

1. Action contre la Faim, 2013. *How to Integrate WASH and MHCP activities for better humanitarian projects*

<http://www.actioncontrelafaim.org/fr/content/acf-international-manual-1-1-3-how-integrate-wash-and-mhcp-activities-better-humanitarian-pr> This ACF International manual examines and outlines strategic and operational aspects of integration between their technical sectors of water, sanitation and hygiene (WASH) and mental health and care practices (MHCP). While emphasizing the need for adapting to specific local conditions, it explores critical points in the project cycles of each sector where integration can enable more holistic and comprehensive programming. Importantly, the authors provide concepts of “mainstreaming” or “cross-cutting” in relation to integration of two broad areas (1) support for care practices through improved WASH at household and community levels and (2) psychosocial aspects of WASH interventions including culturally sensitive design. Providing examples from experience in the field, ACF highlights inadequate hygiene conditions as a contributing factor to psychological distress for displaced peoples and provides insight to utilizing WASH as an entry point to further discussion and engagement in menstrual hygiene management, psychosocial care, gender and healthcare seeking behaviours. ACF provides a perspective to integration of WASH within its strategic priorities of hunger, malnutrition and food security to “maximize the impact, sustainability, appropriateness and effectiveness of interventions, creating greater benefits” of programming.

2. Action for Global Health, 2013. *Adopting a Child-Centred Approach: Integration for Maximising Impact on Child Health*

<http://www.actionforglobalhealth.eu/publications/detail-view/article/adopting-a-child-centred-approach-integration-for-maximising-impact-on-child-health.html> This paper from Action for Global Health seeks to promote integrated approaches to child health programming. It utilizes examples from a cross section of development initiatives, primarily WASH, malnutrition and the MDGs, to emphasize and make recommendations on the interrelations needed for delivering on global health goals for children. The authors highlight the importance of water, sanitation and hygiene for success in broader health outcomes, including child nutrition and deworming interventions, while urging integration of policy into practice.

3. Action for Global Health and WaterAid, 2014. *Making Health A Right for All: Universal Health Coverage and Water, Sanitation and Hygiene*

<http://www.actionforglobalhealth.eu/publications/detail-view/article/realising-the-right-to-health-for-all-universal-health-coverage-uhc-and-water-sanitation-and-hyg.html> Action for Global Health and WaterAid produced this discussion paper examining the intrinsic relation between health and WASH. This evaluation of WASH for human health parallels the promotive, preventive, curative, rehabilitative and palliative pillars of UHC with WASH to make quality healthcare – including water, sanitation and hygiene - available, accessible, acceptable and affordable. One of the key messages here is the vital role health providers hold to champion WASH as they steward public health and work to reduce the burden of disease.

4. Bartram, J. & Cairncross, S., 2010. *Hygiene, Sanitation, and Water: Forgotten Foundations of Health. PLoS Medicine*, 7(11), pp.1-9.

<http://www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.1000367> This inaugural article in a PLoS Medicine four-part series, examines the multifaceted health and development impacts of hygiene, sanitation and water (HSW). Research examines the largely preventable burden of disease attributed to lack of reliable sanitation and drinking water and practice of appropriate hygiene and related economic limitations on development. Using examples from developed and developing countries, authors highlight the broad reach of HSW health impacts while contrasting the prejudicial economic burden carried by the poor. While non-health benefits are numerous, including education and income generation, health sector professionals are urged to advocate for HSW as an essential and accepted foundation for health.

5. Benova, L., Cumming, O., Gordon, B.A., et al., 2014. *Where There Is No Toilet : Water and Sanitation Environments of Domestic and Facility Births in Tanzania. PLOS One*, 9(9), pp.1-10.

<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0106738> Benova et al examine the relationships between water and sanitation access for home and health facility births taking into account regional variations and financial disparities within Tanzania. Based on aggregated results, 30.5% of births occur in WATSAN safe environments as defined by the study parameters while 7900 women die each year due to

complications, largely preventable or treatable, during childbirth. Quality of care, and the perception of this care for expectant mothers, is seen to influence decision-making between home and facility births. Recommendations seek to outline steps to improve WATSAN safe environments for in both facility and home births.

