

Improving the Care of Hospitalized Children with Serious Infections and Severe Malnutrition

Results from Pediatric Hospital Improvement (PHI) Collaboratives in Three Developing Countries

Diana R. Silimperi, MD, Deputy Director, Quality Assurance Project (QAP)
University Research Co., LLC, 7200 Wisconsin Avenue, Suite 600, Bethesda, MD 20814
dsilimperi@urc-chs.com

Rationale for Hospital-focused Improvement in Pediatric Care

- The World Health Organization (WHO) estimates 10-20% of sick children treated according to IMCI strategy at primary care centers will need referral to first-level hospitals for life-threatening conditions (mostly serious common infections and severe malnutrition)
- WHO developed an evidence-based guide for treatment at first referral level hospitals in 2000 (WHO Referral Care Manual or RCM), but it has not been widely used
- WHO 7-country study (2000-2001) of hospital care of children with serious infections and malnutrition indicated a need for focused attention on first level referral facilities as an important component of the continuum of care
- Improved care for referred children will reinforce implementation of IMCI and improve the continuum of care for sick child

What Is an Improvement Collaborative?

A collaborative is an organized effort of shared learning by a network of facilities (or teams) to:

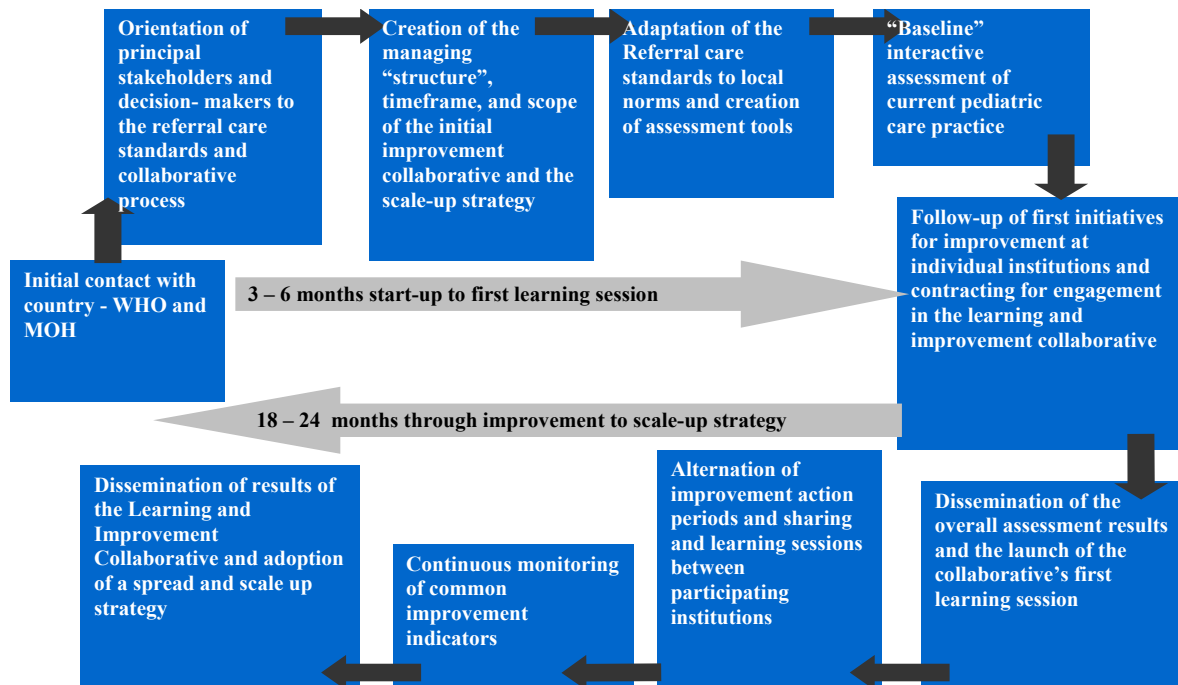
- Adapt to their local situations a known, best practice model of care (e.g., RCM) for a specific priority health problem (e.g., serious infections and severe malnutrition in < 5 years old)
- Achieve significant results in a short period of time (12-18 mos.) and thus reduce the gap between best and current practice
- Scale up the adapted model throughout the health system using an intentional spread strategy

Aims of the Pediatric Hospital Improvement Collaborative

- To improve the quality of care for hospitalised children (under 5 years of age) with serious infections and severe malnutrition through the application of evidence-based standards
- To improve the recognition and management of emergency conditions in children
- To decrease hospital case fatality rates per condition and hospital death rates of children under 5 years
- To increase efficiency of care and decrease management costs of serious infections

Who Are the Collaborators?

