



# PAPUA NEW GUINEA CHILD AND ADOLESCENT HEALTH POLICY AND PLAN 2021-2030



Third edition

<b>FOREWORD.....</b>	<b>6</b>
<b>ACKNOWLEDGEMENT .....</b>	<b>7</b>
<b>ABBREVIATIONS.....</b>	<b>8</b>
<b>EXECUTIVE SUMMARY.....</b>	<b>9</b>
<b>CHAPTER 1. BACKGROUND.....</b>	<b>11</b>
1.1. <i>Recent progress in child health and the Sustainable Development Goals.....</i>	<i>11</i>
1.2. <i>Child mortality.....</i>	<i>13</i>
1.3. <i>Common causes of childhood illness.....</i>	<i>14</i>
Hospitals .....	14
Primary health care .....	15
1.4. <i>A Life-course approach.....</i>	<i>15</i>
Neonatal health.....	15
Infants 1 month to 5 years .....	15
Primary school age children 5-11 years of age .....	16
Adolescents 12-18 years, secondary school age .....	16
1.5. <i>A health systems approach.....</i>	<i>18</i>
Human resources.....	18
Welfare of health workers .....	19
Service delivery – Universal Primary Health Care and good quality secondary and tertiary health care.....	19
Medical products and technology .....	20
1.6. <i>A People-Centred Approach.....</i>	<i>20</i>
1.7. <i>Population issues and family planning.....</i>	<i>21</i>
<b>CHAPTER 2. POLICY BASIS AND BACKGROUND.....</b>	<b>22</b>
2.1. <i>Audience .....</i>	<i>22</i>
2.2. <i>Policy goals.....</i>	<i>22</i>
2.3. <i>Policy objectives.....</i>	<i>22</i>
2.4. <i>Policy principles.....</i>	<i>22</i>
Guiding principles of partnership in Child and Adolescent Health Policy .....	23
Responsibility for Policy .....	23
Responsibility for Service Provision .....	23
Complementarities.....	23
Identity and Autonomy .....	23
Equity.....	23
Transparency and Accountability .....	23
2.5. <i>Core Government commitments and policies.....</i>	<i>23</i>
2.6. <i>Legislation .....</i>	<i>24</i>
<b>CHAPTER 3. PROGRAM AREAS .....</b>	<b>26</b>
<b>3.1. Expanded Program of Immunization.....</b>	<b>26</b>

The aims of the EPI program.....	26
Vaccine preventable disease surveillance.....	27
<b>Key messages for Provincial and District Health Staff.....</b>	<b>28</b>
<b>3.2. Neonatal Care.....</b>	<b>29</b>
Early essential newborn care.....	30
Models of neonatal care.....	30
Care of the low birth weight baby.....	31
Neonatal sepsis.....	31
The Baby Friendly Hospital Initiative .....	31
Centres of Excellence for Neonatal Care.....	32
Activities.....	32
<b>Key messages for Provincial and District Health Staff.....</b>	<b>33</b>
<b>3.3. Improving Quality of Paediatric and Child Health Care.....</b>	<b>34</b>
Paediatric Quality Improvement Program.....	34
A quality improvement team in each hospital.....	34
Quality Improvement Checklist .....	35
Mortality auditing.....	35
WHO Pocketbook of Hospital Care for Children training course .....	35
Improving oxygen supplies and the management of severe pneumonia .....	36
Paediatric Hospital Reporting (PHR) program .....	37
Improving the care of children and adolescents with chronic illnesses.....	37
Hospital outreach services.....	37
Targets.....	38
<b>Key messages for Provincial and District Health Staff.....</b>	<b>38</b>
<b>3.4. Standard Treatment Manual and Clinical Guidelines .....</b>	<b>40</b>
<b>Key messages for Provincial and District Health Staff.....</b>	<b>40</b>
<b>3.5. Pneumonia and acute respiratory infections.....</b>	<b>41</b>
Causes.....	41
Treatment of pneumonia.....	42
Prevention of pneumonia.....	42
Immunisation.....	42
Other types of prevention .....	42
Pneumonia surveillance.....	43
<b>Key messages for Provincial and District Health Staff.....</b>	<b>43</b>
<b>3.6. COVID-19 and the pandemic.....</b>	<b>44</b>
<b>3.7. Malaria.....</b>	<b>44</b>
Prevention with insecticide-treated mosquito nets.....	44
Diagnosis and treatment.....	45

