

# Testing the Feasibility of Delivering Vitamin A to Newborns in Nepal and Bangladesh

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## Background

Infants are born with small livers and total body stores of vitamin A (VA).<sup>1-5</sup> Exclusively breastfed infants depend on adequate breastfeeding and good health to build body stores.<sup>6</sup> However, low breast milk vitamin A, inadequate breast milk intake concentration,<sup>5-8</sup> poor complementary food quality<sup>9</sup> and/or frequent infection<sup>10</sup> can all reduce an infant's ability to achieve normal vitamin A status.

## A promising new intervention

Newborn vitamin A supplementation (NVAS) is a promising new intervention that involves supplementing infants shortly after birth with a single, large oral dose of vitamin A (50,000 IU) (Figure 1). The intervention was tested in three field trials in southern Asia (Indonesia, India, and Bangladesh), each of which reported significant reductions of  $\geq 15\%$  in infant mortality in the first six months of life.<sup>11-13</sup> When combined, the results suggest that infant mortality can be reduced by approximately 20% in southern Asia by giving newborns a single, oral dose of vitamin A.<sup>14</sup> Given previous evidence of safety with respect to short- or long-term side effects,<sup>15-20</sup> newborn vitamin A supplementation appears to be a low-cost approach to reducing infant mortality in South and Southeast Asia.

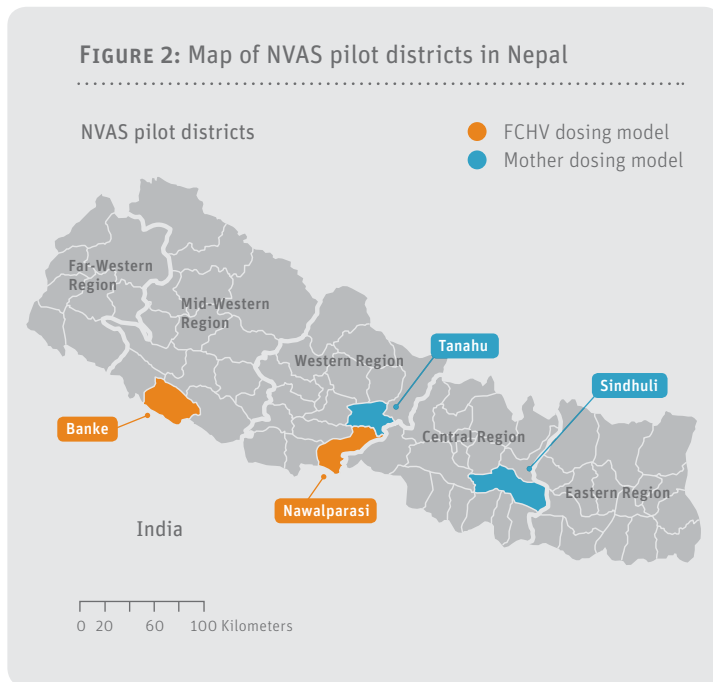
In Africa, however, this intervention had no beneficial effect on early infant survival in an urban setting in Zimbabwe,<sup>21</sup> and a peri-urban setting in Guinea Bissau.<sup>22,23</sup> All three African studies (two in Guinea Bissau) were done in populations with little, if any, vitamin A deficiency. Mortality in the Zimbabwean study was very low.<sup>21</sup> In one study in Guinea Bissau, investigators reduced mortality by excluding the highest risk infants (those with low birth weight) and giving free care and drugs to sick infants.<sup>22</sup>

A 2008 WHO Technical Consultation on Neonatal Vitamin A Supplementation Research Priorities<sup>24</sup> made the following



“Insufficient evidence exists to recommend a global policy of supplementing newborns with vitamin A.”

FIGURE 1: Female community health volunteer (FCHV) dosing newborn with vitamin A in Nepal

**FIGURE 2:** Map of NVAS pilot districts in Nepal

recommendation: “Operational research on how to reach most babies in developing countries within two days of birth should be conducted in general, not necessarily in the context of neonatal vitamin A supplementation.” The consultation also reviewed a systematic review of neonatal vitamin A trials.<sup>25</sup> It concluded that insufficient evidence existed to recommend a global policy of supplementing newborns with vitamin A until further efficacy trials in appropriate populations are conducted in Africa and Asia. WHO is currently supporting additional efficacy studies in Africa (Tanzania and Ghana) and South Asia (India), as well as studies investigating potential biological mechanisms through which NVAS may decrease the risk of early infant mortality.

