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Perspective

Perinatal Mental Health in Emergencies: An Evidence-Calibrated Biosocial Framework

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Abstract

Public health emergencies expose pregnant and postpartum women to disrupted maternity care, food insecurity, violence, displacement, bereavement, social isolation, infection, and loss of income. Mental health and psychosocial support remains essential, but the same exposures also disturb sleep and affect stress, immune, and metabolic pathways, with possible effects on the microbiota-gut-brain axis. Biological plausibility does not make a biomarker clinically useful. This Perspective sets out an evidence-calibrated biosocial framework that separates services that should be delivered now, routinely available information that should alter care, and technologies that remain investigational. It also defines a minimum workflow for disrupted systems and treats digital tools as ways to extend care rather than prerequisites for it. Biomarkers, microbiome profiling, multi-omics, and targeted biological interventions should remain research tools until they show incremental clinical value, feasibility, safety, reproducibility, affordability, and equity across settings.

Keywords: Depression, Disasters, Mental health, Microbiota, Perinatal care, Pregnancy, Postpartum, Social determinants of health

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Introduction

Pregnancy and the first year after birth bring major psychological, social, and physiological change. Perinatal mental health conditions are common, and maternal and child health services provide important points of contact for prevention, identification, treatment, and referral.[1] Emergencies can interrupt antenatal and postnatal care while adding bereavement, violence, food and income insecurity, displacement, infection, and loss of social support. WHO places mental health and psychosocial support (MHPSS) within emergency preparedness, response, and recovery.[2]

Perinatal mental health therefore needs an explicit place in preparedness. Humanitarian guidance already recognizes compounded risks involving protection, nutrition, autonomy, disrupted reproductive health services, and reduced access to MHPSS.[3] Refugee and asylum-seeking women also face postpartum depression alongside recurrent barriers involving isolation, abuse, low income, discrimination, language, and service access.[4] These exposures often occur together rather than as separate social and clinical problems.

The framework draws on social determinants of health and life-course perspectives. Social adversity may become biologically embedded through physiological and behavioral pathways, but its social causes remain actionable. Biological measurement should not displace action on violence, food insecurity, displacement, disrupted care, or loss of social support. The question for emergency care is what should be delivered now, what routine information should change care, and what still requires research.

Emergency Exposures Converge Across Clinical, Social, And Material Pathways

Emergency risks rarely occur in isolation. Food insecurity, interrupted maternity or mental health services, violence, displacement, infection, sleep loss, and obstetric complications can reinforce one another. A missed antenatal visit can remove an opportunity to identify depressive symptoms or violence; displacement can separate a woman from family support and alter where care is available. Preparedness depends on identifying modifiable pathways and responses that remain feasible under pressure.

Food insecurity illustrates this overlap. The 2026 State of Food Security and Nutrition in the World reported persistent inequalities in access to healthy diets, particularly for women, children, and resource-constrained populations.[5] A 2025 meta-analysis linked household food insecurity in pregnancy with more depressive symptoms, although heterogeneity was substantial and certainty very low.[6] A scoping review reported similar associations with perinatal depression or anxiety.[7] These pathways may be nutritional, psychosocial, economic, or structural. Hunger should not be recast as a psychiatric problem.

Identifying food insecurity should trigger material support as well as mental health care when both are needed. Where available, this may include food or nutrition

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assistance, cash or social protection, and maternal health review, while depressive or anxiety symptoms are assessed in parallel. Violence, insecure housing, and loss of social support should likewise alter safety planning, access, referral, or follow-up. Trust, workforce training, referral pathways, stigma, organizational arrangements, policy, and funding all affect implementation.[8]

Biological Embedding Does Not Establish Clinical Utility

Psychosocial adversity can influence physiology through interacting neuroendocrine, autonomic, immune, and metabolic pathways. Sleep disruption affects mood and cognition; infection and inflammation alter behavior and energy balance; diet can influence metabolic and microbial processes. The microbiota-gut-brain axis also involves neural, immune, endocrine, epithelial, and microbial-metabolite signaling.[9] These mechanisms support biological plausibility, not clinical utility.

