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**Maternal and Child
Survival Program**

Management of Sick Young Infants 0–2 Months of Age in the Private Sector in Nepal

Results of a National Survey of Medicine Shops and Clinics

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Background

In Nepal, neonatal mortality accounts for 54% of deaths among children under age 5, with neonatal infection (sepsis) being one of the leading causes. The private sector treats the largest proportion of childhood illness cases. However, nationally representative data on the quality and appropriateness of care provided in the private sector for sick young infants are limited.

In 2017, USAID Nepal asked the Maternal and Child Survival Program (MCSP) to coordinate a large, nationally representative survey to obtain a more definitive picture of private sector outpatient care for possible severe bacterial infection (PSBI) among newborns and young infants. Study partners included the Child Health Division (CHD) of the Ministry of Health and Population, USAID, and New ERA.

Survey Objectives

The survey aimed to document the appropriateness of care that private medicine shops and clinics in Nepal provide for PSBI in sick infants ages 0–2 months. The specific objectives were to:

- Characterize the current practices of service providers in private medicine shops and clinics in the assessment, treatment, referral, and follow-up of sick young infants;
- Compare these practices with nationally and globally recommended practices; and
- Identify factors that influence providers' practices that could be amenable to improvement efforts.



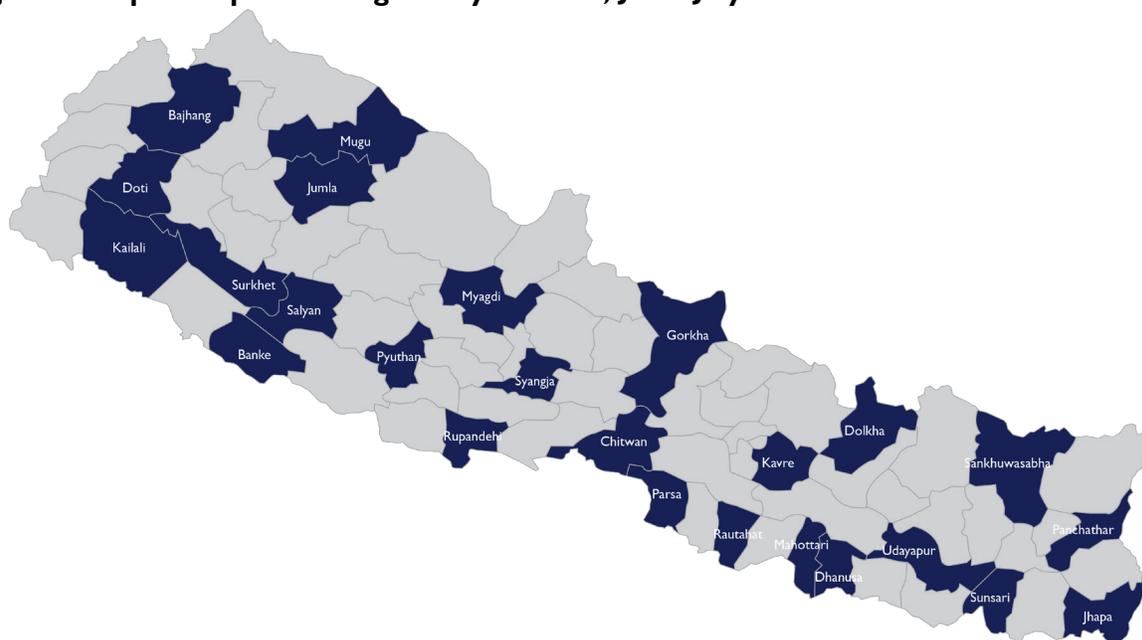
Photo credit: Save the Children

Methods

Researchers conducted the survey in a representative sample of 25 districts in Nepal between June and July 2017 (Figure 1). Researchers divided medicine shops in each district into three strata: proximal (within 30 minutes of the identified referral hospital), semi-proximal (30–60 minutes from the hospital), and remote (more than 1 hour from the hospital). In total, the survey targeted 400 medicine shops and 150 physician-run private clinics¹ that managed cases and provided antibiotics for sick young infants. The researchers conducted initial screening interviews with providers at 501 shops, and omitted 101 shops because they had not treated sick young infants in the previous 6 months. Ultimately, researchers interviewed 400 shops that managed and treated sick young infants with antibiotics. Of these, 200 were proximal, 100 were semi-proximal, and 100 were remote. Researchers completed only 82 interviews with providers at physician-run private clinics because the number of such clinics was unexpectedly limited (particularly in the more rural hill and mountain districts) and because some physicians were not willing to consent to an interview.

