ANNEX 01 - INVESTMENT CASE SUMMARY

The PERMATA programs aims to strengthen performance of Indonesia's primary health care system and reduce maternal and newborn death and stunting. The partnership will have impacts on maternal and newborn health and stunting outcomes through improvements in family planning, nutrition, and the delivery and use of life saving health services during and immediately after pregnancy and birth. Primary care systems will be strengthened to support both these and broader health outcomes, including the earlier detection and management of chronic disease at the primary care level particularly important as non-communicable diseases rise.

Experience across a range of development partners in Indonesia shows that programs that have a focus on doing a few things well that are appropriately targeted to the main constraints to achieving improved health outcomes are more likely to have impact than a very broad unfocussed approach (WHO discussion 2012). This investment case was prepared as part of the PERMATA concept and design development to provide guidance on where the biggest gains to maternal and newborn health and primary care strengthening might be for DFAT's dollar investment, as well as to estimate the overall costs of and contribution to outcomes possible from potential PERMATA interventions.

Earlier options for PERMATA to expand the scope of DFAT's existing AIPMNH program to include an extended scale (additional provinces) and scope (to include family planning, nutrition and pre-service education for midwives) were assessed as part of the PERMATA concept development and review. Options assessed in an economic appraisal framework were

- Option 1: - Continue with only a maternal and newborn health service focus
- Option 2: - Include a focus on family planning and nutrition in the scope of the program
- Option 3: - On top of the above also include an investment in improving quality of pre-service training for midwifery and other key health personnel skills

Though option 3 provided the best returns to maternal and newborn death and stunting, the additional scope to include pre-service training was considered to be beyond the implementation capacity for a single DFAT program and option 2 was approved to proceed to design.

Since then decisions have been taken to separate the national and sub-national focus of the Australia Indonesia Partnership for Health Systems Strengthening in order to give greater focus to and ownership of national and sub national activities. Rather than have a stand-alone sub-national health system program (increasing overhead costs through a further division in management structures) the DFAT health development cooperation program in discussion with the Internal Program Advisory Group (IPAG) are including the primary care systems strengthening focus in the PERMATA program. To avoid a vertical focus on systems strengthening only for maternal and newborn health outcomes (which can cause duplication and distortion, lowering efficiency of health system strengthening) a two pillar approach to the PERMATA program has been proposed:

1) ***strengthen primary health care systems*** to deliver health services essential to the health needs of the Indonesian population they serve. This includes addressing the high rates of maternal and newborn death and illness in Indonesia as well as the growing burden of non-communicable diseases and continuing burden of communicable diseases. Ensuring availability, quality and effectiveness in the use of human, financial and physical resources for primary care can improve a range of health outcomes in Indonesia at the lowest possible cost and reduce unnecessary referrals to hospital care that is more expensive for both the Indonesian health system and for families.

2) ***directly reduce maternal and newborn death and stunting*** through targeted interventions that address key constraints in demand for, access to and delivery of specifically reproductive, maternal and newborn health and nutrition services.

This investment case has therefore evaluated

1) Specific maternal and newborn health and nutrition related interventions including a focus on family planning, nutrition and targeted maternal and newborn health services
2) Priority areas for primary care system strengthening to both support maternal and newborn health and nutrition outcomes as well as effectiveness and efficiency outcomes for the Indonesia health system more broadly.

The appraisal has been completed within a cost efficiency and cost effectiveness framework contrasting estimated costs of priority interventions against their estimated effectiveness in terms of contribution to maternal and newborn death and stunting reduction and, for primary health care strengthening interventions the increase in PHC utilisation they might contribute to and related estimated net savings to the health system. Rates of return were calculated based on internationally accepted economic values of maternal and newborn lives saved and intrauterine growth related stunting reduction (given this is the main focus of PERMATA specific interventions rather than post birth stunting interventions).