- Pediatric improvement teams within and across hospitals (doctors, nurses and associate nurses; other hospital staff involved with pediatric care)
- Hospital leaders/management (Hospital Director, Head Matron, In-charge Nurse/Pediatric ward, QA Committee members)
- District or regional health leaders



Timeline of the QAP Pediatric Hospital Improvement (PHI) Collaborative

- 2001: QAP participates in WHO/Southern Africa meeting to initiate discussion on current hospital care for sick children and role of quality improvement (QI)
- 2002: QAP participates in WHO/AFRO meeting in Uganda to review current hospital care practices in Africa
 - Participants recognize need for more systematic approach to improve pediatric care such as formalized assessment, implementation of WHO's Referral Care Manual (RCM) guidelines and application of quality improvement methods
 - 11 countries make plans to initiate efforts to improve pediatric care in hospitals
 - QAP launches PHI with initial assessment in Eritrea
- 2003: QAP co-facilitates with WHO/AFRO meeting in Niger to review current hospital care practices in Francophone Africa
 - Participants agree on need for more systematic approach to improve pediatric care such as use of assessment, RCM guidelines and QI
 - Six countries make plans to initiate PHI
 - QAP undertakes PHI Assessment in Niger and PHI Nigerien Collaborative initiated in 14 hospitals
 - Kenya and Zimbabwe Assessments completed
 - Emergency Triage, Assessment and Treatment (ETAT) TOT courses held in Kenya (WHO) and Eritrea (QAP)
 - QAP performs PHI assessments in Niger, Nicaragua and begins Collaborative Improvement Sessions in Eritrea, Niger and Nicaragua
- 2004: QAP and WHO facilitate ETAT Regional TOT in Malawi
 - QAP facilitates Malawi PHI Assessment, and ETAT/PHI Collaborative initiated
 - QAP assists Tanzania and Nigeria to plan assessments and initiation of PHI collaborative as well as Kenya to make plans to implement PHI
 - QAP performs PHI assessments in Guatemala and Malawi

How Does an Improvement Collaborative Work?

Quality Improvement methods are at the core of the collaborative approach, which:

- Combines technical content knowledge with improvement knowledge to change the process of care (QI)
- Uses rapid cycle improvement (plan-do-study-act or PDSA)
- Emphasizes rapid implementation of small changes: “What will you do by next Tuesday?”
- Builds on successes
- Promotes implementation of a common set of core “changes” in both inputs and processes:
 - Guidelines, job aids, essential equipment and drugs
 - Provider knowledge and skills
 - Clinical processes: triage, assessment and treatment, patient monitoring, supportive care, counseling, discharge
- Relies on continuous self-measurement to see if changes bring improvement
- Shared learning among networks of health care teams, permitting each team to learn from work of the others (not re-invent the wheel) and more rapid progress
- Value added of multiple teams (facilities) working on same problem
- Peer group provides motivation for QI work and facilitates spread of improvements
- Changes are facility-based, clinical service driven and actively engage facility staff in improvement strategies

Traditional quality improvement vs Collaborative improvement

Traditional	Collaborative
Each team independent	Multiple teams achieving accelerated improvement propelled by: <ul style="list-style-type: none"> ● Motivation to share successes and experiences with peers ● Greater problem-solving efficiency ● Systematic inter-team sharing of experiences
Multiple topics for improvement	Common improvement aim (care model, evidence-based standards)
Diverse measurements for each team-selected topic of improvement	Common set of indicators
Single improvement action or change	Package of changes predetermined by TAG
Informal sharing of lessons, better practices, and benchmarking	Organized, systematic sharing
Limited spread or scale up	Intentional, planned spread strategy

A Collaborative is Organized into Improvement/Learning Sessions & Action Periods

- Pre-Work Phase
- Five or Six Improvement or Learning Sessions
- Five or Six Action Periods (intervals between Learning Sessions, during which teams implement improvements)

Organization of the PHI Improvement Collaborative

- 6-14 collaborating hospitals in each country using quality improvement and collaborative learning to improve quality of pediatric hospital care of common conditions according to evidence-based standards for first referral level hospitals
- During the course of 18-24 months, teams of providers at each hospital will have met 4-6 times to:
 - Enhance technical knowledge and skills required for implementing care according to standards
 - Enhance QI knowledge and skills to change work processes in order to operationalize standards of care based on evidence
 - Examine improvement results (and underlying changes which resulted in improvement) using a core set of common indicators
 - Learn from each other about best practices (as tested and measured for success)
- Anticipated scale-up to all or most hospitals in country within 2-3 years

PHI Implementation Status

Country	Status	Country Scale Up Goal
Eritrea	10 hospitals in 4 <i>zobas</i> representing 74 % of country population	19 hospitals in 6 <i>zobas</i>
Nicaragua	6 hospitals in 6 regional health systems (SILAIS), representing 35 % of country population	21 hospitals in 17 SILAIS
Niger	<ul style="list-style-type: none"> • 6 national/regional hospitals • 8 district hospitals in 8 districts, representing 25 % of country population 	<ul style="list-style-type: none"> • 10 national/regional hospitals • 33 district hospitals
Malawi	<i>Interactive assessment underway</i>	
Guatemala	<i>Interactive assessment underway</i>	
Nigeria	<i>Planning stage</i>	
Kenya	<i>Planning stage</i>	

Key Activities in the PHI Pre-work Phase

- Selection of clinical area for improvement
- Agreement on implementing structure, link with existing structures (IMCI Working Group)
- Selection of Expert or TAG/ Working Group and Planning/Steering Committee, leadership
- Adaptation of Referral Care Manual
- Interactive Assessment of current practices (baseline)
- Development of indicators
- Identification of partners
- Selection of facilities, and establishment of facility teams
- At the conclusion of the assessment, the hospital identifies immediate, rapid improvements that can be made with existing resources and agrees on action plan
- Assessment results used to focus improvement collaborative