¹ The private clinics were not stratified.

Figure 1. Map of Nepal showing survey districts, June–July 2017



Analysis

Criteria for assessment, treatment, referral, and follow-up were defined in order to characterize appropriate management of sick infants ages 0–2 months with PSBI (Table 1). Weights were applied in the analysis of medicine shops following the standard method to make a nationally representative sample.

Operational Definitions

Medicine shops:

- The shop sells medicine with and without prescriptions.
- The service provider treats sick young infants with antibiotics.
- The main service provider is not a physician.

Private clinics:

- A physician is the main provider to examine and treat patients or visits the clinic at least 4 days/week.
- The service provider treats sick young infants with antibiotics.

Table 1. Criteria for appropriate management of sick young infants 0-2 months

Domain	Criteria for assessing appropriateness
Assessment	<ul style="list-style-type: none"> • Can cite at least four (out of seven) correct signs of PSBI • Uses Integrated Management of Neonatal and Childhood Illnesses (IMNCI) guidelines for assessment • Uses appropriate equipment (timer/watch or stethoscope and thermometer) • Assesses at least four signs of severe illness, per WHO/IMNCI protocol
Treatment with injectable antibiotics	<ul style="list-style-type: none"> • Correctly identifies indications for injectable antibiotic (at least four signs) • Uses gentamycin/ampicillin as first-line injectable antibiotic • Reports not using injectable steroids for PSBI cases • Follows correct weighing procedure • Correctly determines dose, frequency, and duration of antibiotics
Referral	<ul style="list-style-type: none"> • Can cite at least four signs of severe illness indicating referral • Administers appropriate injectable antibiotics before referral • Facilitates referral (e.g., by organizing transport or calling ahead to receiving facility)

Domain	Criteria for assessing appropriateness
Follow-up	<ul style="list-style-type: none"> Follows up non-referred cases on at least days 3 and 5 of treatment Before starting treatment, gives parents or guardians appropriate advice on danger signs and when to return for follow-up Takes action to contact infants who do not return for treatment as expected (by calling by phone or sending someone to speak to family)

Findings

Profile of medicine shops and private clinics

- Most medicine shops (84%) were staffed by paramedics; almost 70% had a community medical assistant or health assistant; 8% had a pharmacy assistant.
- Only 55% of medicine shops were registered with the Department of Drug Administration (DDA); in peripheral and remote areas, the proportion registered was much lower (Table 2).
- Almost all medicine shops (95%) reported being open 7 days/week, and over 75% reported being open at least 11 hours/day. The majority (90%) of medicine shops did not have a physician available at any time, and 10% had a visiting physician.
- About 15% of medicine shop providers reported also working in public-sector health facilities. The percentage was higher among clinic physicians: 34% reported working in public-sector health facilities. In addition, 33% of clinic physicians reported work in other private hospitals or clinics.
- Participation in IMNCI training was reported by 27% of medicine shop providers and 49% of clinic physicians. Medicine shop providers in remote areas were less likely than were those in proximal areas to have IMNCI training.