Existing tools are available for assessing potential impacts of further investment in maternal and newborn health, particularly the LiST tool within the Spectrum suite of models. This, however, has a starting point of increased coverage of particular known interventions. It does not allow consideration of the effectiveness of different approaches to improving this coverage which is important from a programming point of view. It also, at times, packages interventions assuming they are implemented jointly, though some of these needed to be considered separately for PERMATA (such as re-inclusion of calcium supplementation in ANC which is assumed part of ANC already in LiST though is currently not in the ANC package in Indonesia). It also uses effectiveness parameters drawn directly from international systematic reviews (largely RCTs but also including other estimates such as the Delphi procedure when RCT results are not available) without adjustment for practical implementation challenges, and the influence of non-linear capacity-to-benefit on coverage. Finally, whilst possible, consideration of effects in particular provinces is difficult in LiST which is largely used for country level estimations.

For these reasons a simple spreadsheet model was purposefully developed for the economic appraisal as part of PERMATA's design. This utilised province specific demographic projections developed by the Central Statistics Office of Indonesia (BPS, 2013) for 2010–2025, which, though potentially optimistic, are similar to the UN population estimations under a medium scenario for Indonesia. Underlying existing maternal mortality ratios and newborn mortality rates were taken from national estimates from the 2012 IDHS (adjusted for geographic variations based on NIHRD analysis of 2010 census data on maternal deaths) and stunting rates from the 2013 National Health Survey (Riskesdas).

CALCULATION OF BENEFITS

The economic and social consequences to maternal death are vast. Children of mothers who have died are more likely to die themselves before age five. Surviving children without a mother are more likely to be socially and economically disadvantaged largely due to the greater investment in the human capital of the child that is made with the mother present.

Both globally (Stenberg et al., 2013) and in the Asia Pacific regionally (MCH Network Asia Pacific, 2009) it has been estimated that an additional investment of only $5 per capita per year in key maternal and child health

interventions would return over nine times this amount in social and economic returns. Prevention of maternal and newborn deaths has economic value in three ways:

- First, averting maternal and newborn deaths in themselves has economic value in terms of the contribution to GDP that these individuals would otherwise have made through the production and savings they would have contributed in their lifetime.
- Secondly, mothers are often the caregivers in households and make important social investments to their children (as well as to other family members) that influence the human capital development of that next generation.
- Thirdly, reducing deaths in early years, including newborn, as well as avoiding deaths in productive age groups including maternal, is an essential component to achievement of a demographic dividend to economic growth through reducing the dependency ratio.

Areas for potential PERMATA intervention were prioritised based on a matrix problem solving approach for key maternal and newborn health and nutrition constraints in Indonesia undertaken by the MNH team and together with other relevant DFAT programs impacting maternal and newborn health and nutrition outcomes (AIPD, PNPM, Access, Social Protection and Pamsimas). Potential interventions were further refined through use of province and district specific evidence on current coverage of and known constraints to effective maternal and newborn health, nutrition and primary care systems interventions in PERMATA proposed provinces of East Java, NTT and NTB. Estimates on the potential effectiveness of interventions were gathered from international systematic reviews and, where available, results from Indonesian specific research were used to adjust these estimates. Where possible intervention impacts on specific causes of maternal mortality (pre/eclampsia, anaemia, postpartum haemorrhage) and newborn mortality (preterm birth, low birth weight, asphyxia and infection) were applied to Indonesian areas (rural versus urban) and where available province specific rates of these causes.

All calculations were proposed to provide a highly conservative estimate of effectiveness (see below adjustments for example). Base as well as low and high intervention effectiveness parameters were used based on 95% confidence intervals (where available in evidence papers used) and/or alternative sources of information particularly when on Indonesia specifically (for example rates of anaemia in pregnant women in Indonesia varied depending on the data source). Estimates of effect are therefore presented as a base case and potential range.

Effectiveness was calculated based on changes in coverage possible from PERMATA taking into account existing coverage rates of the relevant intervention. Where evidence based increases applied to the relevant provincial coverage rate resulted in coverage exceeding 90%, this was capped at 90% with no further assumption in effectiveness given known difficulties in obtaining coverage rates of over 90% for any health care intervention in low and middle income countries. For example where an intervention has been suggested to enable an increase in institutional deliveries over 20% but they are already at 80% of all births in a particular province only 10% increase in institutional delivery was assumed.