6. Benova, L., Cumming, O. & Campbell, O.M.R., 2014. Systematic Review Systematic review and meta-analysis : association between water and sanitation environment and maternal mortality. *Tropical Medicine & International Health*, 19(4), pp.368-387. <http://onlinelibrary.wiley.com/doi/10.1111/tmi.12275/abstract> Researchers examine 14 studies since 1980. This examination suggests that an association does exist between increased maternal mortality and poor water and/or sanitation environments. Meta-analysis of adjusted estimates indicates that women with poor sanitation at home carry a three-fold risk for maternal mortality. Authors go on to summarize the mechanisms by which effects of sanitation and water on maternal mortality operate, including puerperal sepsis, WASH infrastructure as determinants of hygiene practices, exposures at place of delivery and long-term effects of poor WASH in utero, pre/post pregnancy and childhood. While authors acknowledge that further study is needed to better understand these pathways and associations, urgent action to improve WASH in relation to maternal health is recommended and should not be delayed for further study.

7. Briceno, B., Coville, A. and Martinez, S., 2015. Promoting Handwashing and Sanitation: Evidence from a Large Scale Randomized Trial in Rural Tanzania. Policy Research Working Paper 7164. World Bank Group Water Global Practice Group & Development Research Group Impact Evaluation Team. <http://documents.worldbank.org/curated/en/2015/01/23804984/promoting-handwashing-sanitation-evidence-large-scale-randomized-trial-rural-tanzania> Randomized trials studying WASH at scale are much needed to inform policy and decision-making. This research examines the impacts of sanitation promotion, handwashing promotion and combined sanitation and handwashing promotion throughout 181 wards of Tanzania. Based on three systematic reviews since 2003 (Fewtrell et al, 2003, Curtis & Cairncross, 2005 and Ejimot-Nwadiaro et al, 2008) handwashing with soap has been proven to reduce diarrhea incidence by 39-47%. However, Briceno et al have now considered the need for larger studies to explore what is achieved with individual and combined handwashing and sanitation interventions at scale. In wards where sanitation promoted, open defecation dropped from 23.1% to 11.1% and latrine construction increased from 38.6% to 51% after one year. Marginal improvements in handwashing practice

were measured in wards with individual handwashing promotion. Combined effects in wards with both handwashing and sanitation promotion were statistically detectable but not considered significant biologically. Researchers have emphasized the critical steps of intermediate outcomes – take up of practices and behaviour change – before realizing health impacts that WASH interventions aim to deliver. This highlights important factors needed to close the gap between the proven rationale for sanitation and hygiene, including handwashing with soap, with programming objectives, project design and delivery especially at scale. The authors urge steps to address key policy questions of appropriate incentives for behaviour change, intensity of interventions and coordination of sectors when seeking to bring WASH impacts to scale.

8. Cameron, J., Hunter, P., Jagals, P. and Pond, K., 2011. *Valuing Water, Valuing Livelihoods: Guidance on Social Cost-Benefit Analysis of Drinking Water Interventions, with Special Reference to Small Community Water Supplies*. London, UK. WHO and IWA Publishing. http://www.who.int/water_sanitation_health/publications/2011/valuing_water/en/ A multidisciplinary team of researchers, including support from Health Canada, provide analysts, decision-makers and health professionals with this comprehensive view of establishing value – both social and economic - for drinking water interventions. The authors have emphasized the universal aspects of small communities – often rural, remote and potentially vulnerable populations – that cross geographic borders, economic boundaries and the varied definitions of small community. In turn, the importance of valuing social benefits of safe and clean water provision in small communities needs to be factored into economic analysis. “By definition, small communities can’t benefit from economies of scale. Yet ensuring access to safe and clean water remains the basic foundation for good health and a key intervention in the primary prevention approach. It can greatly relieve the burden on health services.” There are complex factors in accounting for benefits and evaluating costs in the cost-benefit analysis for drinking water interventions, especially for small-scale interventions. Researchers argue that this complexity has resulted in undervaluation of the socio-economic benefits of safe water supply especially for small community interventions.