### Program implications

Adequate and effective NVAS will require innovative but feasible programs in South Asian settings, where often >80% of infants are born at home. For example, newborn dosing might require identifying and engaging neighborhood “watch” networks to detect births and rapidly dose infants, or using cell phones to contact health workers at the time of birth. The capsule would need to be widely available, perhaps through both the private and public sectors. It could be included as a new component in “safe birthing kits” for women to use themselves (obtained during antenatal care or purchased in local shops), provided at the time of home-delivery by nurse midwives or trained traditional birth attendants or, lastly, at clinic- or hospital-based obstetric care and delivery programs. Newborn VA delivery could be combined with other emerging and effective neonatal care services, such as cord cleaning with chlorhexidine wipes<sup>26</sup> and newborn care intervention packages.<sup>27</sup> It could provide an opportunity to establish birth dates and set the timing for an infant’s “six-

month” VA-dosing visit – an idea that is currently gaining interest. Alternatively, in contexts where a high proportion of women attend antenatal clinics, women could be given the supplement and instructed on its use and administration, and then give it directly to their newborn shortly after birth.

### NVAS feasibility activities purpose

In both Nepal and Bangladesh, NVAS feasibility activities were to identify, develop, and evaluate feasible models for delivering NVAS integrated within existing ante- and postnatal interventions at a scalable level within existing delivery platforms and government health services.

### Nepal

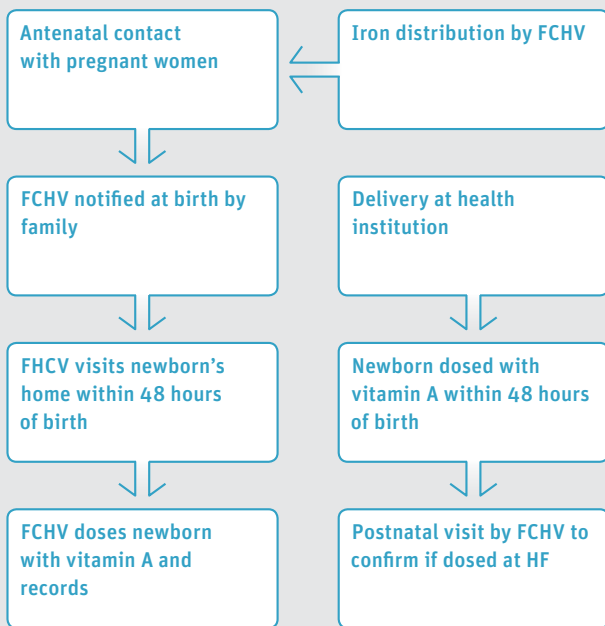
**Background.** Nepal is on track to meet its Millennium Development Goal (MDG)-4 to reduce under-five mortality by two-thirds; however, the government is finding ways to make further reductions by seeking efficacious interventions that reduce neonatal and early infant deaths. The Child Health Division, Department of Health Services of the Nepal Ministry of Health and Population formulated a policy to pilot first, and piloted NVAS in 2009 in four districts (Figure 2), in partnership with the USAID-funded Nepal Family Health Program-II (NFHP-II), UNICEF, and the Micronutrient Initiative (MI).

**Delivery models.** Considering that ~80% of births in Nepal occur in the home, the extensive network of female community health volunteers (FCHVs), and the government’s efforts to intensify and improve access to Antenatal Care services, Nepal selected two distribution models for feasibility testing:

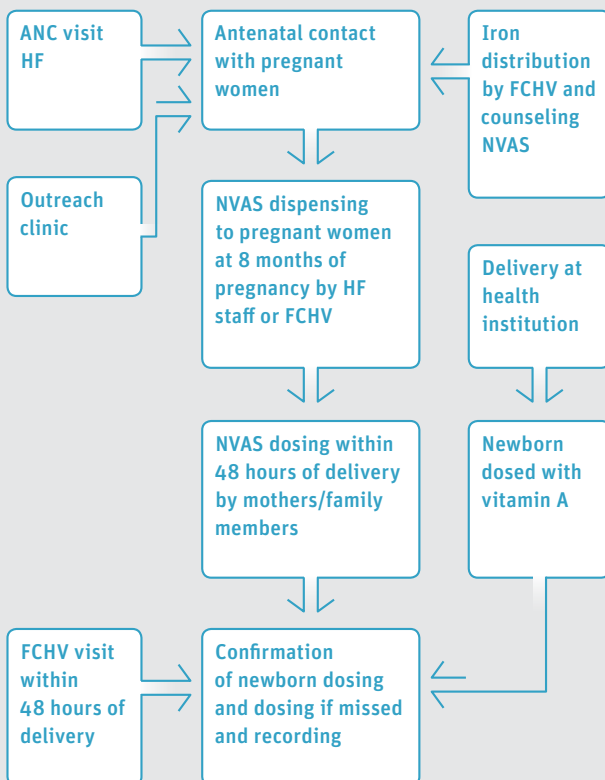
1. The “FCHV Dosing” model, using postnatal home visits by female community health volunteers to administer vitamin A directly to newborns in two districts (Banke and Nawalparasi) (Figure 3); and
2. The “Mother/Family Member Dosing” model, in which mothers who attend an antenatal clinic at a health facility (HF), or are visited at home by the FCHV after the eighth month of pregnancy, are counseled about NVAS and given a supplement which they give directly to their newborn, also in two districts (Sindhuli and Tanahu) (Figure 4).