Activities and future directions .....	45
<b>Key messages for Provincial and District Health Staff .....</b>	<b>45</b>
<b>3.8. Tuberculosis.....</b>	<b>46</b>
Essential measures to reduce child TB .....	46
TB and HIV .....	47
GeneXpert testing and drug-resistant TB (DR-TB).....	47
Adolescents and TB .....	48
TB preventative therapy for children and adolescents.....	48
<b>Key messages for Provincial and District Health Staff .....</b>	<b>49</b>
<b>3.9. HIV in children.....</b>	<b>50</b>
Prevention of parent-to-child transmission.....	50
Priorities in paediatric HIV.....	51
<b>Key messages for Provincial and District Health Staff .....</b>	<b>52</b>
<b>3.10. Nutrition and Malnutrition.....</b>	<b>53</b>
Malnutrition.....	53
Breast feeding promotion .....	54
Complementary feeding.....	54
Micronutrients .....	54
Vitamin A.....	54
Deworming .....	55
Zinc .....	55
Growth monitoring every time a child receives their vaccines.....	55
Nutritional support to sick and malnourished children.....	55
Human resources for nutrition.....	56
Essential nutrition requirements.....	56
<b>Key messages for Provincial and District Health Staff .....</b>	<b>56</b>
<b>3.11. Adolescent health and school health.....</b>	<b>58</b>
Adolescent services within a hospital.....	60
School health programs .....	60
<b>Key messages for Provincial and District Health Staff .....</b>	<b>60</b>
<b>3.12. Children with disabilities.....</b>	<b>61</b>
Causes of childhood disability and complications.....	61
Support services for children with disabilities .....	61
Prevention of disability .....	62
<b>Key messages for Provincial and District Health Staff .....</b>	<b>62</b>
<b>3.13. Children with chronic illnesses .....</b>	<b>64</b>
<b>Key messages for Provincial and District Health Staff .....</b>	<b>66</b>
<b>3.14. Childhood cancer .....</b>	<b>67</b>

Future plans .....	67
<b>Key messages for Provincial and District Health Staff .....</b>	<b>68</b>
<b>3.15. Children with heart disease.....</b>	<b>69</b>
Future plans in the management of cardiac disease.....	69
<b>Key messages for Provincial and District Health Staff .....</b>	<b>70</b>
<b>3.16. Child protection and social services.....</b>	<b>71</b>
Child abuse and neglect.....	71
Reducing domestic violence.....	71
Universal education.....	72
Birth registration .....	73
<b>Key messages for Provincial and District Health Staff .....</b>	<b>73</b>
<b>3.17. Urban and environmental health .....</b>	<b>74</b>
Features of a healthy environment for children: .....	74
Reducing deaths and injuries from road trauma, burns and drowning .....	75
<b>Chapter 4. Human resources for child health .....</b>	<b>77</b>
4.1. <i>Training of paediatricians for the next 10 years.....</i>	77
Sub-specialty training.....	77
<b>Key messages for Provincial and District Health Staff .....</b>	<b>78</b>
4.2. <i>Child health nurses .....</i>	79
<b>Key messages for Provincial and District Health Staff .....</b>	<b>79</b>
4.3. <i>Community Health Nurses.....</i>	80
4.4. <i>Health extension officers.....</i>	80
4.5. <i>Continuing professional development.....</i>	81
<b>Key messages for Provincial Health Office .....</b>	<b>82</b>
<b>Chapter 5. Child health research.....</b>	<b>84</b>
<b>CHAPTER 6. CHILD HEALTH ADVISORY COMMITTEE.....</b>	<b>85</b>
<b>SECTION II.....</b>	<b>86</b>
<b>STRATEGIC IMPLEMENTATION PLAN 2021-2030.....</b>	<b>86</b>
<b>Appendix 1. Projection of paediatrician training 2021-2030 .....</b>	<b>108</b>
<b>Appendix 2. Paediatrician sub-specialty training 2021-2030.....</b>	<b>109</b>
<b>Acknowledgements.....</b>	<b>111</b>
<b>Appendix 3. Child health contact addresses.....</b>	<b>111</b>
<b>Appendix 4. Core indicators and monitoring.....</b>	<b>114</b>
<b>References.....</b>	<b>116</b>

# FOREWORD

It is with great pleasure that I introduce this updated PNG Child and Adolescent Health Policy and Plan. Improving child and adolescent health are vital for the future of Papua New Guinea. In recent years child death rates have reduced, and this is because of a comprehensive approach that is outlined in this plan. However there is still a very long way to go to achieve acceptable child survival, health and development, and child death rates are still among the highest in the Asia Pacific.

Recent improvements in child health have not been shared by all. Some children have missed out. Also child survival gains are not evenly distributed throughout the country. Some districts have child mortality rates that are 3-4 times higher than other districts. The challenges are many, including difficult geographical access, weak health systems and limited human resources. Preventable and treatable diseases such as pneumonia, diarrhoea, malnutrition, HIV and tuberculosis remain some of the biggest causes of child death. Many of these diseases also cause disability and long term problems that limit quality of life, educational outcomes and productivity.