Three adjustments were then applied to these “ideal” effectiveness figures from rigorous evaluations to enable more practical and conservative estimates of PERMATA’s potential contribution. These were

a) likely coverage of the intervention – the proportion of the target population that might realistically be reached by an intervention in an average PERMATA district. Some further increase in take-up outside of these direct implementation areas is then assumed at 60% likelihood of take-up in other areas in the implementation district (e.g. other Puskesmas) an average of two years after implementation in initial target areas, 50% likelihood of take-up in other PERMATA districts in the province and 40% likelihood of take-up in other districts within the PERMATA province one to two years before the end of the program (depending on timing of

implementation). This was based on discussion with three DFAT advisers who have worked in Indonesia for many years in programs that have taken a demonstration approach and emphasised policy dialogue for scale up. Though further take-up of activities and approaches shown to be effective beyond PERMATA provinces is hoped, this has not been assumed in the calculation of PERMATA's contribution to outcomes.

b) implementation effectiveness – which tries to take into account the difference between implementing in a program setting and a more controlled environment of an RCT or other experimental study used to underpin effectiveness estimates. Three levels are used based on how closely linked the outcomes are to the intervention (less room for implementation variability in outcomes) and DFAT experience with overseeing similar activities previously. Three levels are used being 55% (for newer program areas and less direct implementation effects but assuming no intervention would be implemented if it had less that 50% chance of being effective), 70% and 85%.

c) Capacity to benefit (CTB) - health improvements are easier to gain from a lower starting base and this has been evidenced in evaluating changes in health service delivery coverage and outcomes in Indonesia (AIPMNH results analysis 2014; Olken et al., 2013). Broad estimates have been based on analysis of changes in ANC, PNC and facility based birth coverage in districts of NTT compared with their starting indicator at commencement of AIPMNH. This parameter aims to adjust for this using a scale of three categories

a. If current indicator is < 50% - CTB = 90%;
b. If current indicator is 50 - 75% - CTB 70%;
c. If current indicator is > 75% - CTB 35%

CALCULATING ECONOMIC VALUES FOR MATERNAL AND NEWBORN DEATHS AVERTED.

In the estimation of economic returns, in accordance with international literature we used an estimated 1.25 times GDP per capita (2015 estimates – World Bank projections) for the value of a maternal life year saved and applied this to the estimated age distribution of maternal deaths in Indonesia and province specific life expectancy at birth from the BPS population projections 2013 (Foster & Bryant, 2012). No addition has been made of value of maternal morbidity prevention given the primary focus of PERMATA to reduce mortality. Newborn deaths have been valued at annual GDP per capita to age of life expectancy (Foster & Bryant, 2012). This results in average life years for a maternal death of 40 years gained and newborn death at 69 years gained at a GDP per capita of US$3,982. The productivity benefits of intrauterine only stunting prevention for Indonesia were estimated using the 7.4% earnings differential obtained by Alderman et al (2006) and used in Quereshy et al (2010) applied to the GDP per capita amount. Only maternal and newborn deaths and cases of stunting averted to 2025 were used in calculations of benefits – using a conservative assumption of no continuation of program activities beyond this date (3 years after program end) and no continued effectiveness. The Indonesian central bank discount rate of 6.37% was applied to benefits though not to costs given they were only estimated over an 8 year period and therefore short term and seen as one program investment. Any bias in discounting benefits only and not costs will only underestimate the cost effectiveness of PERMATA's investment.

CALCULATION OF COSTS

Costs have been estimated bottom up from rough costing of potential activities for the sake of this investment case and to allow comparison of where some of our best areas of value for money might be. Costs were separated into fixed and variable so that potential trade-offs in scale – numbers of district and provinces – could be explored. Where possible an evidence base on what the likely costs would be in Indonesia has been used using information from previous programs such as AIPMNH and HSS as well as local reports and websites (such as from the World Food Program and BKKBN information).

Costs for overall managing contractor administration, monitoring and evaluation and the learning platform were estimated separately. This economic appraisal therefore considers only costs of implementing the activities. An overall rate of return considering the total budget for PERMATA has also been provided but these overarching costs have not been apportioned to each activity or included in activity specific cost effectiveness or rates of return calculations.