Activities of the PHI Learning or Improvement Sessions

- Current practices analyzed
- Improvement effort prioritized
- Technical and QI guidance
- Country-wide improvement plans and indicators adopted
- Quarterly opportunity to report on activities, methods, results, and lessons learned
- Challenges and successes are shared

PHI Improvement Session Content*

Session #1	Aggregate results of baseline assessment (Collaborative approach, aims, develop flow diagram of care processes (e.g., ETAT))
Session #2	ETAT, Patient Monitoring, PDSA cycle, measuring improvement, indicators
Session #3	Pneumonia, Fever, Support system (oxygen), Indicators, team work
Session #4	Malnutrition, Nutrition/Feeding, Counseling, Cause analysis, other QA tools
Session #5	Diarrhea, HIV, Support systems (fluids), institutionalizing best practices
Session #6	Best practices, plan/intentional spread

*variation in topics between countries based on priority focus areas and PHI team needs

Activities of the PHI Action Periods (within each participating hospital)

- New ideas for change/improvement activities are tested using QI methods (PDSA cycles)
- Hospital pediatric improvement teams track and report on indicators monthly
- Results are shared with the full group of Collaborative members every three months
- Actual change process occurs here

Objectives of the Interactive Assessment of Pediatric Care in Hospitals

- Identify current practices and how they compare with WHO RCM guidelines for care of serious infections and severe malnutrition
- Introduce evidence-based guidelines in RCM
- Improve the knowledge and case management skills of hospital providers, and foster links between hospitals
- Use findings to initiate rapid quality improvements and begin QI collaborative

Standards of Pediatric Care Used in the Assessment

- Assessment was based on guidelines from WHO referral care manual (RCM),¹ adapted to each country.
- Manual provides evidence-based case management guidelines on the inpatient management of the major causes of childhood mortality (linked with IMCI conditions):
 - Emergency triage, assessment and treatment (ETAT)
 - Assessment and diagnosis

¹ *Management of the child with a serious infection or severe malnutrition: Guidelines for care at the first-referral level in developing countries* (2000)

- Cough or difficult breathing (pneumonia – very severe, severe and non-severe; pleural effusion and empyema, cough or cold, conditions presenting with stridor, pertussis, tuberculosis, foreign body inhalation, heart failure)
- Diarrhea (acute with severe dehydration, some dehydration and no dehydration; persistent – severe persistent and non-severe persistent), and dysentery)
- Fever (malaria- severe and non-severe), meningitis, measles, sepsis, typhoid fever, ear infection, including mastoiditis, urinary tract infection, septic arthritis and osteomyelitis, and dengue hemorrhagic fever)
- Young infants (serious bacterial infections, local bacterial infections, diarrhea, ophthalmia neonatorum and hypothermia)
- Severe malnutrition
- HIV/AIDS
- Supportive care(nutritional management, fluid management, management of fever, management of anemia, oxygen therapy)
- Patient monitoring
- Counseling and discharge

Interactive hospital assessment methodology

Selection criteria for hospitals:

- 1) Presence of IMCI at primary care level in district
- 2) Epidemiology of childhood illnesses in the district
- 3) Geographic accessibility to facilitate technical assistance during the first phase of the collaborative
- 4) MOH or USAID priority facilities or area
- 5) Expressed interest at hospital

Assessment teams

- Composed of 3-4 practitioners, including a pediatrician, general practitioner, and nurse
- Each team assesses multiple hospitals (2 per week), including at least one regional hospital
- Spend 2.5-3 days onsite, including night shift
- Focus on inpatient care of children < 5 years

Data collection methods

- Direct observation of cases
- Review of current records and nursing notes
- Interviews with providers, managers and mothers/caretakers
- Onsite inventory and site inspection
- Past record (chart) reviews
- Case simulations

Units of analysis

- Hospital
- Children 0-59 months with specific condition (inpatient)

Assessment Based on Key Processes: Sections of the Guidelines

Support systems
Emergency care (*direct observation*)
Inpatient care of common conditions (*direct observation*)
Newborn care (*direct observation*)
Care of sick young infant (*direct observation*)
Monitoring and DC
Feeding and baby friendly services
Mother/Caretaker involvement
Child friendly services
Access to care

Example: Levels of Assessment

- **Key Process or Function (section):** Inpatient care of serious infection or malnutrition
- **Sub section:** Care of child with cough or respiratory condition
- **Standard:** Severe pneumonia is correctly assessed and diagnosed in patients 2 mos. – 5 years according to the RCM
- **Criteria:** Assessment is based on chest indrawing, respiratory rate, presence of central cyanosis and the child's general condition

Scoring

- Performance was scored at three different levels:
 - *Strong improvement* [SI], when poor performance could be life threatening or have serious adverse consequences.
 - *Some improvement needed* [I] when adherence to standards is not rigorously applied; however, lack of adherence does not jeopardize life or cause serious morbidity;
 - *Good performance according to guidelines* [G] when performance is according to standards.
- Scores were determined by team consensus, based on all relevant data sources.
- Summary performance scores were given for all criteria corresponding to each norm or standard, as well as for categories of case management (i.e. management of febrile conditions), and for each section of the assessment (i.e. overall case management of common conditions).
- Detailed commentary was recorded, to provide the rationale for each performance score
- Scores were then used to select functional areas to focus improvement activities