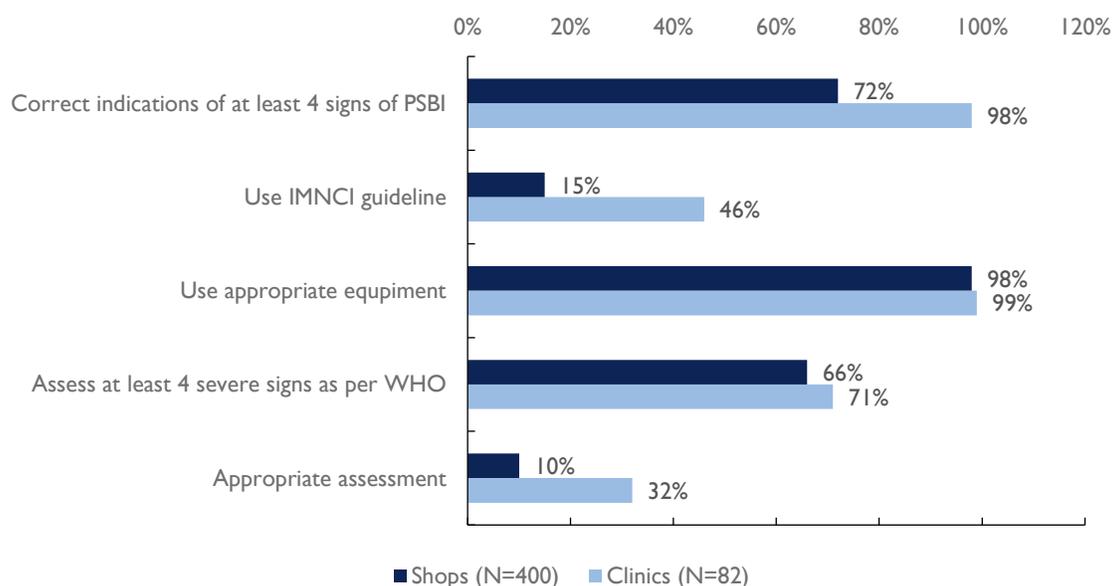
Table 2. Profile of medicine shops and clinics

Variable	Medicine Shops				Clinics
	Proximal	Semi-proximal	Remote	Total	
DDA registration	74%	36%	34%	55%	NA
Paramedics as service providers	82%	86%	84%	83%	NA
Open 7 days/week	98%	96%	90%	95%	83%
Training in IMNCI	33%	23%	20%	27%	49%

Management of sick young infants

- Both clinic physicians and medicine shop providers reported managing sick infants under 2 months of age in the previous 6 months, although their caseloads were highly variable. The higher caseloads were concentrated among a relatively small number of providers. For example, although the mean number of young infants seen by medicine shops in the previous 6 months was 53, 56% of shops reported having seen fewer than 20 patients. Clinic physicians managed about twice as many sick young infants as did the medicine shops (mean of 105 cases), and two-thirds of clinic physicians had treated 20 or more cases in the previous 6 months.
- The number of infants under 1 month old treated at medicine shops and clinics in the previous 6 months was considerably lower than the number of infants under 2 months old (mean of 17 cases reported for medicine shops and 41 for clinics). Thus, the majority of sick infants seen in medicine shops and clinics were between 4 and 8 weeks old.

Figure 2. Adherence to appropriate assessment criteria for sick infants ages 0–2 months among private shops and clinics



Assessment

- Clinic physicians were considerably more likely than medicine shop providers were to report using IMNCI manuals (46% vs. 15%) and the Internet (28% vs. 12%), and they were somewhat more likely to report using course books (49% vs. 36%). Both clinic physicians and medicine shop providers also reported using the Current Index of Medical Specialties (CIMS) (28% and 37%, respectively). Medicine shop providers in remote clusters were least likely to report using IMNCI manuals, CIMS, or the Internet, and more than one-fourth (28%) did not use any reference materials.
- Most providers (80%–90%) reported routinely assessing temperature, respiratory rate, and breathing. Only 72% of medicine shop providers cited at least four PSBI signs, compared to 98% of clinic physicians (Figure 2).
- The majority of medicine shop providers and clinic physicians reported using appropriate equipment (stethoscope, thermometer, and respiratory rate timer/watch) to assess sick young infants (Figure 2). Medicine shop providers were less likely to use pulse oximeters to assess infants, compared to clinic physicians (14% vs. 70%).
- Overall, just 10% of medicine shop providers and 32% of clinic physicians met the criteria for appropriate assessment of sick young infants. The largest gaps in performance were in use of the IMNCI guidelines and assessment for at least four signs of severe illness (Figure 2).