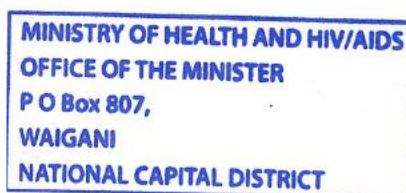
The good news is that there are effective interventions to reduce the burden of these illnesses, which are included in this Child and Adolescent Health Policy and Plan, and child health indicators are starting to improve. The plan emphasizes the importance of a people-centred approach, which mean listens to the perspectives of individuals, families and communities, and sees them as participants as well as beneficiaries of health care. The Plan also emphasises primary health care, improving quality of care, disease prevention and improving the human resources for health. Much can be done, even with limited resources, with a people-centred approach.

This Child and Adolescent Health Policy and Plan complements our overall National Health Plan. The aim of the National Health Plan is to improve the health of all Papua New Guineans through the development of a health system that is responsive, effective, affordable, acceptable and accessible to all people. This National Child and Adolescent Health Plan shows the detail of the child health component of the overall National Health Plan, and sets out activities and programs that will result in the further progress to the Sustainable Development Goals being achieved.

With sufficient investment in child health and education, this plan can be fully implemented and our goals for child and adolescent health can be achieved. Changes outside the health sector are also needed: there needs to be improvements in community development and engagement for better use of health facilities and care seeking, increased access to education and improved literacy for girls and women, curbing of domestic violence, increased male involvement in families, and the more equitable sharing of the favourable economic conditions.

This plan will be used at National, Provincial and local level. It will be used by Provincial Health to guide their annual implementation plans; and to inform health workers, the community and the Government's partners about child health priorities and the approaches being adopted.

Special thanks are due to the Paediatric Society of PNG, Family Health Services Branch and the Child Health Advisory Committee of the National Department of Health for their key roles in reviewing and revising this plan.



**Dr Lino Tom, Minister for Health and HIV& AIDS, May 2023**

## ACKNOWLEDGEMENT

Improving child, adolescent and maternal health is a major commitment of the PNG National Department of Health and Provincial Departments of Health. To achieve the Sustainable Development Goals will require that all people responsible for the health and wellbeing of children focus on the one strategy and work with commitment together, and have a people-centred approach. This policy and plan outlines a comprehensive approach that will result in real and sustained improvements in health services for children.

It is a tragedy that children in PNG still die unnecessarily, from preventable and easily treatable diseases, malnutrition and neglect. Our health service can contribute substantially, not only to preventing these deaths, but by the respectful and caring way we treat children and their families, in minimizing the effects of social disadvantages and poverty on the lives of people. We should treat people as we would want to be treated ourselves; with timely, considerate and effective care and good communication.

The first edition of this document was published in 2009, and was updated between in 2015. Many people contributed ideas and suggestions or reviewed various drafts. Contributions to the writing of this plan were made by members of the Paediatric Society of Papua New Guinea; Family Health Services of Department of Health; Child Health Advisory Committee; Division of Child Health, School of Medicine and Health Sciences, University of Papua New Guinea; and Centre for International Child Health, University of Melbourne.

On behalf of the National Department of Health, I would like to convey my sincere gratitude to all that were involved in reviewing and revising this very comprehensive and evidence-based Child Health Policy, Plan and Strategic Implementation Plan for 2021-2030.

I look forward to this Child and Adolescent Health Policy and Plan being promoted and implemented at all levels of governance by all cadre of health workers, as well as everyone else who contribute one way or the other in the development and well-being of the children of Papua New Guinea. I would ask you to please read this document carefully and do what you can to help us implement it.



**Dr Osborne Liko, Secretary for Health, May 2023**

## ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
AIP	Annual Implementation Plan
ANC	Antenatal Clinic
ART	Antiretroviral therapy
BFHI	Baby Friendly Hospital Initiative
CAP	Community Action Program
CHAC	Child Health Advisory Committee
CHP	Child Health Policy
CHW	Community Health Worker
DHS	Demographic Health Survey
DOTS	Directly Observe Treatment Strategy
EPI	Expanded Program on Immunization
EPTB	Extra-pulmonary tuberculosis
FBO	Faith Based Organization
FDC	Fixed Dose Combination
HEO	Health Extension Officer
HFS	Health Facility Survey
HIV	Human Immune Deficiency Virus
HSIP	Health Sector Improvement Program
IYCF	Infant and Young Child Feeding
MDG	Millennium Development Goal
MDR-TB	Multi-drug resistant tuberculosis
NDoH	National Department of Health
NGO	Non-Government Organization
NHIS	National Health Information System
PCR	Polymerase Chain Reaction
PHR	Paediatric Hospital Reporting program
PPTCT	Prevention of Parent to Child Transmission
PTB	Pulmonary tuberculosis
SIA	Supplementary Immunization Activity
SMHS	School of Medicine and Health Sciences
STM	Standard Treatment Manual
TB	Tuberculosis
UNICEF	United Nations International Children
UPNG	University of Papua New Guinea
VBA	Village Birth Attendant
VHV	Village Health Volunteer
WHO	World Health Organization
WPRO	Western Pacific Regional Office