**Monitoring and evaluation.** NVAS implementation is being monitored through the routine government health management and information system. To record information on NVAS receipt, the existing Iron Intensification Register, a record used to track iron and folic acid tablet receipt among pregnant and postpartum mothers, was modified. Data from this record are compiled and sent monthly to the district and national levels. In addition, three to four external monitors per district provide

**FIGURE 3:** FCHV Dosing Model



**FIGURE 4:** Mother Dosing Model



special technical support visits, and interview health workers and mothers whose babies have received the VA. In addition, the effectiveness of the intervention is being evaluated using two population-based cross-sectional surveys at baseline (September 2009) and end-line (February 2011).

**Preliminary findings.** Through the initial nine months of implementation in the four pilot districts, >18,000 newborns have been supplemented. Preliminary findings suggest that 62% of newborns are reached in the female community health volunteer (FCHV) and community health worker dosing model, and only 45% in the mother/family member dosing model.

**Interesting preliminary observations from monitoring surveys include:**

- > High NVAS coverage in districts where institutional deliveries are high, and where other community-based services targeting newborns have been well established (e.g. in Banke).
- > Low ANC attendance, especially the last visit at eight months' gestation, appears to lead to low NVAS coverage.
- > In the "Mother/Family Member Dosing" model, ~11% of mothers are reluctant to dose their newborns. Instead, they wait for the community health worker (i.e. the FCHV) to visit and dose the newborn.
- > Fewer than one percent of mothers and about one percent of health workers reported a bulging fontanel in dosed infants. All cases were transitory and recovered without treatment.

**Bangladesh**

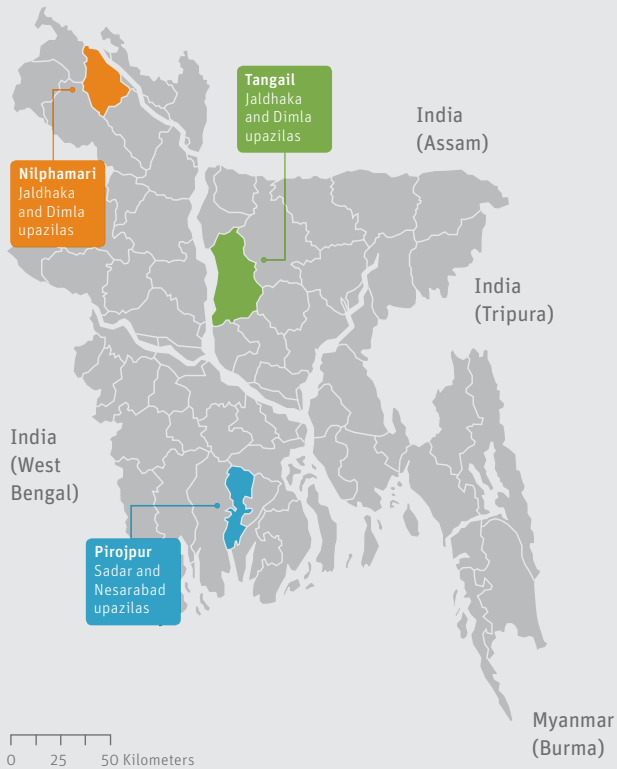
**Background.** The Ministry of Health and Family Welfare (MoHFW) in Bangladesh has extensive experience in considering research findings, establishing a permissive policy, piloting models to test implementation feasibility, and scaling up interventions. In December 2009, the Government of Bangladesh approved pilot feasibility testing activities for NVAS in three districts (Tangail, Pirojpur and Nilphamari), and six sub-districts divided between the Directorate General of Family Planning and Revitalization of Community Health Care Initiative/Community Clinic, Bangladesh (Figure 5).