Treatment

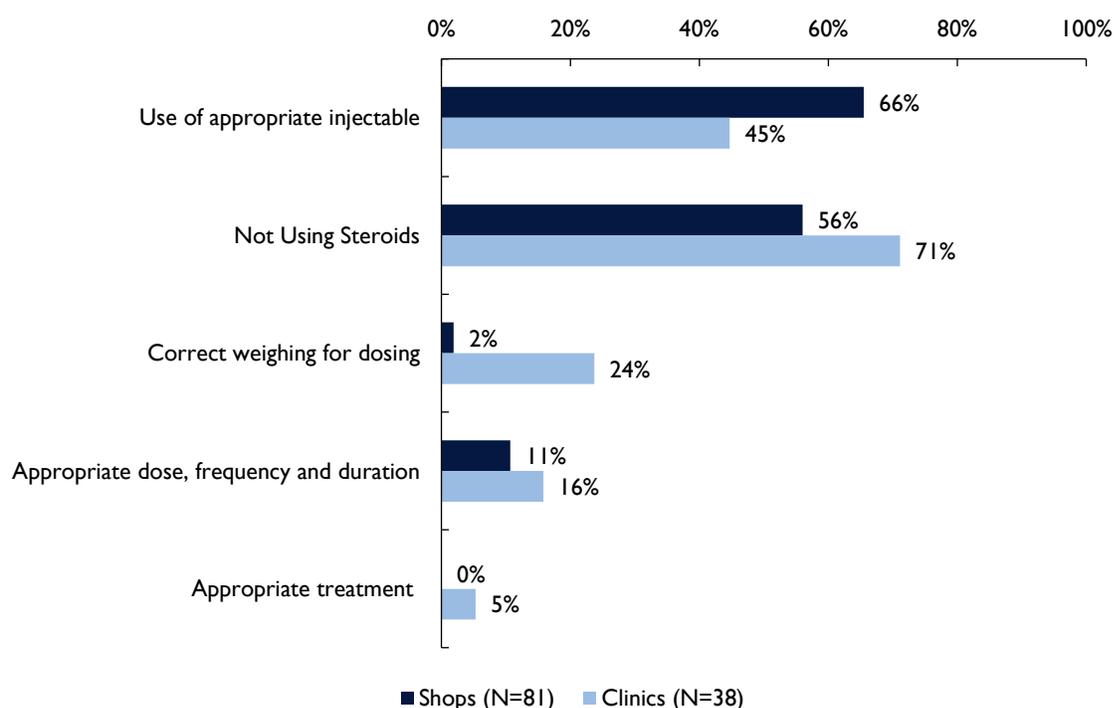
- Almost all providers reported giving oral antibiotics for PSBI in the previous 6 months. Twenty percent of medicine shop providers and 46% of clinic physicians said they used injectable antibiotics. A higher proportion of medicine shop providers in remote areas reported using injectable antibiotics (36%), compared to providers in proximal and semi-proximal areas (14% and 17%). Bronchodilators were commonly used (43% for both medicine shop and clinic providers): use was higher among medicine shop providers in proximal areas (50%) than among those in remote and semi-proximal areas (34% and 37%, respectively).
- About 21% of clinic physicians and 11% of medicine shop providers reported that they had used injectable steroids for treating sick young infants, and reported they most often did so “when the child has signs of critical illness.”
- The majority of providers reported prescribing amoxicillin² as the first-line treatment (69% of medicine shop providers and 82% of clinic physicians). Medicine shop providers in remote areas were more likely (75%) than providers in proximal (55%) and semi-proximal (66%) areas to report using amoxicillin.
- Gentamycin and cefotaxime were the injectable antibiotics reported most commonly by medicine shop providers. Clinic physicians reported that they most commonly used ampicillin, cefotaxime, and ceftriaxone as first-line

² IMNCI guidelines recommend gentamycin and ampicillin as the first-line treatment and amoxicillin and gentamycin for outpatient treatment where referral is not possible.

injectable antibiotics. Most medicine shop providers (74%)—as compared to 29% of clinic physicians—who used injectable antibiotics reported never using second-line injectable antibiotics.

- Incorrect dosing of both oral and injectable antibiotics was common among providers, potentially threatening treatment effectiveness and safety (Figure 3). Part of the problem was a failure among some medicine shop providers and clinic physicians to base the dose on the infant’s recorded weight. About 35% of medicine shop providers and 10% of clinic physicians determined the dose based on the age of the infant instead. Medicine shop providers in remote areas were more likely to report using age to determine dose (49%) than were providers in proximal and semi-proximal areas (30% for each).
- Inaccurate weighing was common, particularly in medicine shops. Many clinic physicians (63%) reported using a salter or pan scale, although most did not remove the baby’s coverings when doing so. Only a few medicine shops had salter or pan scales available. Indeed, 79% of medicine shop providers reported determining the infant’s weight by having the mother stand on an adult scale with and without the baby, and then subtracting to determine the baby’s weight.
- Among providers who used injectable antibiotics, many reported giving injectable antibiotics for a minimum of 5 days (50% of medicine shop providers and 37% of clinic physicians), but only a fraction gave injections for a full 7 days (Figure 3). Nearly half of the medicine shop providers reported that short treatment regimens were due to the parents’ failure to return to the medicine shop or an inability to pay.