## EXECUTIVE SUMMARY

This Child and Adolescent Health Plan spans 2020-2030, it is designed as a blue print for progress in child health, and provide guidance for provinces and districts, managers and program coordinators, paediatricians and nurses to align local activities with the National Plan.

The ultimate goal is to ensure that every child and adolescent is optimally healthy, raised in a safe and secure environment, and appropriately prepared physically, mentally, socially and emotionally for adulthood and to contribute to their society. This requires

- good health and nutrition
- responsive relationships and connectedness
- security, safety and supportive, clean environment
- opportunities for learning and education
- realisation of personal autonomy and resilience

### *Earlier editions of the Child Health Plan*

The first edition of the national Child Health Plan was produced in 2009. It was a road-map for the advancement of health services for children in PNG from 2009 to 2020, and incorporated as the child health component of the National Health Plan 2011-2020. The first edition of the Child Health Plan followed the World Health Organization (WHO) and the United National Children's Fund (UNICEF) Child Survival Strategy for the Western Pacific Region (2005).<sup>1</sup>

The Western Pacific regional strategy called for:

- One effective high level co-ordination mechanism (the Child Health Advisory Committee)
- One integrated national plan for child survival
- One national monitoring and evaluation system measuring core child survival indicators

The Plan was revised in 2015. Much progress had occurred in the first five years of that first Plan. These included: reducing malaria by increasing the use of insecticide-treated bed nets, the introduction of new vaccines against pneumonia and meningitis, slowing of the HIV epidemic, PCR testing for early infant diagnosis of HIV, improved paediatricians coverage in provinces, better surveillance and outcome data at hospital level.

### *The Sustainable Development Goals era and Child and Adolescent Health*

The period 2015-2030 is the era of the Sustainable Development Goals. It brings old and new challenges, and new opportunities for progress. WHO and UNICEF have redesigned their programs to address the high priority global problems in child health, regarding both preventable deaths and enhancing overall child health and development.<sup>2</sup>

In the last 15 years in PNG and globally some new problems have emerged, including an increase in malaria since 2015, and various types of drug resistance (multi-drug resistant tuberculosis, antibiotic-resistant neonatal sepsis, ART-resistant HIV). There are more children with chronic conditions, many affected by social problems causing failure to thrive, ill-health, and failure to reach their full potential.

The Child and Adolescent Health Policy and Plan 2020-2030 describes the essential interventions to reduce child mortality and ill-health. We need a strong focus on nutrition as this accounts for so much illness. Healthy nutrition is important at all stages life so that children reach their full growth and intellectual potential and are not delayed by nutritional deficiencies. The Plan includes a life-course approach, recognising that the health of children requires healthy mothers and pre-

conception care, and that older children and adolescents need good nutrition and to adopt healthy choices in order to be healthy adults with less risk of lifestyle-related diseases.

This Plan also focuses on children with chronic non-communicable conditions, such as heart disease, epilepsy and neurodevelopmental problems, thalassaemia, cancer and disability.

In 2020 we take a holistic view of health and wellbeing for children of all ages. In addition to health care that is provided in hospitals and health centres, we should also now focus on the health of children at school and the health needs of teenagers and adolescents. This includes preventative health, mental health, and the promotion of healthy lifestyles. Schools and communities need to promote healthy lifestyles, thus there is an important role for school health programs. There are also new opportunities for health education through social media and mobile technology, and new risks to the health and well-being of children and young people through the internet.

A focus on adolescents is also an opportunity to protect children from common adult conditions, including cardiovascular disease, sexually transmitted diseases, HIV, and social problems which result in the majority of the disease burden in adults. Family planning is crucial to achieving progress in child and maternal survival and other health outcomes.

This Plan includes activities in health care delivery, training and continuing education which have been introduced in recent years to strengthen each level of the health service. The plan also describes the coordinating committee, which has responsibility for implementation, oversight, and monitoring. Provinces need their own coordinating committees to ensure activities align with this Plan.

The Plan recognises the vital role that people have in child health: health care workers, health managers, parents, caregivers and families, community leaders, and teachers. Increased training of child health nurses, training of pediatricians, and teaching the components of this Plan in pre-service nursing, community health worker, HEO, and under-graduate medical training will be important.