Interactive Assessment Results: Eritrea, Nicaragua, and Niger

Overall

- 800+ children were directly observed in 39 hospitals in the three participating countries
- Children receiving treatment according to the guidelines ranged from about 6% in Niger to 45% in Nicaragua.
- In all countries, case management of diarrhea/severe dehydration (especially in severely malnourished child) and of severe malnutrition needed significant improvement
- Major areas requiring improvement included:
 - Emergency triage, assessment and treatment,
 - Patient monitoring, and
 - Nutritional support for hospitalized children
- Most of the improvements identified required better use of existing resources, and should result in cost savings as well as improved clinical outcomes
- Most hospitals did have essential drugs and lab, though functioning essential equipment was less common
- Oxygen supply and/or correct use was lacking in most hospitals in all countries

Management of emergencies

- Triage system present in very few hospitals
- Out of 39 hospitals assessed in 3 countries, only one hospital in performed according to RCM emergency case management standards of care
- Inadequate training and job aids (ie. Clinical algorithms) to help providers adhere to standards
- Poor patient layout and flow and inadequate access to other critical services in most hospitals
- Essential pediatric emergency care equipment lacking or not functioning in many hospitals
- Essential supplies and medicines not rapidly accessible or available where needed in most hospitals

Support systems

- Essential equipment was available in over half the hospitals in Niger and Nicaragua, though it was lacking in Eritrea.
- Essential drugs were available at over half the hospitals assessed in each country, though drugs were not always found where needed in Niger and Eritrea
- Essential laboratory exam services were available most of the time in Nicaragua but less so during evening hours and weekends for Eritrea and Niger
- Infection prevention was irregularly and/or inconsistently practiced at hospitals in all three countries

Number of Hospitals Performing According to Standards (i.e., Receiving a Score of “Good Performance”)

	Eritrea	Niger	Nicaragua
--	----------------	--------------	------------------

	Eritrea	Niger	Nicaragua
Support Systems	5/18	0/14	3/6
Emergency Care	0/19	1/14	0/6
Case Management of Common Conditions	2/19	0/14	0/6
Newborn Care	5/17	2/11	6/6
Sick Young Infant [7 Days-2 Months]	2/11	2/13	0/6
Feeding, Nutrition	3/19	1/14	0/6
Mother Involvement	9/19	1/14	2/6
Child Friendly Services	5/19	1/14	4/6
Monitoring And Discharge	3/19	0/14	0/6
Hospital Systems	4/19	2/12	0/6
Access To Care	8/18	3/13	2/6

Assessment scores by country of case management of serious infections and severe malnutrition (by condition)

Condition	Eritrea			Niger			Nicaragua		
	Good	Needs Significant Improvement	# cases	Good	Needs Significant Improvement	# cases	Good	Needs Significant Improvement	# cases
Cough	34%	23%	56	14%	43%	28	54%	14%	78
Diarrhea	13%	55%	31	0%	76%	45	41%	52%	58
Fever	17%	13%	23	10%	61%	51	65%	0%	17
Malnutrition	20%	36%	36	3%	72%	32	26%	30%	46

Unit of analysis: child/condition

Illustrative PHI Achievements To Date: Eritrea

Initial Improvement Focus Areas: Emergency, Nutrition, Patient Monitoring

Emergency Triage, Assessment and Treatment (ETAT)

- Initiated triage system to rapidly identify and treat children with emergency signs (every child to be “triaged”)
- Established emergency treatment area at first contact sites (stabilization and procedure space) in First Aid, OPD and/or pediatric wards
- Organization of emergency meds, supplies and equipment (emergency “kits”)
- Initiated on-site training of staff in emergency treatments according to guidelines
- Initiated measurement of ETAT indicators

Pediatric Inpatient Feeding

- Food Committee established
- Weekly pediatric feeding program (menu) established (cooks taught, hospital administrator approved budget to buy food appropriate for pediatric diet)
- Daily supervision of feeding initiated in all pediatric wards
- Feeding monitored by pediatric ward head nurse or hospital matron
- Doctors write feeding orders

Patient Monitoring

- Vital sign/monitoring charts introduced
- Initiated monitoring of respiratory rates in children with severe pneumonia and using rates to monitor response to treatment
- Discharge orders formalized