9. CAWST, 2014. *Technical Brief: Reproductive, Maternal, Newborn and Child Health and WASH-Related Diseases*. http://resources.cawst.org/asset/reproductive-maternal-newborn-and-child-health-and-importance-wash-technical-brief_en The Centre for Affordable Water and Sanitation Technology (CAWST) has developed this technical brief to examine specific WASH related

disease risk for pregnant women, newborns and children. The authors detail modes of WASH related disease transmission including water-borne, insect vectors and soil transmitted helminths with the associated microbiological diseases and means of prevention. Citing studies for each health impact, risk factors of each WASH related disease type are reported for pregnant women, newborns and children. This technical brief, along with a related fact sheet and training tools, seeks to inform the broader MNCH agenda in regards to the role of hygiene, sanitation and water in prevention of disease and reducing risk factors for mothers and children. It importantly quotes the Partnership for Maternal, Newborn and Child Health (PMNCH) “Creating multi-sectoral interventions that address WASH and RMNCH and integrating WASH into existing frameworks and agendas for health, has the potential to bring about lasting and positive change for women, children, families and communities.”

10. Chambers, R. & Medezaza, G.V., 2014. Reframing Undernutrition: Faecally- Transmitted Infections and the 5 As, *IDS Working Paper*, (450), p.36. <http://www.ids.ac.uk/publication/reframing-undernutrition-faecally-transmitted-infections-and-the-5-as> Chambers and Medezaza examine the related impacts of open-defecation, faecally transmitted infections (FTIs), population density and undernutrition. Considered “undernutrition’s blind spot,” the authors highlight recent research that leads to the emerging conclusion that, “...in many environments, a half to two thirds of undernutrition can be attributed to open defecation and faecally transmitted infections, with environmental enteropathy the most significant of many.” By introducing the 5A concept -availability and access plus absorption, antibodies and allopathogens – the perception and analysis of undernutrition can be reframed to examine the impact of unhygienic and sanitation poor environments. Citing Humphrey, 2009, *Child Undernutrition, Tropical Enteropathy, Toilets, and Handwashing* as the provocation for this further research, the authors conclude that “the potential for enhanced human well-being” is significant with increased priority on hygiene, sanitation and water interventions.

11. Cheng, JJ, Schuster-Wallace CJ, Watt, S, Newbold BK and Mente A, 2012. An ecological quantification of the relationships between water, sanitation and infant, child and maternal mortality. *Environ Health* 11:4. <http://www.ehjournal.net/content/11/1/4> Researchers from McMaster University, including those of UNU-INWEH housed at McMaster, sought to quantify the relationships between water and sanitation access and newborn, child and maternal health outcomes. Using global country-level data for 193 countries, researchers utilized linear regression and ordinal logistic regression

models to determine that increased access to improved water sources are significantly associated with decreased probability of under-five mortality, under-five mortality due to diarrhea, infant mortality rate (IMR) and maternal mortality rate (MMR). The authors recognize the weaknesses of ecological studies with geographic scale, lack of statistical rigour and inability to appropriately define risks or health measures while also highlighting the advantages of studying these relationships on a global scale. By utilizing openly available data sources, the researchers were able to analyze their research question through use of existing data that is already collected on a global scale. This analysis, and a growing body literature, strongly supports the existence of relationships between water and sanitation access and infant, child and maternal health outcomes.

12. Clasen, T. et al., 2014. Estimating the impact of unsafe water, sanitation and hygiene on the global burden of disease : evolving and alternative methods. *Tropical Medicine & International Health*, 19(8), pp.884-893. <http://onlinelibrary.wiley.com/doi/10.1111/tmi.12330/abstract> Clasen examines the methodologies used in determining global burden of disease estimates and associated risk factors including water, sanitation and hygiene. While burden of disease attributable to diarrheal disease and WASH has been decreasing since 1990, Clasen, along with WASH experts and advocates, present the question that changing research methodologies have given rise to these declining figures. Global burden of disease studies have significant influence on decisions of policymakers and allocations of limited resources. The author highlights the need for comprehensive understanding of, and confidence in, the methodology used to determine the figures and trends being reported.