RESULTING POTENTIAL CONTRIBUTIONS OF THE PERMATA PROGRAM TO COVERAGE OF TARGET POPULATIONS, MATERNAL AND NEWBORN DEATH AND STUNTING REDUCTION

BENEFICIARIES

Covering 10 districts in NTT and East Java and 5 districts in NTB PERMATA will benefit just over 4 million women of reproductive age, just over 1 million children under five and cover just under 3 million births. Table A.1 below provides number of key types of beneficiaries using the base case population and birth rate estimates from BPS population projections (BPS 2013)[1]. This excludes potential benefits to populations outside PERMATA selected districts from wider take up of effective interventions supported by the program.

Table A.1 PERMATA beneficiaries by province and target population (PERMATA districts only)- 2015 - 2025

	East Java	NTT	NTB	Total
Districts	10 / 38	10 / 21	5 / 10	25 / 69 (36%)
Average population per district	1.05 million	264,000	484,000	
Average Puskesmas per district	25	16	15	
Reproductive age women (15-49)	2.7 million	0.67 million	0.71 million	4.1 million
Births	1.6 million	0.74 million	0.56 million	2.9 million
Stunting preventable children < 5*	736 thousand	311 thousand	246 thousand	1.29 million
Maternal deaths (at current ratio)	3,580	2,800	2,140	8,520
Newborn deaths (at current rate)	22,790	19,130	18,580	65,000
Cases stunting (at current rate)	263,590	161,620	111,400	536,610

*Those under 2, including births, and reaching 5 years during life of PERMATA

If additional scale up within PERMATA provinces across districts is taken into account (at 40% likelihood) PERMATA could benefit nearly 8 million women of reproductive age, over 2 million children under five and cover an additional 400 000 births.

ESTIMATED COST AND RETURNS FOR DFAT'S PERMATA INVESTMENT

Total cost for a core package of focus areas and activities for PERMATA implementation is estimated to cost just over 125 million over 8 years of the program. This excludes contractor costs (including ongoing technical assistance positions), monitoring and evaluation, operational research and learning platform costs.

[1] Alternative scenarios of population growth using UN low and high estimates have also been used in the uncertainty analysis – see more detailed economic appraisal background paper.

Assuming benefits from the program investment run to 2025 and including scale up within PERMATA districts at 60% likelihood two years after effectiveness is shown. PERMATA could contribute to reductions in maternal and newborn mortality in selected districts by over 20% and stunting by over 11% with a rate of return of over $10 dollars per $1 invested. Where scale up to province is considered (between PERMATA and non PERMATA districts) at least 3 years after effectiveness and at a lower likelihood of take up at 40%, rate of return increases to just under $20 per DFAT dollar invested.

Table A.2 – Overall economic appraisal of potential PERMATA investemnt

	Cost ($AUD millions)	Contribution to maternal lives saved	Contribution to neonatal lives saved	Contribution to stunting cases averted	Rate of return on investment
Family planning	9.8	823	3,047	33,730	41
% contribution	8%	20%	12%	29%	
Nutrition	13.6	2,168	12,728	77,628	95*
% contribution	11%	47%	48%	65%	
Maternal & Newborn services	54.3	865	7,379	N/A	9
% contribution	47%	19%	28%	N/A	
Performance based financing	12.2	363	1,192	N/A	8
% contribution	10%	8%	7%	N/A	
Primary health systems**	30.2	253	1,865	6,919	6
% contribution **	23%	6%	5%	6%	
TOTAL PERMATA	126.2	4472	26,210	118,277	20

*Due to the hoped impact of reinclusion of Ca supplementation into antenatal package with only short term TA input from PERMATA. Without this the rate of return of nutrition investments drops to $38

**Note that benefits accrue beyond maternal and newborn health to other health outcomes therefore rate of return on investment based only on MNH and savings to the health care system would still significantly underestimate the economic returns to health systems investments and hence they have not been represented here. Also note that for some of the interventions as they play a supporting role to MNH services above – benefits have already been captured (eg facility audit to improve BEONC in Puskesmas).