**Delivery models.** In Bangladesh >80% of births occur in the home, <18% of deliveries are attended by a professional health worker, and only 20% of women receive a postpartum visit.<sup>28</sup> To identify potentially feasible delivery platforms for NVAS, a





**FIGURE 5:** Map of districts in Bangladesh where NVAS is being piloted



**FIGURE 6:** NVAS design workshop participants in Bangladesh

design workshop, including national, district and sub-district level health and family planning managers, was held in October 2010 (Figure 6) and proposed two delivery platforms:

1. The “Mother/Family Member Dosing” model in Bangladesh uses two cadres of community health workers: The “Female Welfare Assistant” (FWA) and the “Health Assistant” (HA), who integrates NVAS into routine home-based pregnancy surveillance

and home- or clinic-based antenatal (ANC) visits (Figure 7). In addition to key ANC services and messages, pregnant women receive an individually packaged dose of vitamin A (50,000 IU), and are instructed about why, when, and how to administer the dose to their newborns, and how to manage potential side effects. This information is accompanied by a counseling card and a “Health Worker Contact Card” that includes the name, cell phone number, and address of the local health worker. The potential advantage of this model is that the VA supplement is in the home at the time of delivery, and does not require the notification of or waiting for the arrival of a health worker to administer the dose.

2. The “Health Worker Dosing” model also uses FWAs and HAs; however, the mother or a family member must contact the health worker at the time of birth and the health worker must visit the mother and her newborn to directly administer the vitamin A (Figure 8). To facilitate birth notification, health workers inform pregnant mothers about the importance of early birth notification so that the baby can obtain newborn vitamin A and other essential newborn services. In this model, a “Health Worker Contact Card” is also provided to promote prompt and direct communication with the health worker.



**Monitoring and evaluation.** Monitoring the pilot activities involves a two-pronged strategy consisting of (1) routine data collection within the MoHFW system; and (2) special monitoring interviews and observations conducted by locally hired “extenders” to assess how well NVAS is being integrated into existing ANC and postpartum visits, and to assess community acceptability (Figure 9). Two cross-sectional surveys in each program upazila, or region, at baseline and at six months after implementation (i.e. end-line), will be conducted among recently delivered mothers to assess coverage and timeliness of the delivery of newborn vitamin A. In addition, community health workers (CHW) will be surveyed at baseline and end-line to assess knowledge, attitudes, and practices about integrating NVAS into existing services.

### Conclusions



Both Nepal and Bangladesh have made important strides in bridging the research-to-program gap by examining scientific evidence and its relevance within each country’s context, establishing policies that permit feasibility testing of this new intervention, and closely monitoring and evaluating NVAS implementation before formulating a policy for national scale-up. From preliminary data, implementation challenges facing NVAS are similar to those faced by other interventions that target pregnant women and newborns. These include identifying and reaching a high proportion of pregnant women and their newborns in a timely manner, overcoming geographic, travel and time constraints

FIGURE 7: Mother/Family Dosing Model

Pregnancy

	<p><b>Contact Points</b></p> <ul style="list-style-type: none"> <li>&gt; Home-based pregnancy identification/registration</li> <li>&gt; Home-based ANC visit</li> <li>&gt; Satellite-clinic ANC visit</li> <li>&gt; FWC-based ANC</li> </ul>	<p><b>Actions</b></p> <ul style="list-style-type: none"> <li>Antenatal contact with pregnant women</li> <li>Pregnant women given NVAS and instructed on why, what, when, how and who will give NVAS (integrated into usual ANC services/counseling)</li> </ul>	
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Birth

	<b>Phone call</b>		<p><b>Actions</b></p> <ul style="list-style-type: none"> <li>Mother or family members gives NVAS to newborn within 2 days of birth</li> </ul>
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Postpartum (0-2 days after birth)






	<p><b>Contact Points</b></p> <ul style="list-style-type: none"> <li>&gt; Postnatal home visit by FWA or HA</li> </ul>	<p><b>Actions</b></p> <ul style="list-style-type: none"> <li>FWA or HA confirms newborn dosing and doses baby if missed</li> </ul>
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FIGURE 8: Health Worker Dosing Model