Figure 3. Adherence to appropriate treatment criteria for sick infants ages 0–2 months among private shops and clinics

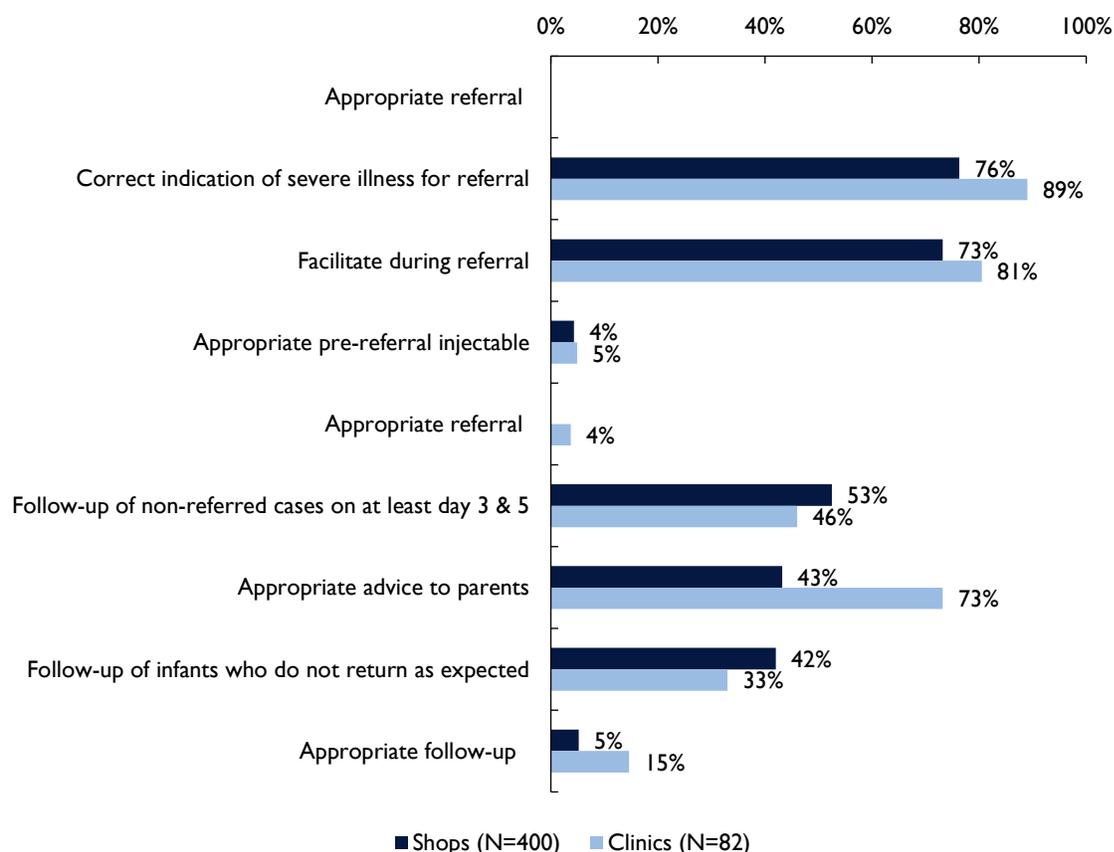


Referral and follow-up

- In general, both medicine shop providers and clinic physicians reported appropriate criteria for determining the need for hospital referral, although more clinic physicians reported considering low weight (< 1500 g), bulging fontanelle, central cyanosis, and failure to improve as criteria for referral.
- All providers identified a specific referral facility, usually a public hospital (68% of medicine shop providers and 62% of clinic physicians) or a private hospital (24% of medicine shop providers and 34% of clinic physicians). Referral sites in remote areas were more likely to be out of district (29%) and more than an hour away (89%).
- Approximately half of providers reported routinely giving a pre-referral dose of oral antibiotics. Considerably fewer reported providing appropriate pre-referral injectable antibiotics (4% of medicine shop providers and 5% of clinic physicians) (Figure 4).
- Medicine shop providers in remote areas were more likely to report giving pre-referral injectable antibiotics but less likely to facilitate referral, particularly in terms of helping to arrange transport.