RETURNS TO FAMILY PLANNING

In development of the PERMATA design, family planning was considered as a path to reducing maternal and newborn mortality and stunting rather than an outcome in and of itself (though economic returns from declines in fertility and greater achievement of a demographic dividend were estimated). On this basis increased uptake of modern contraception overall as well as proportionate use has estimated benefits in terms of prevention of unintended pregnancies (and reduces fully the risk of maternal and newborn mortality from each) and particular reduction in high risk births i.e. high parity (4 and higher), late age and short spaced births (< 2 years apart) all carrying higher risk of maternal and newborn mortality and (for short intervals) stunting. Family planning is recognised internationally as one of the most cost effective ways of reducing maternal and

newborn death, particularly in countries with low modern contraceptive prevalence rates less than 50% (though Indonesia is currently at 58% which is average for South East Asian countries).

Family planning also has large returns to economic growth through bridging the gap between the declining number of children desired by couples with increases in a country's economic status and the achievement of those lower family sizes. The resulting reduction in fertility is one of the major contributors to the maximisation of a "demographic dividend" to economic growth through having lowered dependency ratios. Indonesia is poised (and is planning) to reap this population structure related boost to economic growth, though to achieve its projected declines in fertility a significant increase (estimated at an additional 12%) in modern contraceptive prevalence will be needed.

Though Indonesia's current contraceptive prevalence rate is 58%, this has stalled and can be improved. In particular changes to method mix to have greater use of long term methods for the limiting of births could reap large benefits though achieving this needs a multipronged strategy to address the current situation where financial incentives, availability and the experience and knowledge of women and families all favour the use of short term methods currently. Among the PERMATA areas, potential returns to investment in family planning are highest in NTT given the higher percentage of births less than 2 years apart and higher maternal mortality.

Whilst the family planning investments are represented separately here they are chosen to work as a package with social and behaviour change communication. This package is expected to increase the demand for contraception and in particular long term acting reversible methods, increase their availability and decrease costs (thereby increasing access) as well as improving the quality of the client provider interaction, known to increase uptake and decrease discontinuation rates.

Table A.3: Cost effectiveness estimates for potential PERMATA family planning investments

	Cost ($AUD millions)	Maternal deaths averted	Newborn deaths averted	Stunting cases averted	ERR
S/BCC for increased demand for modern contraception	2.9	531	1,634	15,661	72
Increased access to LARC at local levels	3.1	125	916	13,134	41
Improved client provider counselling and interaction for family planning	3.8	167	497	4,935	17
TOTAL FAMILY PLANNING	9.8	823	3,047	33,730	41

RETURNS TO NUTRITION

Rates of economic return to improved nutrition are among the highest of any health investment driven by improved productivity and educational performance with every dollar returning between an estimated 18 and 48 dollars in economic gains. Poor nutrition status of women and babies in Indonesia is a huge problem for a country of its income and is estimated to underpin up to two thirds of Indonesia's newborn deaths. Nearly a quarter of Indonesia's pregnant women have very low energy intake and are at risk of chronic energy deficiency (Riskesdas 2013). This contributes over 10% of Indonesia's babies being born at low birth weights (<2500g), carrying greater risk of newborn death. An estimated 36% of Indonesia's newborn deaths are due to complications of preterm birth, which are generally low birth weight. Not having preterm birth numbers separate from low birth weight in Indonesia is not ideal to guide best strategies for reducing the highest numbers of newborn deaths; however nutrition interventions can address both issues. Hypertension in pregnancy is one of the determinants of preterm birth and is rising in Indonesia yet simple known effective

interventions such as antenatal calcium supplementation has no or low coverage given it no longer appears in the antenatal policy. Rates of anaemia generally and in pregnant women specifically are high in Indonesia (even higher than the already high South East Asian average rates) contributing to greater maternal death particularly from post-partum haemorrhage, low birth weight and stunting. This suggests that the high reported rates of iron supplementation reported may not reflect the true situation of iron deficiency in Indonesia's pregnant women, given that blood is currently taken less than 50% of the time in antenatal care. This would be used for Hb monitoring, a more reliable measure of iron deficiency.

PERMATA is proposing a package of nutrition interventions to address the main causes of maternal and newborn death and in utero contribution to stunting. These include two potential demonstration projects, one on balanced protein energy supplementation for undernourished women (particularly high in NTT) to reduce incidence of low birth weight and another to improve monitoring of haemoglobin for targeting and monitoring of consistent iron supplementation compliance.