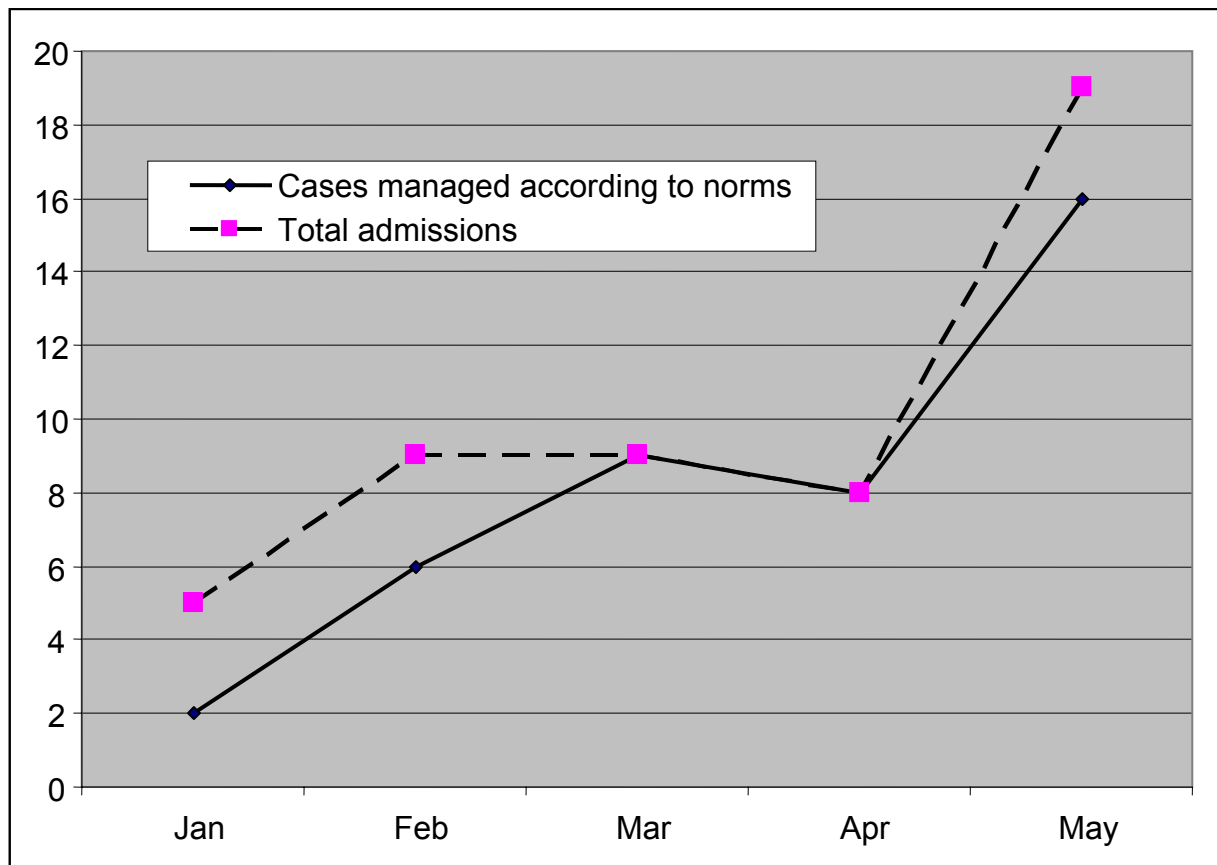
Illustrative PHI Achievements To Date: Nicaragua

Initial Improvement Focus Areas: Case Management of Pneumonia and Patient Monitoring/Discharge

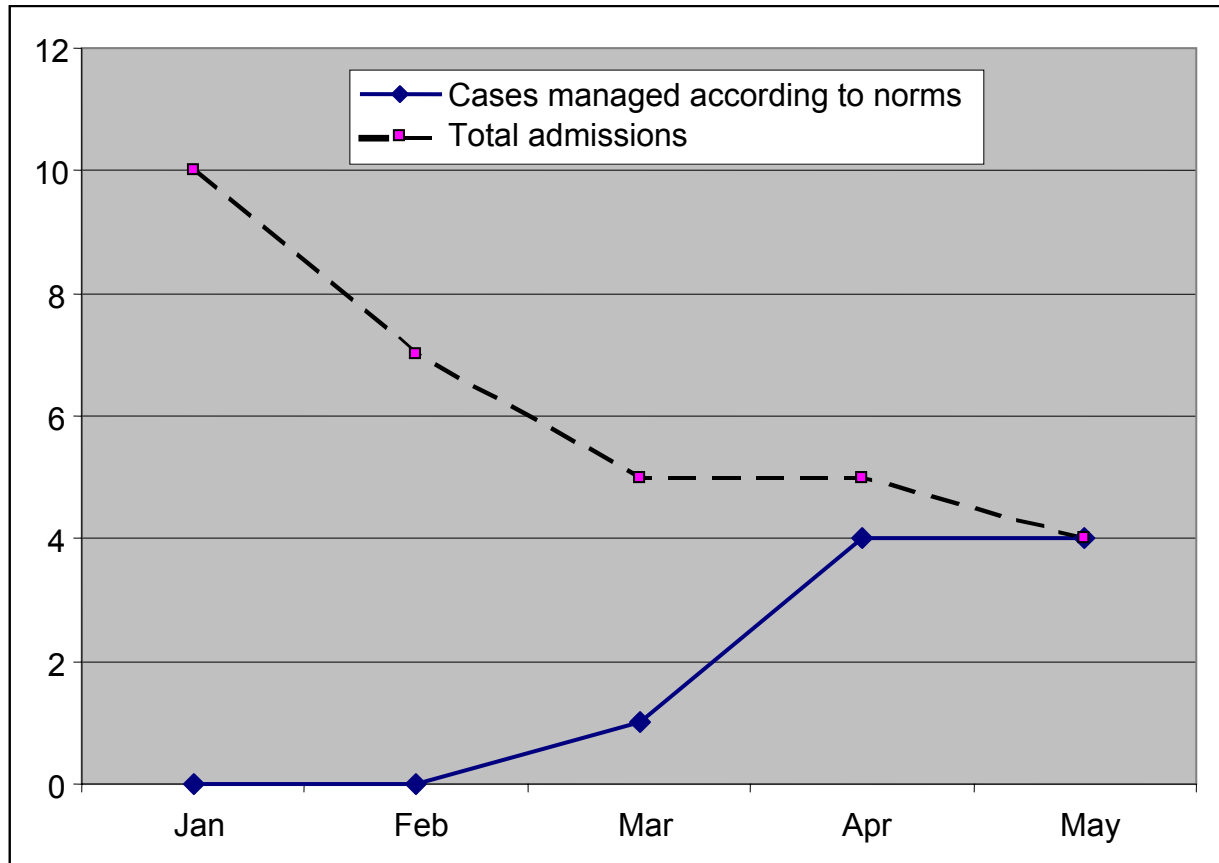
This is one of the childhood illnesses in which hospitals have achieved improved monitoring and case management of patients based on the clinical criteria defined by the guide. We can observe in both hospitals illustrated below, a continued increase in adherence to norms to guarantee adequate medical and nursing care for the severe and very severe pneumonia patient, with the Chinandega team achieving 100% adherence.