This plan describes the core indicators that would enable progress to be monitored over the next decade.

Throughout the plan we have listed key messages for provincial health staff. These are designed to assist you implement the plan. At the end of the plan we have listed key contacts. If you have any questions about the child health, please contact the relevant people.



**Figure 1. Map of Papua New Guinea**

## CHAPTER 1. BACKGROUND

### 1.1. Recent progress in child health and the Sustainable Development Goals

Child health is at an important turning point in PNG. We have passed the Millennium Development Goal target date of 2015 and are in an era of the Sustainable Development Goals. Child mortality has been steadily falling over the last 15 years, but neonatal and infant mortality remain the highest in Oceania. We are at the cross-roads of the old and the new causes and determinants of child morbidity and mortality.

The health system in PNG has many strengths, and systems are changing with more provinces taking responsibility for policy implementation through the establishment of the Provincial Health Authorities. There is strong commitment by nurses and paediatricians to the health and welfare of all children. Recent successes in PNG have included:

- Progress in technical policy including the publication of the 10<sup>th</sup> Edition of the Standard Treatment Manual for children, which includes zinc as treatment for diarrhoea, six-monthly vitamin A supplementation to all children, revisions to all treatment protocols for malaria, TB and HIV
- Introduction of Haemophilus influenzae type b (Hib) vaccine as the Pentavalent vaccine in 2008 and the pneumococcal conjugate vaccine (PCV) in 2014

- Successful containment of polio outbreak in 2018-19
- Currently few cases of serious Covid-19 infection in PNG in 2020
- Increase in the number of paediatricians serving clinical and public health needs of provinces, and the development of substantial capacity of paediatricians in EPI, HIV, neonatal care, public health, child nutrition, research, oncology and cardiology. There have been 50 paediatricians trained since 2000, and these people are filling important roles in child health throughout the country

The Sustainable Development Goals call for an ambitious target; by 2030 to reduce child mortality to less than 25 per 1000, and neonatal mortality to less than 12 per 1000. The challenges are many, including difficult geographical access, health system gaps and limited human resources.

Preventable and treatable diseases such as pneumonia, diarrhoea, malnutrition, neonatal sepsis, birth asphyxia, HIV and tuberculosis are still some of the biggest causes of child deaths. Many of these diseases also cause disability and long-term problems that limit quality of life, educational outcomes and productivity. New problems have emerged, including social problems causing child illness within urban environments, the challenges of adolescent health, the care of children with chronic illnesses, and child and family mental health.

The good news is that there are effective ways to reduce these conditions, all are included in this Child Health Policy and Plan. This document emphasises the importance of prevention, primary health care, improving quality of care, disease prevention and improving the human resources for health. The Plan includes a life-course approach, from educated and healthy mothers, to newborn care, the first 1000 days, care of children with acute and chronic conditions, school health and adolescent health. This Plan will help PNG respond to the Sustainable Development Goals, which require a multi-sector, whole of community and whole of government approaches to development, and set the targets to be achieved by 2030.

There are several major obstacles to achieving the SDGs. Tuberculosis in children is a major obstacle to achieving improved child health, leading to severe chronic disease, disability and malnutrition. The high rates of childhood TB reflects the weak TB control system, poor nutrition and poverty, and now multi-drug resistant TB represents new challenges. HIV epidemic has slowed but remains endemic, and HIV infection still accounts considerable proportion of child deaths, and control preventative and treatment programs need strengthening.

Other obstacles to achieving the SDGs and general improvements in child development, are the poor social situations in many urban settlements and some rural communities and poor nutritional outcomes. Infants and children in many urban settlements live in crowded and often unstructured households, where breast feeding often gives way to early weaning, poor quality complementary feeding, bottle feeding, and where informal adoption or child neglect also may occur with significant health consequences for children. In these environments preventable deaths due to combinations of severe malnutrition, diarrhoeal disease, acute respiratory infection and tuberculosis occur. It will be essential to address malnutrition to achieve reductions in child mortality, and allow children to thrive. A significant constraint to services being delivered within some communities is their sometimes dangerous and volatile environments, which makes them places into which health workers are understandably reluctant to venture.

If the child health related SDGs are to be achieved by 2030 there will need to be major focuses on improving, supervising and supporting rural health services; on outreach EPI services; on infant and young child nutrition and growth monitoring linked to vaccines; on economic development that benefits poorer communities and those in remote rural areas; and helping poorer communities in both rural and urban areas to improve essential health services and education. But it is feasible with a coordinated effort. The National Department of Health, the Paediatric Society and other partners



are committed to reaching higher coverage for interventions that reduce child deaths and improve child and adolescent health and well-being.