13. DFID, 2013. *Water, Sanitation and Hygiene Evidence Paper* <https://www.gov.uk/government/publications/water-sanitation-and-hygiene-evidence-paper> The DFID Water and Sanitation and Research Evidence Division teams were commissioned to present available evidence on benefits and cost-effectiveness of WASH interventions. Primary goals of the paper were to present existing evidence, identify what is known and not known within the existing evidence while assessing its rigour, disaggregate benefits by gender, poverty, regionalism and economic status where possible and provide an accessible guide of evidence and research methods used for determining the health, economic and social impacts of WASH. Using an arguably high threshold for evidence to assign measures of “good” “suggestive” or “weak,” the authors sought to “identify key lessons for consideration in evidence-based policy making” including evidence of impacts, delivery options, cost-effectiveness and value for money and identifying

remaining knowledge gaps. The research recognizes the substantial evidence that WASH interventions can bring about positive impacts for health, economics and development. It also recognizes the weakness in assessing the magnitude of these impacts and need for more robust research to fill information gaps.

“Improved estimates of costs, evidence of additional impacts, and synthesized analyses could improve the inefficiency of investment within the sector and better prioritize decisions between sectors.”

14. Gon, G. et al., 2014. The contribution of unimproved water and toilet facilities to pregnancy-related mortality in Afghanistan: analysis of the Afghan Mortality Survey. *Tropical medicine & international health : TM & IH*, 00(00), pp.1-12. <http://onlinelibrary.wiley.com/doi/10.1111/tmi.12394/abstract> Gon et al have utilized data from the Afghan Mortality Survey of 2010 to estimate the effects of unimproved household water and toilets on pregnancy related deaths. The authors highlight the unique nature of this study, citing Benova et al, 2014 as the only systematic review of this relationship and their study as the first to explicitly test the association between maternal mortality and lack of access to improved water and sanitation while thoroughly adjusting for socio-economic factors. Researchers concluded that households with unimproved water were at 1.91 times greater risk of pregnancy related death. Although evidence of the risk presented due to lack of improved toilets was weak, the authors recommend further studies of a larger sample size. This is, in part, due to the challenges of discerning availability of improved water and toilets as markers of unhygienic environments or of socio-economic conditions.

15. Hathi, P. et al, 2014. *Place and child health: The interaction of population density and sanitation in developing countries.* <http://documents.worldbank.org/curated/en/2014/11/20426961/place-child-health-interaction-population-density-sanitation-developing-countries> Researchers examined child height and infant mortality within 172 international Demographic and Health Surveys while matching to population density census data in relation to sanitation behaviours. For further internal validity, researchers examined their hypothesis for child height in districts of Bangladesh. As a result, the authors determined a “statistically robust and quantitatively comparable interaction between sanitation and population density with both approaches.” Researchers concluded that poor sanitation is more detrimental for early life health where population density is great, otherwise stated as; population density does not have the same benefit to health where sanitation is poor. These findings have policy implications for those in positions to decide on investments in sanitation with the need for greater

allocation of sanitation funding where population density is greater, whether it be urban or rural settings.