Evidence on inflammatory markers remains heterogeneous. A 2024 systematic review found associations between perinatal depression and several markers, but studies varied in sampling time, specimen, depression measurement, and analytical method.[10] No individual marker has established clinical utility for predicting or diagnosing perinatal depression, and interpretation is especially difficult during outbreaks because inflammation may reflect infection, vaccination, obstetric complications, or chronic disease.

Microbiome evidence is also preliminary. An observational study of 140 pregnant participants linked prenatal or postpartum depressive symptom scores with features of the gut or vaginal microbiota, with limitations from sample size and self-report.[11] A 2025 meta-analysis reported associations between postpartum depression and specific gut microbial patterns, but studies remained heterogeneous in population, sampling, sequencing, and analysis.[12] Neither finding establishes a diagnostic signature for emergency maternity care.

Intervention evidence remains preliminary. The *Lactobacillus rhamnosus* HN001 trial reported lower postpartum depression and anxiety scores, but mental health outcomes were secondary.[13] A 2026 systematic review found four probiotic randomized controlled 'randomized controlled trials' trials involving 1,342 women. Some reported small benefits, but heterogeneity precluded meta-analysis and risk of bias was moderate or high.[14] Current evidence does not support routine probiotic supplementation for perinatal mental health, especially in emergencies. Microbiome studies also need standardized sampling, preservation, laboratory methods, and analysis.[15]

Biological evidence is therefore most useful for explaining possible pathways and shaping research questions. Biological abnormality should never be a prerequisite for mental health, nutritional, safeguarding, maternity, or social support.

Translating Evidence Strength into Emergency Action

Table 1 groups actions by readiness for routine emergency use. Implement Now covers established services and interventions that should be available within the emergency response. Integrate Now covers routinely obtainable social or clinical information that should be embedded in assessment and linked to a defined action in triage, safety planning, referral, treatment, or follow-up. Research Before Scale-Up covers approaches whose clinical value or feasibility remains unproven.

Figure 1 converts these criteria into a decision pathway. Technological complexity does not confer priority: a new approach should add clinically meaningful information beyond simpler, safer, and more equitable options, with its infrastructure burden weighed against displaced staff time and services.

Implement Now: Protect Essential Services And Response Pathways

This tier should not wait for new biosocial science. Antenatal and postnatal care should remain available, with perinatal mental health assessment linked to response, referral, and follow-up.[1,16] Plans should identify who assesses acute risk and where severe symptoms or suicidality are referred. They should also protect essential psychiatric treatment, psychological care, and follow-up after displacement.

MHPSS should connect directly with maternity care. WHO recommends community and social supports,

Table 1. Evidence-calibrated actions for perinatal mental health in emergencies

Evidence tier	Emergency action and workflow	Guardrail / progression criterion
Implement Now	Maintain antenatal and postnatal care; symptom assessment linked to response; integrated MHPSS, including trained and supervised community or peer support where appropriate; essential treatment continuity; safeguarding; and routes to food/nutrition and social support. Specify escalation, referral, and follow-up after displacement.	Deliver now with degraded-staffing plans. Monitor response, referral completion, urgent-review delay, treatment interruption, and referral downtime. Community or peer delivery requires training, supervision, role clarity, and escalation. No biomarker required.
Integrate Now	Embed actionable determinants into existing assessment: social support, violence, severe sleep disruption, infection/medical events, medication, obstetric history, food insecurity/dietary disruption, substance use where relevant, and access disruption. Record the action each item triggers.	Collect only clinically interpretable, routinely obtainable information linked to a defined decision. Use a brief minimum dataset in existing documentation; assess staff time, completeness, and whether the action can be delivered.
Research Before Scale-Up	Evaluate microbiome profiling, inflammatory or metabolomic panels, multi-omic prediction models, test-guided care, and carefully defined microbiome-targeted interventions.	Pre-specify added clinical value over a strong social/clinical baseline; externally validate; and assess decision impact, turnaround, staff time, cost, safety, reproducibility, access, and equity before implementation.

