartum tracking.

6. Technical Requirements

For Health Workers & Clinic Staff (Internet Mode)

- Android smartphone or tablet (minimum Android 8.0)
- Intermittent 3G/4G connectivity (offline data capture with sync when online)
- Periodic charging access (solar charging compatible)
- MedNeura app or web browser

For Beneficiaries without Internet (Voice Mode)

- Any GSM-compatible phone (feature phone or smartphone)
- Access to cellular voice network
- No data plan or internet required

For Program Administration

- Web-based dashboard accessible from any modern browser
- Data export compatible with Excel, Google Sheets, and common M&E platforms
- API access available for system integration (optional)

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7. Data Privacy, Consent & Governance

Consent Management:

- Clear consent scripts in local languages for voice and app interactions
- Audio or digital signature capture
- Opt-in for data sharing with research or public health authorities

Data Minimization:

- Only essential health information collected
- Personal identifiers stored separately from clinical data
- Anonymized data used for aggregate reporting and analysis

Security & Access Control:

- End-to-end encryption for data transmission
- Encrypted storage of personal health information
- Role-based access (health workers see only their assigned patients, supervisors see aggregated data)
- Audit trails for all data access and modifications

Governance Agreements:

- Memoranda of Understanding (MOUs) define data ownership, sharing, and use
- Partners retain ownership of program-specific data
- BioNeuraX provides data hosting and technical support under agreed terms

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8. Implementation Process

Phase 1: Design & Configuration (4 to 6 weeks)

- Joint workshop to define program priorities, target population, and success metrics
- Clinical protocol review and adaptation
- Customization of voice prompts, app interface, and data collection forms
- Integration planning with existing systems
- User testing with representative health workers and beneficiaries

Phase 2: Training & Pilot (6 to 8 weeks)

- Health worker training on app use, consent procedures, and referral workflows
- Community sensitization and hotline launch
- Pilot deployment in selected sites with close monitoring
- Feedback collection and rapid iteration
- Quality assurance and protocol refinement

Phase 3: Scale & Optimization (Ongoing)

- Expansion to additional sites and health workers
- Regular performance review and program adjustment
- Continuous quality improvement based on outcome data
- Integration with health system reporting and planning processes

9. Monitoring, Evaluation & Learning

Program KPIs

MedNeura dashboards provide real-time visibility into program performance.

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Access & Reach:

- Total consultations (voice, text, video)
- Unique beneficiaries reached
- Geographic coverage and penetration by area
- Consultation trends over time

Clinical Quality:

- Proportion of consultations flagged as high-risk
- Referral rates and reasons for referral
- Time from consultation to referral action
- Follow-up completion rates

Health Worker Performance:

- CHW adoption and usage patterns
- Caseload distribution and equity
- Consultation quality scores (based on protocol adherence)
- Training needs identified from usage data

System Performance:

- Hotline drop rates and call completion
- App uptime and technical issues
- Average consultation duration
- User satisfaction (from periodic surveys)

Outcome Evaluation

Sample Evaluation Questions:

- Are high-risk cases detected earlier in the course of illness?
- Do referrals reach facilities more quickly?

- Are health workers more confident in clinical decision-making?
- Do beneficiaries report improved access to health information?
- Are program costs per case managed lower than baseline?

Methods:

- Pre/post surveys with health workers and beneficiaries
- Facility record review to verify outcomes
- Comparison with control areas or historical data
- Cost-effectiveness analysis

10. Expected Impact Across Program Areas

While impact varies by context, MedNeura consistently delivers value through three mechanisms: earlier detection, better triage, and stronger health system linkages.

Clinical Impact:

- Reduced time from symptom onset to appropriate care
- Increased proportion of cases receiving evidence-based management
- Fewer preventable complications and deaths
- Improved treatment adherence and follow-up completion

Health System Impact:

- More efficient use of scarce clinical resources
- Reduced facility overcrowding through better case routing
- Improved data for program planning and resource allocation
- Strengthened community-facility linkages

Equity Impact:

- Access to clinical knowledge for populations far from facilities

- Overcome language and literacy barriers
- Reduced financial burden of unnecessary travel or delayed care
- Empowerment of women, children, and marginalized groups to seek care

Operational Impact:

- Lower cost per beneficiary reached compared to facility-based models
- Scalable across large geographic areas
- Rapid deployment in emergencies or new program areas
- Real-time program monitoring and adaptive management

11. Partnership Models

BioNeuraX works with partners through flexible arrangements designed to align with program goals and funding realities.

Pilot Partnerships:

- Collaborative design and testing in limited sites
- Shared learning and co-publication of results
- Subsidized or in-kind support for early adopters

Program Licensing:

- Annual or multi-year license for defined user volumes
- Customization and integration included
- Ongoing technical support and platform updates

Implementation Support:

- Training, deployment, and monitoring assistance
- Embedded technical staff during rollout (optional)
- Quality assurance and evaluation support

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Data & Research Collaborations:

- Anonymized data products for public health planning
- Joint research on platform effectiveness
- Support for academic partnerships and publications

12. Contact & Next Steps

BioNeuraX is ready to discuss how MedNeura can support your program goals. Whether you are designing a new intervention or looking to strengthen an existing program, we can configure MedNeura to fit your needs.

To explore a partnership:

- Email: info@bioneurax.com
- Phone: +234 (913) 329 4905
- Web: www.bioneurax.com

What We Will Discuss:

- Your program priorities and target population
- Technical requirements and existing infrastructure
- Timeline and phasing for deployment
- Budget and partnership structure
- Monitoring and evaluation needs

Appendix: Frequently Asked Questions

Q: Can MedNeura work in areas with no internet? A: Yes. The IVR hotline and USSD menus work on any cellular network without requiring data or internet access. CHWs can also capture data offline and sync when connectivity is available.

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Q: What languages does MedNeura support? A: MedNeura currently supports English, Hausa, Yoruba, and Igbo, with additional languages added based on partner needs. Voice recognition and text interfaces can be configured for new languages within 4 to 6 weeks.

Q: How is clinical accuracy ensured? A: All triage protocols are based on WHO, national, or peer-reviewed clinical guidelines. Protocols are reviewed by local clinicians and tested in pilot settings. Quality assurance includes periodic manual review of consultations and outcome verification.

Q: Can MedNeura integrate with our existing health information system? A: Yes. MedNeura can export data in standard formats (CSV, Excel, DHIS2) and can integrate via API with electronic medical records, patient registries, and SMS gateways.

Q: What happens if the AI gives incorrect advice? A: MedNeura is designed with multiple safeguards: clear escalation thresholds, human clinician oversight for high-risk cases, and disclaimers that AI guidance is not a substitute for professional medical care. All serious adverse events are logged and reviewed.

Q: Who owns the data collected through MedNeura? A: Data ownership is defined in partnership agreements. Typically, program data belongs to the implementing partner, while BioNeuraX retains rights to anonymized, aggregated data for platform improvement and research.

Q: How much does MedNeura cost? A: Pricing depends on deployment model, user volume, and customization needs. We offer flexible structures including per-user licenses, per-consultation fees, and flat annual fees. Contact us for a tailored quote.

Q: Can we pilot MedNeura before committing to a full program? A: Absolutely. We encourage pilot testing in a limited area with a subset of health workers. Pilots typically run 8 to 12 weeks and include full support for design, training, and evaluation.

BioNeuraX | Building the medical intelligence layer for the underserved world.