16. Humphrey, J.H., 2009. Child undernutrition, tropical enteropathy, toilets and handwashing. *The Lancet*, 374: 1032-35. <http://www.thelancet.com/journals/lancet/article/PIIS0140-6736%2809%2960950-8/abstract> Cited by Chambers (2014) as a “seminal research note,” this viewpoint by Jean H. Humphrey hypothesizes the role of tropical enteropathy, now referred to as environmental enteropathy, in child growth and undernutrition. This condition, caused by ingestion of large quantities of faecal bacteria by young children, afflicts almost all children in the developing world. While studies have focused on incidences of diarrhea in relation to child undernutrition and growth, as of this 2009 publication, there were no published randomized trials of toilet provision on child growth. Adjusting for socio-economic markers is once again seen as a challenge in researching the impacts of unhygienic environments. Humphrey seeks to question the findings of *The Lancet’s* Maternal and Child Undernutrition Series estimating that 99% sanitation and hygiene coverage would reduce incidence of diarrhea by 30% and, in turn, reduce incidence of stunted growth by only 2-4%. “Importantly, because of mortality, and cognitive and economic consequences of child undernutrition, sanitation and hygiene interventions might have been undervalued because they have been mainly appraised for their effect on diarrhea.” The author urges further study on the role and prevention of tropical (environmental) enteropathy through provision of toilets as an important contributor to solving child undernutrition.

17. Rodina, Lucy, 2014. *Implementation of the Human Right to Water in Khayelitsha, South Africa: Lessons from a ‘lived experience’ perspective*, IRES Working Paper Series No. 2014-05, University of British Columbia Institute for Resources, Environment and Sustainability. <http://ires.ubc.ca/2014/10/02/working-paper-2014-05/> Rodina examines the important case of South Africa in the practical implications of the human right to water. The study looks at water access conditions in Khayelitsha, an impoverished area of Cape Town where grievances against municipalities contributed to the South African Human Rights Commission “Water is Life, Sanitation is Dignity” proceedings. Water is the only fundamental and explicit human right to a resource. This brings about significant practical issues in exercising this human right with “resource distribution and governance embedded in broader social-political dynamics.” The study finds that the materiality of water access and the associated cultural and social implications accentuate an inequality between shack dwellers and formal housing owners. This emphasis on materiality within a “lived experience” helps to provide context to

the human right to water and its practical implications for people and communities on a daily basis.

18. UNU-INWEH, 2010. *Sanitation as the Key to Global Health* http://inweh.unu.edu/wp-content/uploads/2013/05/2010_Sanitation_PolicyBrief.pdf In 2008, the United Nations University Institute for Water, Environment and Health (UNU-INWEH) in Hamilton, Ontario, Canada held a workshop of international representatives from civil society, government, academia and UN agencies. This policy brief details the discussions of barriers and breakthroughs to providing sanitation for all, provides recommendations and importantly provides stories from the field that highlight key sanitation challenges and realities. Expert contributors from University of Ottawa, Water for People, IDRF, the Kenya Medical Research Institute and the Canadian Toilet Organization provide experiences in gender and sanitation, social marketing of sanitation, grass roots projects, tapping market potential and enhancing capacity for sanitation provision for rural populations. These experiences provide insight to challenges and successes of sanitation interventions. Looking to the future, workshop participants defined recommendations for future action on sanitation. In doing so, consideration is given to future impacts of climate change on water resources with the compounding effects on the sanitation challenge and the emerging discussion of sanitation as a human right. Sanitation is positioned to be one of the MDG targets that will fail to meet expected results presenting new challenges to an age-old problem in the post-2015 agenda. Further reference can be made to the related policy brief, *Water as the Key to Global Health* also from UNU-INWEH http://inweh.unu.edu/wp-content/uploads/2013/05/SafeWater_Web_version.pdf

19. Velleman, Y. et al, 2014. From Joint Thinking to Joint Action: A Call to Action on Improving Water, Sanitation, and Hygiene for Maternal and Newborn Health. *PLOS Medicine* 11(12). <http://www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.1001771> This recent journal article in *PLOS Medicine* brings together expert perspectives on the interrelations of water, sanitation and hygiene (WASH) and maternal and newborn health (MNH), including quality of care and service provision in health facilities and at home. It importantly explores existing evidence on the impact of hygiene, sanitation and water for MNH outcomes and examines targets and indicators within the MDGs, the Post-2015 agenda and global health coverage. Five recommendations for integration of WASH and health provide actionable steps for the global community and stakeholders to work towards. These include support for forthcoming WHO strategy for WASH in health facilities, implementation support for the WHO Every Newborn Action Plan (ENAP), embedding WASH in Universal Health

Coverage monitoring frameworks, embedding WASH in the post-2015 agenda and ensuring adequate financial resources are directed to WASH as a core health strategy. This journal is an important step forward in a new movement towards crosscutting WASH integration with maternal and newborn health.