Abbreviation: MHPSS, mental health and psychosocial support. The tiers distinguish what should be delivered, what routine information should be made consistently actionable, and what requires additional evidence before scale-up. Feasibility and equity apply across all tiers.

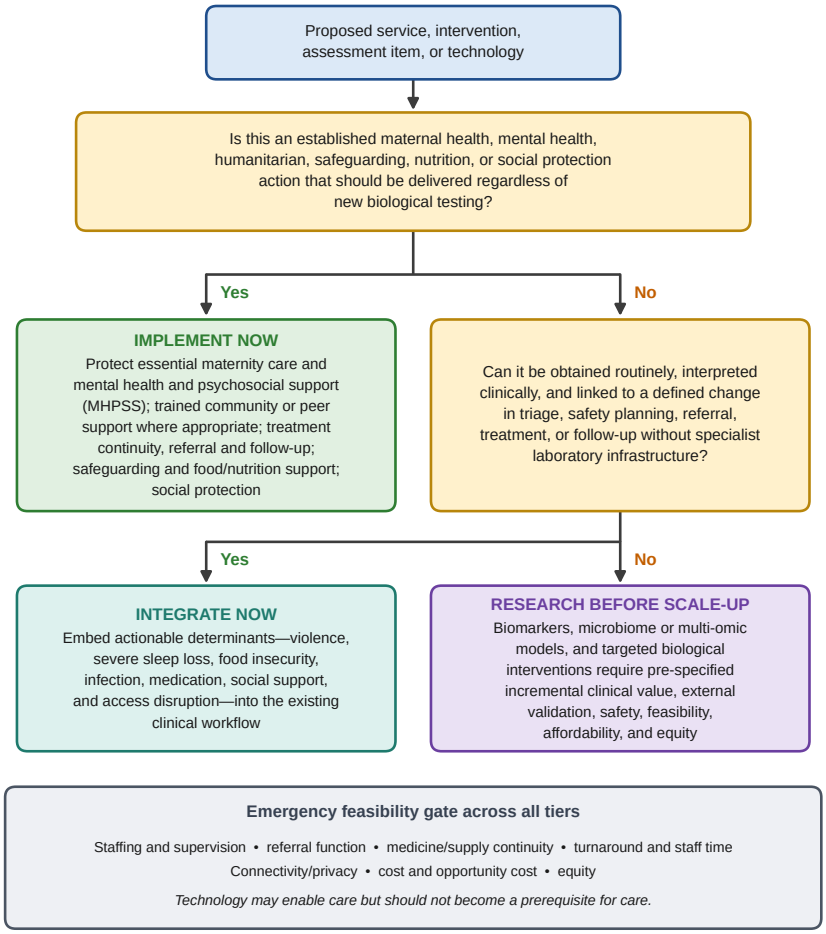


Figure 1. Evidence-calibrated decision pathway for emergency perinatal mental health action
The framework distinguishes established services that should be delivered, routinely obtainable determinants that should alter care, and approaches that require research before scale-up. Feasibility and equity are assessed across all tiers

psychological first aid, evidence-based psychological interventions, clinical care for priority conditions, and referral networks.[2] Where specialists are scarce, trained and supervised community health workers can provide low-intensity support, identify risk, support follow-up, and link women to care. Peer support may complement these functions where locally acceptable. Task sharing requires integration, training, supervision, and clear escalation for severe or complex presentations.[17,18]

Perinatal pathways should also link, where feasible, with newborn and child health, nutrition, and parenting support. Maternal mental health is associated with infant development, although evidence from low- and middle-income countries (LMICs) is heterogeneous and causality is difficult to isolate.[19] Maternal and child outcomes should therefore be considered together. Food security, safeguarding, and social protection belong in the same operational plan because they affect whether referrals can be used.