The reintroduction of calcium supplementation in the antenatal package and support to its roll out is a potentially low cost very effective means to reducing maternal death due to hypertensive disorders (such as preeclampsia which it can reduce by nearly 60% in low-calcium intake populations) and the risk of preterm birth. The high CE figures below for calcium are due to the assumption that, given it is a re-introduction into the ANC package that was previously there, limited TA and meetings would be funded for this but with large returns given the potential reduction in deaths due to preeclampsia, as well as the likelihood of and ease in scale up given it was previously policy and calcium supplements are relatively easy to obtain and distribute through ANC. Whilst this could be expected to reap national benefit relatively quickly, benefits have been calculated for PERMATA provinces only to ensure comparability with economic appraisal of the other interventions.

Nutrition information and counselling, whilst not being very effective on its own, will support better take-up of other nutrition interventions and so values reflect additional returns only if implemented with the iron or balanced protein energy supplementation demonstrations.

The higher cost of early breastfeeding initiation is largely due to costs of reaching a large number of private providers in East Java where some problematic practices (particularly selling of formula and take-home packs with formula feeding supportive items) are highest.

Table A.3: Cost effectiveness estimates for potential PERMATA nutrition investments

	Cost ($AUD millions)	Maternal death	Newborn death	Stunting	ERR
Re-inclusion of calcium in ANC package	0.3	1,901	7,302	41,150	2,776
Improved iron supplementation including Hb monitoring	1.8	149	2,690	14,831	138
Balanced protein energy supplementation	1.7	-	990	17,281	82
Nutrition counselling & S/BCC – if coupled with iron or BPE	4.0	118	619	4,366	17
In facility initiatives to promote early initiation of breast feeding	5.9	-	1,126	-	12
TOTAL NUTRITION	13.6	2,168	12,728	77,628	95

INVESTING IN IMPROVED AVAILABILITY, USE AND QUALITY OF MATERNAL AND NEWBORN SPECIFIC HEALTH SERVICES

The main causes of maternal and newborn death in Indonesia are strongly related and suggest that significant reductions could be made with a focus on improved access to and quality of a few key maternal and newborn health services. Rising rates of hypertension in Indonesian women underpin both the rising rates of maternal death due to preeclampsia (the highest cause of maternal mortality nationally and estimated to cause a third of all maternal deaths) as well as contributing to high rates of preterm birth which contributes to but, in Indonesia, is indistinguishable from low birth weight babies and estimated as the leading cause of newborn death underpinning just over a third of these deaths. It also contributes to the second highest cause of newborn death, birth asphyxia. In Eastern parts of Indonesia maternal deaths due to postpartum haemorrhage remains the leading cause of maternal death (30%) with risks higher for women with iron deficiency anaemia which also contributes to lower birth weights of newborns.

Better screening for these risks and efficient linkage to preventative medication has been shown to be able to reduce maternal mortality by between 16 and 36% and newborn mortality by between 12 and 28 %. However, an estimated two thirds of complications occurring during pregnancy remain unpredictable and so supporting births in facilities that are equipped with and/or can easily and efficiently refer to emergency obstetric and neonatal care (both basic initially which could cope with two thirds of these complications, then more comprehensive for the remainder) is key. In Indonesia basic constraints to this include availability of appropriately skilled staff, the right medication, equipment and birthing environment and clear clinical practice and referral procedures, the strengthening of mid-level primary health care systems starting at the Puskesmas is key (see further below under primary care strengthening).

Outreach to women and their families at home and at nearby health facilities is crucial to provide needed information and education about risks and good practices for birth and care of the newborn as well as to provide important services such as post natal care where women are less able and likely to return to the facility and are more likely to use services closer to home. Few incentives or health worker time is available for this, however, which needs to be addressed.

Direct maternal and newborn service coverage and quality strengthening interventions make up an estimated 50% of the activity cost of PERMATA but are crucial to addressing maternal and newborn death contributing at least a third of PERMATA's contribution to maternal and newborn death reduction. Because these interventions largely require ongoing support at a sub district level, however, they are more costly to implement than some of the nutrition demonstration projects which have limited scope but potential for benefit through scale up or some of the social and behavioural change communication interventions which have a higher proportion of fixed costs to reach larger numbers of individuals.