20. WaterAid, SHARE and London School of Hygiene & Tropical Medicine, 2013. *Under-nutrition and water, sanitation and hygiene* <http://www.wateraid.org/what-we-do/our-approach/research-and-publications/view-publication?id=7c7b535f-680f-44ee-a9a2-2f5fd5850bbb> This collaborative paper highlights direct and indirect linkages between under-nutrition and WASH through key literature resources. It is estimated that use of unsafe water, lack of adequate sanitation and unhygienic practices account for 50% of malnutrition associated with repeated diarrhea or intestinal worm infections. Meanwhile, indirect impacts on health, wellbeing and economic status are experienced due to the rigours of daily water collection, lack of options for safe water sources, insufficient quantity of water for hygienic behaviours and demands on time. The authors recognize the need for more in-depth research trials to define the magnitude of this relationship between childhood nutrition and regular water, sanitation and hygiene practice. They go on to outline recommendations for setting clear goals and a framework for improved outcomes related to WASH within the response to undernutrition.

21. WHO, 2013. *Water Quality and Health Strategy 2013-2020* http://www.who.int/water_sanitation_health/publications/2013/water_quality_strategy/en/ WHO has provided a global strategy for water quality framed with the priority of realizing the largest possible reduction in waterborne and water-related disease. It is estimated that the total global economic loss related to inadequate water supply and sanitation is US \$260 billion annually. Meanwhile, the potential total benefit of meeting the MDGs for water supply and sanitation are in the order of US \$60 billion per year. The WHO strategy, bridging pre- and post-2015 agendas through to 2020, targets decision makers, technical advisors, all relevant ministries, public health advocates, academics, civil society and all other external agents working in water supply and sanitation services. In doing so, WHO will “foster collaborative actions at international, national and local levels to promote a stewardship role for the health sector to foster policy coherence across other sectors impacting the safety of water” as one of its strategic responsibilities. Strategic priorities emphasize rigorous and relevant evidence, current and harmonized water quality management guidelines and supporting resources, strengthening capacity of Member States to manage water resources to protect public health, facilitate implementation activities

through partnerships and monitor impacts on policy and practice to more effectively inform decision-making.

22. WHO & UNDP, 2007. *Economic and health effects of increasing coverage of low cost household drinking-water supply and sanitation interventions to countries off-track to meet MDG target 10*, http://www.who.int/water_sanitation_health/economic/mdg10_offtrack/en/ It was recognized in 2007 that accelerated progress would be needed in order to meet MDG targets for water and sanitation. Now in 2015, with the target for water arguably reached and late stage efforts for sanitation still struggling, this report from WHO and UNDP remains timely. Authors push for linkages to be made with sanitation and water to other MDG targets for poverty reduction, child health, gender equality and environmental sustainability. Urging increased national and international advocacy to support greater resource allocations to WASH and good quality research, it builds a new case for global cost-benefit analysis of water and sanitation interventions. “Aside from global cost-benefit analysis by WHO in 2004, there is limited comprehensive information on global cost-benefits of improved WASH interventions.” With focus on least developed countries that were off-track to meet the MDG target as of 2007, this case examines two scenarios (1) meeting MDG targets for water and sanitation and (2) universal coverage of water and sanitation, to estimate the health impacts and economic costs and benefits of improved water supply and sanitation services. The authors conclude that, while cost-benefit analysis does not provide a significant incentive for the health sector to invest in improved water and sanitation services, a cost-effectiveness analysis indicates that good value for money can be realized with relatively inexpensive water and sanitation interventions in terms of health. For this reason, the health sector should be interested in leveraging these investments along with a variety of financing mechanisms for target populations.