Pregnancy

	<p><b>Contact Points</b></p> <ul style="list-style-type: none"> <li>&gt; Home-based pregnancy identification/registration</li> <li>&gt; Home-based ANC visit</li> <li>&gt; Satellite-clinic ANC visit</li> <li>&gt; FWC-based ANC</li> </ul>	<p><b>Actions</b></p> <ul style="list-style-type: none"> <li>Antenatal contact with pregnant women</li> <li>Pregnant women given NVAS and instructed on why, what, when, how and who will give NVAS (integrated into usual ANC services/counseling)</li> </ul>	
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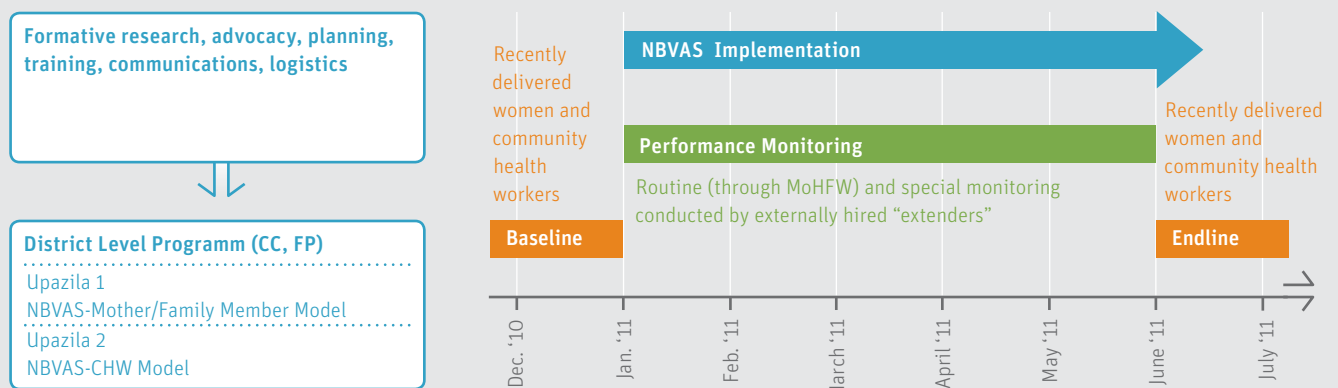
Birth

	<b>Baby is born, please come!</b>		<p><b>Actions</b></p> <ul style="list-style-type: none"> <li>Family member contacts health worker by mobile phone or drops card at clinic</li> </ul>
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Postpartum (0-2 days after birth)

	<p><b>Contact Points</b></p> <ul style="list-style-type: none"> <li>&gt; Postnatal home visit by FWA or HA</li> </ul>	<p><b>Actions</b></p> <ul style="list-style-type: none"> <li>Health worker directly doses newborn</li> </ul>	
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FIGURE 9: Monitoring and evaluation of NVAS pilot activities in Bangladesh



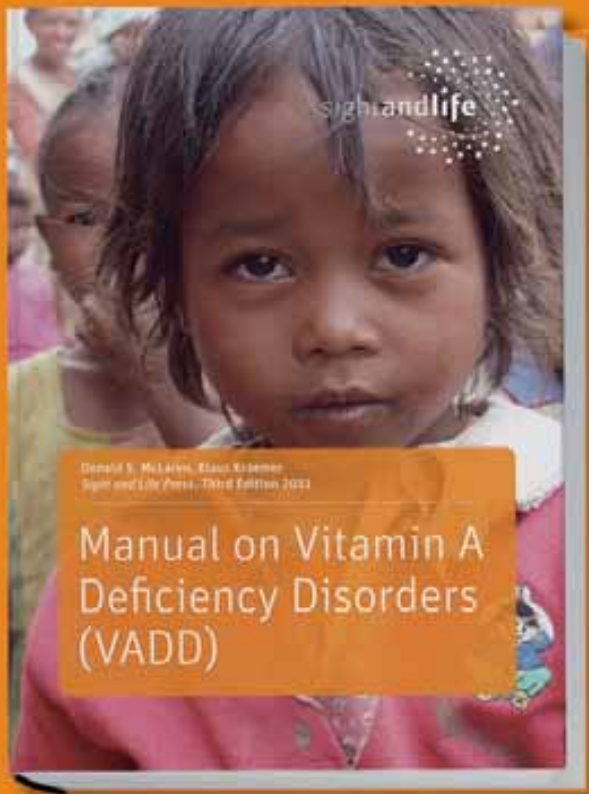
in reaching a health facility or a home, and tracking pregnant women who travel to their parental home to give birth. Lessons learned from these pilot activities will provide useful insights on how to introduce and integrate this new intervention within existing health systems and delivery platforms in South Asia.

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