Integrate Now: Use Routine Determinants To Guide Care

Routine assessment can capture clinically relevant biosocial information without creating new technological dependencies. Social support, violence, sleep disruption, recent infection, medication use, obstetric history, dietary disruption, substance use where relevant, and changes in access to care can be documented with symptom assessment. Each item should have a pre-agreed action. Severe sleep loss may prompt reassessment; infection or obstetric complications may alter the differential diagnosis. Food insecurity may prompt social support, violence requires safeguarding, and displacement may change follow-up.

These items are better incorporated into existing maternity or emergency documentation than placed in a parallel checklist. A minimum dataset can record the determinant, whether it is active, the action triggered, and whether referral or follow-up was completed. Routine inflammatory markers and complete blood counts should not be used as proxies for psychological strain. When clinically indicated, they remain useful for medical assessment but are too nonspecific as stand-alone mental health indicators.[10]

Maintaining Minimum Viable Care Under System Disruption

Emergency plans should assume some loss of capacity. Staff shortages, rotation, supply interruptions, damaged referral networks, and competing priorities can collapse a

comprehensive pathway. A practical minimum is a short assessment linked to defined actions, a named route for acute risk, a current referral map, and documentation that survives staff turnover. Task sharing requires role clarity, supervision, and access to escalation.[16,17]

Continuity plans should protect functions that cannot safely stop: management of suicidality or psychosis, safeguarding, essential psychiatric treatment, urgent obstetric or medical review, and re-contact after displacement or facility closure. Where specialists are scarce, plans should define what trained maternity, primary-care, or community workers can do, what requires specialist review, and how handover occurs.

A small set of measures can show whether the pathway is working: response after positive assessment, referral completion, failed follow-up, time to urgent review, medicine interruptions, staff time, and referral downtime. Evidence comparing implementation strategies during emergencies is limited. Consolidated Framework for Implementation Research (CFIR) can assess fit, resources, workforce capacity, service conditions, and recipient needs.[20] Perinatal implementation evidence supports integration, adaptation, training, supervision, and stakeholder engagement.[17] Core therapeutic and safeguarding functions should remain intact, while delivery can be adapted. A Sierra Leone study provides a recent example of structured local adaptation.[21]

Operational details will vary by emergency. Outbreaks may require infection-control precautions and remote follow-up. Conflict increases safeguarding and confidentiality concerns and may require coordination with protection services. Displacement makes portable documentation, cross-site referral, and re-contact especially important. These are changes in delivery, not in the evidence threshold for each tier.[2,3]

Using Technology Without Making Access Technology-Dependent

Digital tools can extend reach when conditions allow. Messaging, telephone or video consultation, decision support, and remote supervision can maintain contact after displacement and connect non-specialist staff with scarce expertise. Digital interventions can reduce perinatal depressive symptoms in some populations, but evidence is concentrated in better-resourced settings and engagement and scale remain concerns.[22] Refugee telemedicine studies also report socioeconomic, cultural, technical, privacy, and access barriers.[23] Evidence for mobile health in emergency care in LMICs remains low quality.[24]

Technology should enable care, not determine access. A non-digital route is needed when connectivity, electricity, devices, data costs, language, privacy, or digital literacy make remote care unsafe or inaccessible. No point-of-care inflammatory, microbiome, or other biological test is established for routine diagnosis of perinatal mental health conditions in emergencies.[10-12] Digital systems also need a failure plan for platform, network, device, or specialist unavailability.

Research Before Scale-Up: Demonstrate Incremental Clinical Value

Microbiome sequencing, inflammatory or metabolomic panels, multi-omic prediction models, and microbiome-targeted interventions belong in research rather than routine emergency screening. Studies should pre-specify added value beyond symptoms, clinical history, obstetric findings, social determinants, and routine medical assessment. Relevant gains include better diagnosis or prognosis, treatment selection, risk classification, decision benefit, or maternal and neonatal outcomes. The minimum acceptable gain should be defined before analysis.