Interventions mentioned: monitoring

Number of children 0-59 months admitted with severe pneumonia managed according to norms at Chinandega Hospital.

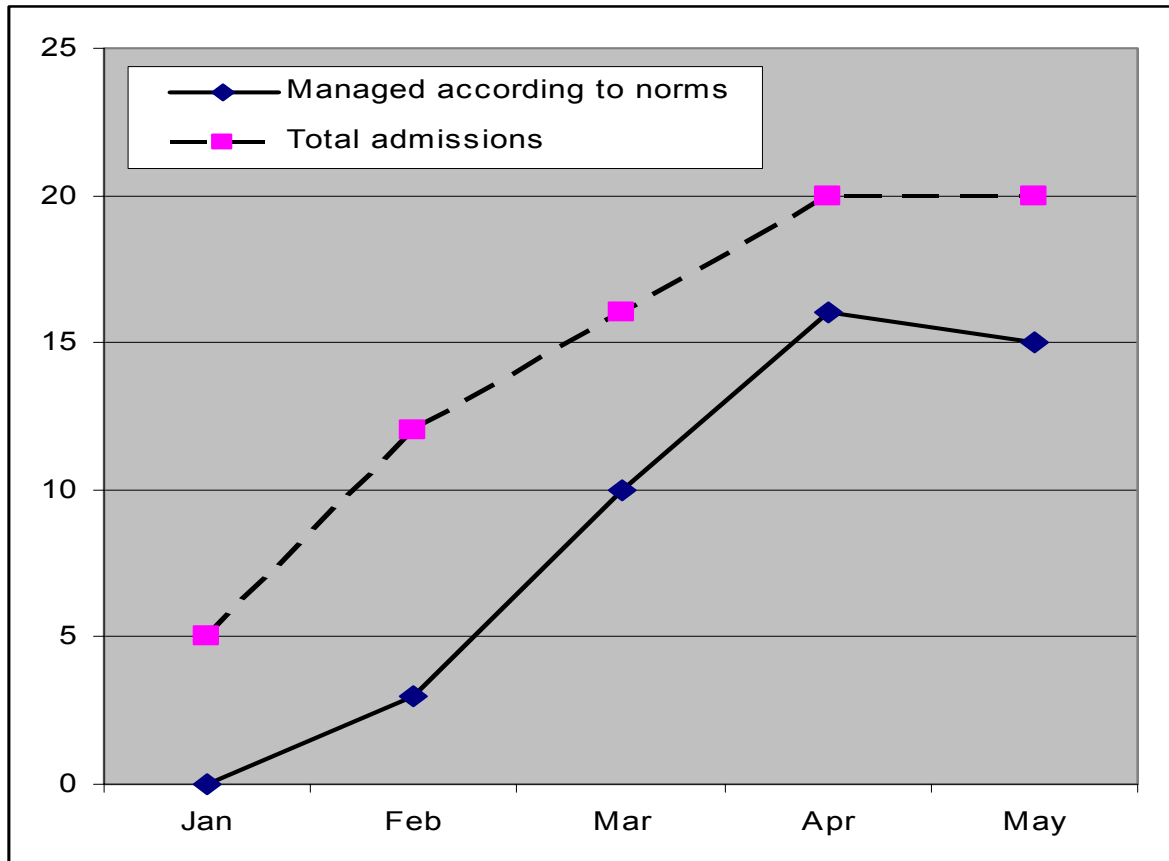


Number of children 0-59 months admitted with severe pneumonia managed according to norms at Estelí Hospital.



All the hospitals have made changes to their emergency services, especially organisational changes, such as staff training, with the objective of guaranteeing the emergency care of patients. Here, the improvement in care is slow but evident.