- For cases that were not referred, 53% of medicine shop providers and 46% of physicians reported doing follow-up reassessments on at least days 3 and 5 (Figure 4). Medicine shop providers in remote areas were less likely than those in proximal and semi-proximal areas to give advice to patients on danger signs to look for (59% compared to more than 70% in proximal and semi-proximal areas) and when they should return for follow-up (46% compared to 69% in proximal areas and 60% in semi-proximal areas).
- More than half of medicine shop providers and two-thirds of clinic physicians reported that they did not take any action to check on infants who did not return for follow-up. Those who took action reported calling families to find out what was going on (31% in both medicine shops and clinics) or sending someone to the family to inquire about the health of the infants (14% medicine shops, 2% clinics).

Figure 4. Adherence to appropriate referral and follow-up criteria for sick infants ages 0–2 months among private shops and clinics



Recommendations

A large proportion of private sector providers are caring for sick young infants; hence, there is an urgent need for interventions aimed at improving quality of care in the private sector. The following recommendations are intended for a consortium of national-level partners from across the nonprofit, government, and private sectors.

- **Undertake a multi-partner effort, leveraging corporate support, to increase the safety and quality of care for sick young infants by private providers.** The study identified several performance gaps that should be prioritized:
 - Inaccurate weighing and dosing of sick young infants
 - Potentially dangerous practices, particularly use of corticosteroids for treating sick young infants
 - Inappropriate use of pre-referral injectable antibiotics and referral facilitation acts
- **Carry out exploratory work to design and test sustainable and scalable strategies to enable and empower private providers to deliver quality care.** Strategies should avoid intensive training and expensive ongoing project inputs and instead employ a mix of light onsite coaching (perhaps modeled somewhat on private sector pharma detailing), at-a-distance support by phone, and job aids. As practices differ between strata, approaches may need to

be tailored to address specific needs of providers in remote areas as compared to needs in proximal or semi-proximal areas.

- **Promote access to and use of relevant clinical protocols.** Medicine shop providers value clinical guidelines developed by the Ministry of Health and Population. The CHD can be a resource center by ensuring that relevant clinical protocols are available on its website and can encourage pharmaceutical companies and others to help publicize availability of ministry treatment protocols and other job aids.
- **Establish functional mechanisms to facilitate timely and reliable referral/coordination of care for more critically ill cases for care at hospital level.** Service providers at medicine shops and clinics play an important role in facilitating timely access to treatment at higher-level facilities by calling the receiving institution and arranging transport, particularly for critically ill cases. Strategies to link private providers, particularly those in remote areas, with hospital-based physicians to access case management should be explored, through both traditional means and innovative technology, including digital/mobile technology.
- **Focus quality improvement efforts on high-volume providers.** The volume of sick young infants managed by medicine shops and clinics was highly variable, with a small number of providers managing relatively large volumes. Concentrating initial quality improvement efforts on high-volume providers will contribute to greater impact.
- **Facilitate registration of medicine shops.** Around 45% of the medicine shops were unregistered under DDA, which makes it difficult to monitor their practices and include them in formal awareness or quality improvement initiatives. Collaborative efforts among CHD, DDA, and the public health offices or public health units at *Paalika* level are needed to design an approach that would facilitate registration of the medicine shops providing basic care to the community.

While half of physician-run clinics have trained providers, only a small proportion of medicine shops have providers trained on IMNCI protocol; therefore, many shop providers with limited knowledge and skills are managing sick young infants. Orientating private sector providers on national IMNCI guidelines could improve existing service delivery. Considering that most of the medicine shops are providing treatment services to sick young infants, there is an urgent need for interventions aimed at improving quality of care in the private sector, and more emphasis should be placed on recognizing danger signs in young infants to ensure immediate referrals are facilitated at appropriate facilities. Engaging the pharmacological industry will be critical to ensuring sustainable logistics and supply chains that guarantee availability of appropriate drugs, supplies, and commodities to provide care to sick young infants. Lastly, this survey suggests that other countries may wish to undertake similar work to assess private sector management of PSBI to address a global knowledge and capacity gap.

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