23. WHO, 2009. *WHO Guidelines on Hand Hygiene in Health Care: A Summary, First Global Patient Safety Challenge Clean Care is Safer Care*. <http://www.who.int/gpsc/en/> Initially launched in 2005, “Clean Care is Safer Care” aims to reduce healthcare associated infection – a risk that crosses all economic and geographic borders. Largely preventable healthcare associated infections are due to numerous causes including healthcare systems and processes of care, human behaviour, societal norms and beliefs in addition to educational and economic constraints. In developed countries, 5-15% of hospital patients are afflicted with infections during hospital care. While the ability to determine this measure in developing countries is limited, it is estimated at 18% and, arguably, much higher “...basic infection control measures are virtually non-existent in most settings as a result of a combination

of numerous unfavourable factors such as understaffing, poor hygiene and sanitation, lack or shortage of basic equipment, inadequate structures and overcrowding, almost all of which can be attributed to limited financial resources.” The WHO guidelines presented for hand hygiene seek to reduce the high financial and human costs of healthcare related infections. Implementation tools and strategies include system level changes of providing access to a safe, continuous water supply and soap along with training and education.

24. WHO and UNICEF, 2014. *Every Newborn: An Action Plan To End Preventable Deaths* http://www.who.int/maternal_child_adolescent/topics/newborn/enap_consultation/en/ The Every Newborn Action Plan (ENAP) was developed from country demand to address an “unfinished agenda” of the MDGs. ENAP reports that 44% of global deaths of children under 5 years old are newborns. 80% of newborn deaths result from one of three largely preventable and treatable conditions, including neonatal infections. With the majority of maternal and newborn deaths occurring around the time of birth, ENAP focuses on skilled care at birth and essential newborn care within the “continuum of care” from reproductive health to childhood. Within this continuum of care, intersectoral elements aim to address “improved living and working conditions” and provide “safe and health work environments for women and pregnant women” including housing, water, sanitation, nutrition, education and empowerment. Strategic objectives of ENAP include strengthening and investing in care during labour, birth and first days of life, improve quality of care for mothers and newborns and reaching every woman and newborn to reduce inequalities. Velleman et al, 2014 include support for the implementation of ENAP within the call to action for maternal and newborn health, with a specific emphasis on WASH within the quality-of-care spectrum.

25. WSP and World Bank Group, 2014. *Scaling Up Rural Sanitation: Investing in the Next Generation, Children grow taller, and smarter, in rural, mountainous villages of Vietnam where community members use improved sanitation*. <http://www.wsp.org/sites/wsp.org/files/publications/WSP-Vietnam-Stunting-Research-Brief.pdf> Research by Quattri and Smets presented at the 37th WEDC International Conference examines linkages between lack of sanitation and stunted growth in targeted regions of Vietnam and Lao PDR <http://www.wedc.lboro.ac.uk/resources/conference/37/Quattri-2040.pdf> Adapted by WSP and World Bank, this paper focuses on the results from Vietnam where a decrease in open defecation from 44% to 3% from 1990 to 2012 has been realized. This significant change is attributed primarily to strong economic growth and national, government led sanitation programs. Within a rural context, researchers examined the suggested

correlation between lack of improved sanitation and stunting in children within the mountainous regions of Vietnam where some of the poorest communities are situated. Through regression analysis with controls for socio-economic, demographic, health and environmental factors that may influence child height, researchers were able to conclude that the correlation has a real effect and a more pronounced influence with community wide sanitation conditions than household level sanitation. On average, children in these regions were 3.7 cm shorter in communities with unimproved sanitation versus those that use improved sanitation. This inhibited growth is

irreversible and leads to children being more likely to have poorer cognitive and education outcomes throughout adolescence. While admirable movement up the sanitation ladder is being experienced in Vietnam, the researchers urge that national level programs need to continue post-2015, a community wide approach to behaviour change is needed and consideration must be given to integrating community wide sanitation into existing child nutrition programs. Analysis of results from Lao PDR is also available:

<http://www.wsp.org/sites/wsp.org/files/publications/WSP-LaoPDR-Stunting-Research-Brief.pdf>