## 1.2. Child mortality

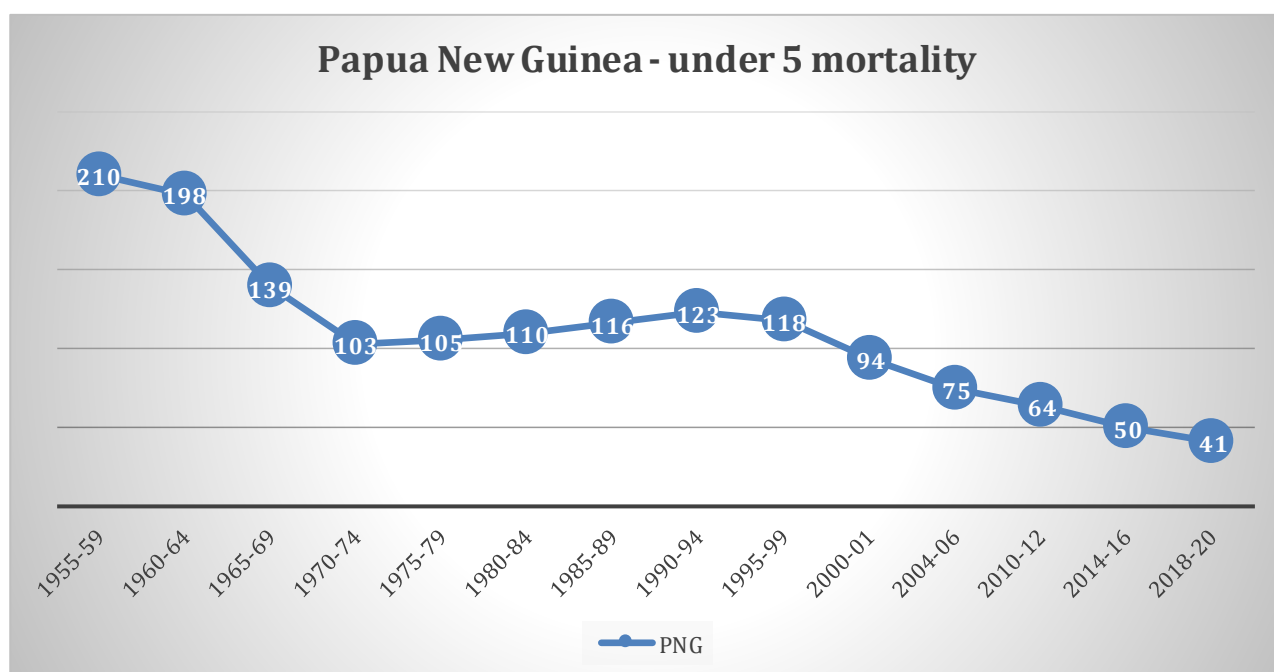
Oceania, which includes PNG, made less progress towards the Millennium Development Goals for child health compared to most other regions of the world.<sup>3</sup> In Oceania, child mortality fell from an average of 67 to 51 per 1000 live births between 2000 and 2015 (average of 1.5% reduction per year). This compared to East Asia and South-East Asia (40 to 17; 3.8% annual reduction) and Central and South Asia (91 to 50; 3.0% annual reduction), and a global reduction of 76 to 43 per 1000 live births (2.9% annual reduction). PNG health and population data dominates Oceania, because of the size of our population.

In the last 25 years the best data on child mortality comes from the Demographic and Health Surveys, PNG has had 4 such surveys: in 1991, 1996, 2006 and 2016-18.<sup>4-6</sup>

In PNG, the estimated under-5 mortality rate is now 49 per 1000 live births, the infant mortality rate is 33, and the neonatal mortality rate is 20 per 1000 live births. This is a major improvement and does represent a 2/3 reduction in child mortality since 1991 (Table), which was the MDG-4 goal.

	1991	1996	2006	2016-18
Under 5 mortality rate	133	94	75	49
Infant mortality rate	82	69	57	33
Neonatal mortality rate		30	29	20

In 2015 the Government of PNG committed to the Sustainable Development Goals. The Sustainable Development Goals call for an ambitious target; by 2030 to reduce child mortality to less than 25 per 1000, and neonatal mortality to less than 12 per 1000.