Prediction studies should report calibration, clinically relevant sensitivity and specificity, decision consequences, missingness, and subgroup performance. A modest gain in discrimination that does not change management may have little clinical value, while false reassurance and false-positive labeling are consequential where referral capacity is limited.

Prospective repeated-measures cohorts can test temporal relationships among exposures, symptoms, clinical events, and biomarkers. Derivation should be followed by external validation across settings that differ in geography, diet, infection burden, ancestry, and health systems. Mature tests or interventions can then be studied in pragmatic or hybrid effectiveness-implementation designs. Protocols should state how a positive result would change care.

Feasibility is part of clinical value. Studies should record turnaround time, unusable or missing samples, staff time, transport and storage failures, infrastructure downtime, costs, and access. Trials of probiotic, prebiotic, dietary, or other microbiome-targeted interventions should specify product or strain, dose, timing, background diet, concurrent medication, safety, and clinically meaningful mental health outcomes. Replication across populations should precede scale-up.[13-15]

Equity, Governance, And Transportability Across Settings

Biological embedding should not individualize structural harm. Poverty, violence, displacement, food deprivation, and disrupted services remain policy and protection failures even when they have measurable physiological effects. A biomarker is not a prerequisite for action, and perinatal mental health care should not depend on advanced testing. Integration and task sharing through trained and supervised maternal, primary-care, community, and mental health workers remain the more immediate priority.[16-18]

Biospecimen and digital research need proportionate governance. Linking mental health information with biological samples or remote-care platforms can create privacy, stigma, and surveillance risks, especially in displaced populations. Consent should address storage, secondary use, data linkage, future genomic or microbiome analysis, and cross-border sharing where relevant. Digital systems should minimize data collection and avoid exposing women to retaliation when disclosure of violence, pregnancy, or mental health contact could be unsafe.

Culture shapes how distress is expressed and disclosed. Screening tools should be validated or adapted for the population. Delivery may require changes in language, examples, provider, or setting without changing core therapeutic and safeguarding functions. Co-design with women and community representatives can improve fit. Traditional, faith, or community leaders may contribute where trusted, but should not replace evidence-based care, confidentiality, or referral.[21] Biomarker and digital models also need local validation.

Research Priorities For Emergency Perinatal Mental Health

Research should first test whether the framework improves service function. Outcomes should include recognition, documented action, referral completion, treatment continuity, linkage to protection and social support, patient experience, staff workload, and equity of reach. Emergency studies should test whether integration, task sharing, adaptation, training, supervision, and stakeholder engagement remain workable when staffing, supplies, or referral networks are disrupted.[17,18]

For food insecurity and other structural exposures, longitudinal studies can clarify temporal pathways. Integrated intervention studies can test whether material support combined with appropriate mental health care improves outcomes. Outcomes should include service access and material conditions as well as symptom scores.

For biomarkers and microbiome measures, repeated-measures cohorts should establish temporal stability and incremental predictive value before test-guided trials. Implementation should require prespecified clinical utility, external validation, feasible delivery under emergency constraints, acceptable cost, and equitable access.

Conclusion

Perinatal mental health during emergencies reflects interacting social, psychological, clinical, and biological processes. Emergency services can already protect maternity care, integrate MHPSS, strengthen referral, and connect women with food, protection, and social support. Routine determinants should change care when actionable. Minimum workflows should withstand staff shortages, disrupted referral, and supply failure. Digital tools may extend access but require non-digital alternatives. Biomarkers, microbiome profiling, multi-omics, and targeted biological interventions should remain in governed research until they demonstrate clinical value, feasibility, reproducibility, safety, affordability, and equity.

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Competing Interests

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