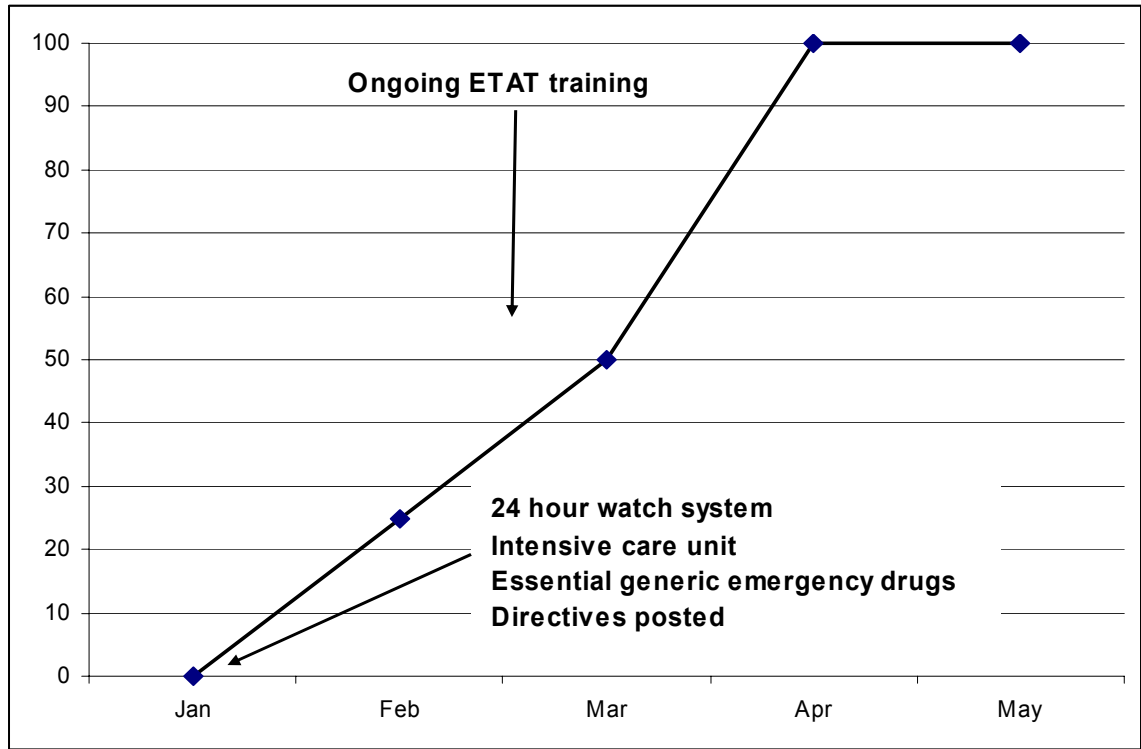
Percentage of children 0-59 months admitted with emergency signs who were managed according to norms, Chinandega Hospital



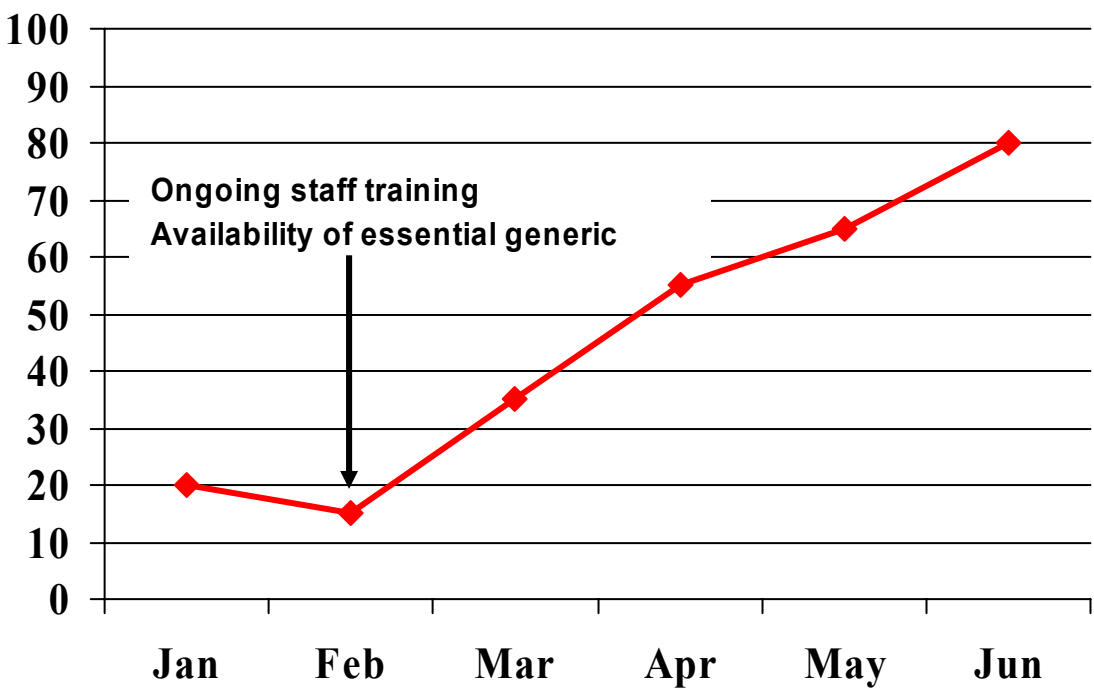
Illustrative PHI Achievements To Date: Niger