**Figure 2. Mortality trends for children in the first 5 years of life in PNG, 1955-2012** <sup>4-6</sup>

### 1.3. Common causes of childhood illness

#### Hospitals

Since 2009 data have been gathered annually on the common causes of child admissions using the Paediatric Hospital Reporting system to up to 20 hospitals per year.<sup>7</sup> Pneumonia is the single most common reason for admission (16.1% of admissions in 2019), but a lower proportion of all admissions than in previous years. Pneumonia case fatality rates are significantly lower than in

previous years: 3.6% overall in 2019 (previously 5%), and 7.4% for severe pneumonia in 2019 (previously more than 10%).<sup>8</sup>

Just over one quarter of all admissions are in the neonatal period. Neonatal deaths account for just over one third (35.3%) of all childhood deaths. The leading causes in neonates are neonatal sepsis, birth asphyxia, and very low birth weight and prematurity.

In 2019 severe malnutrition was present in 8% of hospital admissions, a reduction in prevalence on previous years. Malnutrition caused or contributed to 13% of all deaths and 20% of post-neonatal deaths. In previous studies in Goroka and Port Moresby either moderate or severe malnutrition was a factor in two-thirds of all child deaths.<sup>10;11</sup> Case fatality rates have decreased for severe malnutrition in the last 10 years, but was still 10% in 2019. Many additional children have moderate malnutrition or other nutritional deficiencies.

More children are now being seen with chronic non-communicable illnesses – asthma, bronchiectasis, rheumatic and congenital heart disease, epilepsy and cerebral palsy, and cancer.

## Primary health care

In primary health care settings, the common causes of presentation are acute respiratory infections, including pneumonia but also upper respiratory tract viral infections and bronchiolitis. Diarrhoea, malaria and viral causes of fever, and nutritional problems. Children often have conditions that are unrecognized, they may present with a fever or virus infection, but have anaemia, malnutrition or skin sores. It is very important that these neglected but common conditions are recognised and treated before they become severe. Also the same children with chronic conditions that are now presenting to hospitals also live in the community, so every health facility will have in their catchment a number of children with these conditions (such as chronic lung disease, asthma, epilepsy or cerebral palsy). It is important that primary health care clinics understand the care of these children and liaise closely with the treating hospitals.

## 1.4. A Life-course approach

A life-course approach recognizes that social and economic conditions strongly influence health, and that events in an early stage in life can have strong effects on health in later life. A life-course approach identifies the different causes of childhood illnesses at different ages.<sup>2</sup>

### Neonatal health

Prematurity, low birth weight  
Infection  
Birth asphyxia  
Congenital malformations

### Infants 1 month to 5 years

Acute infections: pneumonia and other acute respiratory infections  
Sepsis, malaria, diarrhoea  
Nutritional problems  
HIV  
Skin infections such as scabies  
Tuberculosis  
Congenital problems such as cerebral palsy

## Primary school age children 5-11 years of age

Acute infections such as malaria, diarrhoea, pneumonia

Chronic infections such as tuberculosis, rheumatic heart disease, HIV

Asthma

Skin infection such as scabies

Chronic non-communicable conditions

## Adolescents 12-18 years, secondary school age

Acute infections such as sepsis and pneumonia

Chronic infections such as tuberculosis, rheumatic heart disease

Asthma

Trauma

Mental health problems

Nutritional problems

Sexual and reproductive health problems

Chronic non-communicable conditions

A life-course approach recognises that the health of children requires healthy mothers and pre-conception care, and that older children and adolescents have specific health care needs. A child must grow and develop optimally during the first 2 decades of life to become a healthy, responsible, productive adult. Physical growth and psychosocial development and fostered by health environments in families, schools, and communities.

In a life-course approach, the building blocks of (1) good health, (2) adequate nutrition, (3) responsive relationships and connectedness, (4) security, safety and supportive environments, (4) opportunities for learning and education, and (5) realization of personal autonomy and resilience have different relevance at different ages. Examples of how these have an effect on health at different ages and stages is illustrated in Figure 3.



Examples	Pre-conception (maternal health)	Pregnancy and childbirth	Neonatal	1-11 months	12-35 months	3-5 years	5-9 years	10-14 years	15-19 years
Good health	STI free Reduction in smoking, substance use		Quality ANC and PNC KMC Maternal health including mental health		Immunization Treatment of acute infections Care for disabilities		Immunization Treatment of acute infections Vision and hearing screening Injury prevention		HIV-free Chronic illness treatment Sexual and reproductive health care Good mental health
Adequate nutrition	Healthy diets Micronutrients		Exclusive breastfeeding		Exclusive breastfeeding Complementary feeding Vitamin A supplementation Growth monitoring		Healthy balanced diet and nutrition		Healthy diets Prevention of anaemia Prevention of obesity
Responsive relationships and connectedness	Supportive partner and family relationships		Responsive caregiving Parenting support		Play and communication Monitoring development		Prevention and early recognition of mental health problems		Prevention and early recognition of mental health problems Peers and networks
Security, safety and supportive environment	Safe housing, WASH and clean environment. An environment free of violence		Clean cook stove Smoke free home		Protection from environmental hazards		Protection from harsh punishment and bullying Safe and clean places for play and recreation		Health-promoting schools Internet safety Road safety Physical activity
Opportunities for learning and education	Health literacy		Holding, singing, talking, copying the child		Detection of developmental difficulties		Early learning activities Care for developmental difficulties Preschool education Universal schooling		Literacy, numeracy, life skills Completion of education Commencement of employment
Realization of personal autonomy and resilience	Family planning STI prevention		Supportive environment for women/mother		Birth spacing		Self-esteem, incremental independent decision-making		Self-esteem Ability to resist peer pressure Agency to realize personal goals