Interventions to increase facility delivery and use of ANC have limited returns due to the high rates of use of ANC and facility delivery in most PERMATA areas (with some exceptions particularly in NTT). It is now more the quality constraints in delivering emergency obstetric care for complications as well as (to a lesser degree) key interventions to prevent complications occurring (such as effective use of oxytocin to prevent and manage post-partum haemorrhage; and improved provision of antenatal corticosteroids (ACT) to prevent respiratory distress syndrome (RDS) in preterm babies).

Table A.3: Cost effectiveness estimates for potential PERMATA maternal and newborn health service delivery investments

	Cost ($AUD millions)	Maternal death	Newborn death	Stunting	Rate of return on investment
Community based interventions / SBCC for ANC, complications etc	3.0	95	393		10
Increased access to facility based birth through Desa Siaga	2.3	37	163		6
Improved screening and referral for ACT for RDS reduction in preterm	4.6		1,355		18
Improved BEONC referral practices and capabilities (with particular focus of active management 3rd stage labor)*	15.7	304	2,619		10
Improved CEONC referral practices and capabilities	9.6	135	1,010		5
Improve role, capacity and value of the midwife coordinator role for mentoring and referral	10.4	201	1,458		10
Improved monitoring and coverage of complete post natal care (inc home visits)	1.3		174		8
Improved use of maternal and newborn death and near miss audits	5.9	94	656		8
TOTAL MNH SERVICES	60.4	865	7379		9

PRIMARY HEALTH CARE SYSTEMS STRENGTHENING INVESTMENTS

Investments are needed in the relatively weak health systems of Indonesia to be able to support and sustain improvement in maternal and newborn health outcomes as well as other health outcomes in Indonesia more broadly. Currently Indonesia has an over focus on hospital care both in terms of supportive policies, reimbursement incentives and spending. The introduction of national health insurance schemes in other countries has tended to exacerbate this trend unless there has been a specific shift in policy focus to primary health care.

Greatest returns to primary care quality, use and health outcomes (including maternal and newborn health and nutrition) are likely to come from investments in reducing formal and informal payments at point of service, greater links between funding received and performance, greater retention of key health workers in rural remote Puskesmas, task shifting to allow midwives more time to focus on maternal and newborn care, increased availability of key drugs, medical supplies and equipment and improved monitoring of these and improved quality and use of key statistics of essential health service provision and outcomes. These both improve outcomes in terms of maternal and newborn health through quality delivery and particularly BEONC services, as well as health outcomes more broadly through increased primary health care utilisation (rather than no utilisation or going straight to hospital). Task shifting of and incentivising more outreach services to nurses and community health experts (such as health promotion workers, nutritionists etc) will particularly improve efficiency and outcomes in addressing the growing burden of non-communicable diseases as well as the remaining burden of communicable chronic diseases. These later benefits in terms of increased primary care utilisation and earlier detection and management of chronic disease are valued in terms of potential cost savings to the health systems of PERMATA provinces.

PRIMARY HEALTH CARE FINANCING

Exploring the role that performance-based financing could play in addressing lack of incentives for improvement on key indicators as well as flexibility in financial streams to primary care to enable effective local response to local problems could have large benefits to maternal and newborn health service delivery as seen in the table above. This has been seen in other countries such as Rwanda (Basigna et al., 2011) and the Philippines (Peabody et al., 2010) though results on different outcomes have been variable and its potential in Indonesia should be evaluated with a rigorous impact evaluation before wide scale up.

Anecdotal evidence suggests that the new financing arrangements for delivery services, with non universal coverage now for delivery care and new payment systems of capitation for primary services, is inducing some health centres to charge up front more frequently for delivery services. Recent health seeking behaviour evidence suggests that these payments average around Rp 150,000 and that, for primary health care services broadly, payments over Rp 20,000 can reduce health care use in poor and near poor populations by up to 70% (HSB report, May 2014). Whilst these populations are meant to be protected by the new Jaminan Kesehatan Nasional it is important that this is effectively the case at point of service and that those covered know what they do and do not have to pay for. Whilst no evidence based estimate on potential reduction in facility delivery and other maternal and newborn health service due to up-front payments requested is available we have conservatively estimated this at 10%. Payments made and potential non-use due to formal and informal payments should be tracked over time.