Initial Improvement Focus Area: ETAT

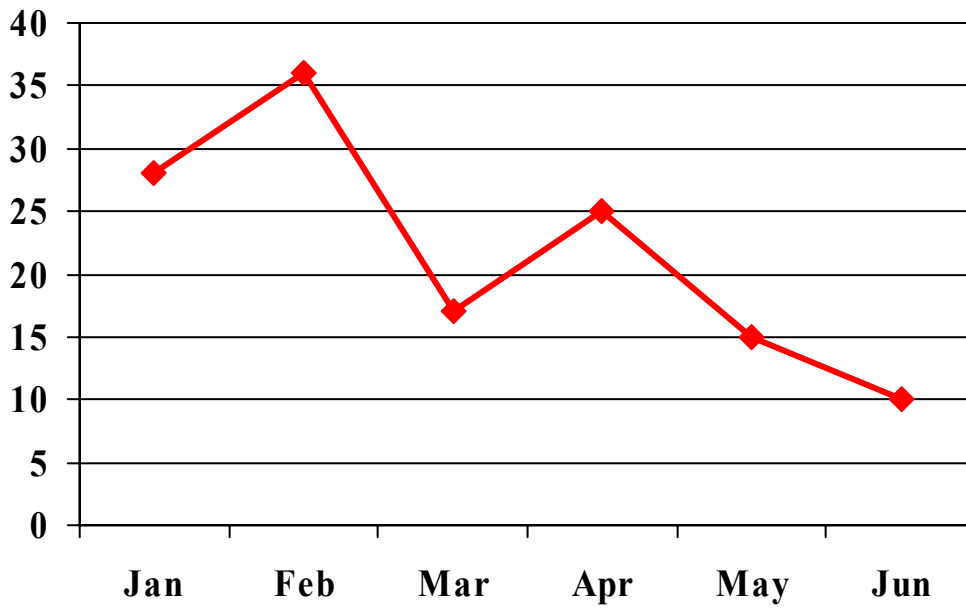
Percent of children 0-59 months who were managed according to norms, Poudrière Regional Hospital (Oct 03 - Jun 04)



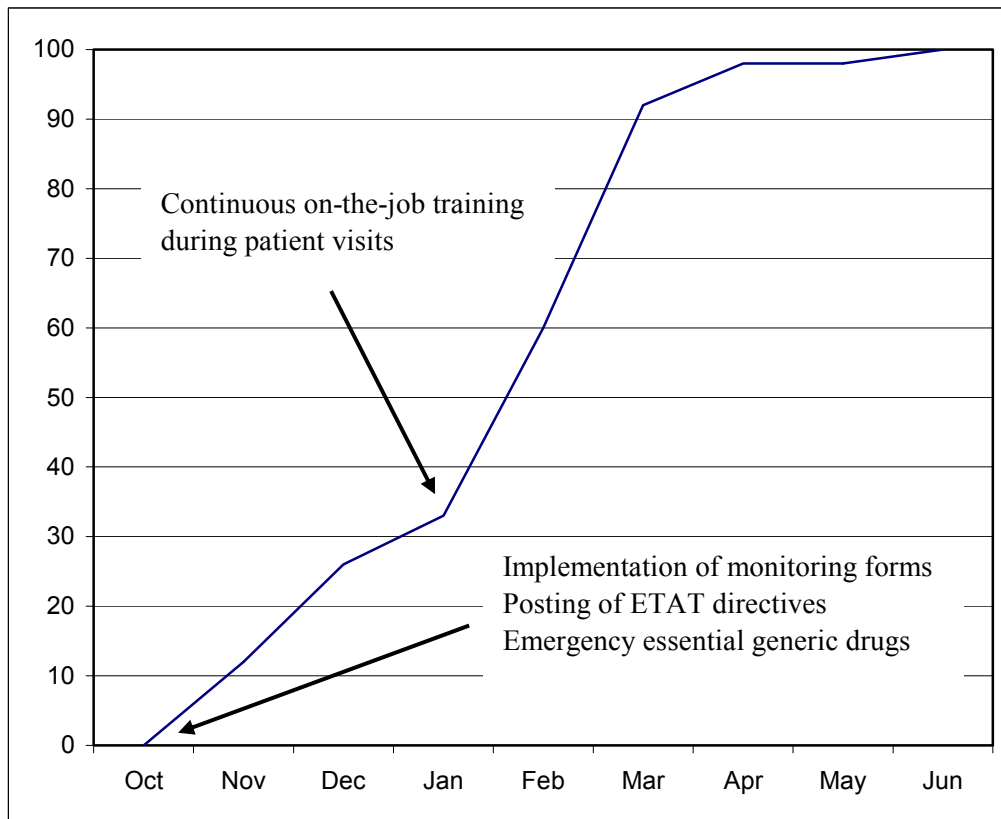
Percent of children 0-59 months admitted for meningitis who were managed according to norms, Niger Hospital (Dec 03 - Jun 04)



24-hour death rate among children 0-59 months admitted in ER, Maradi Regional Hospital (Jan - May 2004)



Percent of children 0-59 months who were managed according to emergency norms, Poudrière Regional Hospital (Oct 03 - Jun 04)



Percent of children 0-59 months who were managed according to norms, Niamey National Hospital (Jan – May 04)