HUMAN RESOURCES FOR HEALTH

Whilst the overall supply of health professionals in Indonesia (other than doctors) is nearing the international standard for health worker to population ratios, the distribution and quality in Indonesia remain serious problems. Far fewer health workers are available in remote rural areas and those that do accept rural posting stay in their positions for a much shorter time than those in urban areas (World Bank 2009).

Retention of staff trained in dealing with maternal and newborn complications is a major barrier to rural health facilities' ability to effectively prevent maternal and newborn death from these causes. A 2013 evaluation conducted in 18 Puskesmas in NTT by the DFAT AIPMNH program found that only 2 of 5 staff trained in PONED were available in the Puskesmas 2 years later (AIPMNH progress report Jan – June 2013). Attraction of more allied health workers to rural Puskesmas, such as nutritionists, could increase the effectiveness of nutrition counselling and allow more task shifting from currently overburdened midwives who can then focus on essential maternal and newborn care quality improvement. Lack of staff availability reduces focus on important public health outreach programs essential for addressing growing burdens of chronic and particularly non communicable disease with remaining staff tending to focus on Puskesmas based services. Frequent turnover or "*mutasi*" of staff reduces community familiarity with health staff which recent health seeking behaviour study results suggest reduces likelihood of primary health care utilisation by a third (34%) amongst the poor and near poor in NTT and East Java provinces.

Efforts financially and non-financially to incentivise and strengthen accountability for attraction, retention and availability of staff and appropriate task shifting to ensure appropriate roles are played by health staff will be central in Indonesia to improvement in primary care coverage and quality.

IMPROVEMENT OF AVAILABILITY OF KEY EQUIPMENT AND SUPPLIES

Recent analysis of the readiness of health facilities in Indonesia to provide key services include maternal and newborn health services using 2011 Risfaskes data have shown less than half of Puskesmas in the country have

available the appropriate policy mandated equipment and medication to be able to supply basic delivery care and even fewer for basic emergency obstetric and neonatal care (World Bank 2014). This is as low as 3% of Pukesmas in NTT having the resources to address the most common cause of maternal death in that province, post partum haemorrhage. AIPMNH and other reports have noted that there is lack of budget available for equipment maintenance for primary care facilities and the annual tendering for drugs with little option for addressing stock outs later in the year; both are large barriers to the provision of essential maternal and newborn care particularly for complications (AIPMNH, 2013). Worryingly those medications and supplies most essential to address the most frequent causes of maternal death are also those most frequently unavailable in Puskesmas (such as oxytocin for PPH prevention and magnesium sulphate to address pre-eclampsia and eclampsia). The introduction of regular audits of key facility items and linked procurement systems and performance payments has been shown to significantly increase availability of key equipment and supplies in a number of countries and is one option that will be explored in PERMATA (Colbourn et al., 2013).

	Cost ($AUD millions)	**Maternal death**	**Newborn death**	**Increase in PHC util***	**Rate of return on investmt* ***
Performance based financing for coverage and quality of known effective interventions	12.2	363	1,192	39%	8
Reduced point of service payments	2.6	57	348	8 -11%	10
Health worker availability in rural remote Puskesmas	7.2	197	1,516	6 – 16%	19
Task shifting for greater midwife time and focus	2.6				
Client provider interaction improvement	5.6	Included in calculations above		26%	13
Improved conduct and use of primary care facility audit for availability of key supplies	3.5	Included in BEONC above		34%	10
Referral SOPs and monitoring	2.6	Little evidence to quantify benefits			
Strengthening community accountability of Puskesmas	1.7			12%	
Better streamlining and use of data for monitoring and decision making	7.4	Little evidence to quantify benefits			
TOTAL PRIMARY CARE SYSTEM	45.5				14

*The range represents East Java at the lower end and NTT at the higher end due to much greater gaps in health systems in Eastern Indonesia including lack of availability of health staff, more frequent absence of key commodities etc.

**Calculated on the basis of maternal and newborn health and stunting returns only to make comparison with other investments but note that far wider benefits will accrue to other health outcomes also and therefore the return on investment will be much higher than the figures represented here.