**Figure 3. A life course approach, requirements at each age group to be optimally healthy**  
(Acknowledgement: WHO Child Health Redesign framework)

## 1.5. A health systems approach

WHO has proposed a framework of six building blocks to analyse health systems. The six building blocks are service delivery, information, medical products and technology, human resources, health financing, and leadership. This policy and plan recommends, by order of priority, the following three components of Health Systems to be seriously addressed.

- Human resources, including welfare of health care workers
- Service delivery – Universal Primary Health Care and good quality secondary and tertiary health care
- Medical products and technology

### Human resources

Without increased numbers of trained health staff this plan cannot be fully implemented, and PNG's health-related Sustainable Development Goals for mothers will not be reached.

There has been an increase in the number of paediatricians since 2000. Fifty paediatricians have graduated from SMHS between 2000 and 2020, and now paediatricians are working in 17 of 22 provinces, and many hold other senior positions within the NDoH, University, National Capital District and working with non-government child health organizations. However, there is still a major short-fall. Without at least two paediatricians in each province it is very difficult for paediatricians to focus on both clinical issues and public child health. Some provinces still do not have one paediatrician, so less specialist expertise is available to these provinces' child health activities. This plan sets out a workforce and training plan and timeline for achieving this (see paediatricians training and Appendix 1 and 2).

There is now increasing need for paediatricians to take national responsibility for certain aspects of child health. This approach is reflected in this plan, with paediatricians identified to provide leadership in neonatal care, immunisation, childhood tuberculosis, adolescent health, paediatric cancer, heart disease, disability, and child protection.

There is a need for many more child health nurses and midwives. In 2009-2015 there were investments in midwifery training, with increased training places at School of Medicine and Health Sciences (SMHS), University of Papua New Guinea, and other midwifery schools, supported by the Australian Government. However the same progress has not occurred in child health / paediatric nursing. In 2020 there is only one post-graduate child health nursing courses in PNG. This is at SMHS, Taurama Campus. This school trains about 20 midwives and paediatric nurses annually. Another child health course in Goroka University was closed down in 2009 after a few years of functioning. A review of PNG's nursing workforce in 2002-3 estimated that there was a need for 435 more midwives and 200 more paediatric nurses. Each of the four regions in the country needs at least one post-graduate midwifery course and at least one child health nursing training school.

Many Health Extension Officers (HEO) work in provincial hospital paediatric wards, under the supervision of a paediatrician, or in district hospitals helping run the paediatric clinical service with nursing staff. However there is no formal continuing education to upskill in paediatrics for HEOs, unlike for nurses and doctors. If selected HEOs were able to enrol in the Diploma of Child Health – or equivalent - through University of PNG School of Medicine and Health Sciences, it would greatly assist their career development, and quality of care for children in district hospitals.

Since the closure of the Nutrition Course at the College of Allied Health Sciences (CAHS) in 1982, there has been a steady decline in number of nutritionists and nutrition positions in provinces. In 2009 nutrition positions were filled in 9 provinces and in 3 provinces nutrition positions have been vacant for extended periods of time. The number of nutrition positions at Health Department Head Quarters had declined from 7 to 2.

Gaps are not just in training, but in workforce planning, accreditation of certain cadres of health workers (including child health nurses), and incentives for rural service.

In some remote communities village health volunteers – which include village birth attendants and other village health workers - have a role in delivering maternal and child health services. Village health volunteers are mostly supported by churches and other non-government agencies. This cadre of health workers is currently unregulated, and there is little standardization of practice or quality assurance. There is a need to determine appropriate content and durations of training, skill-set, standards of practice, supervision, remuneration, and integration with the formal health system. The links between VHWs and government and church run health centres needs to be strengthened.

Undergraduate training of additional students in medicine needs to be supported and negotiated with the Higher Education section under the Ministry of Higher Education, Research, Science and Technology.

Service training of the paediatric health workforce is strongly supported and promoted by the Child Health Policy and Plan, as is continuing professional development. In the Child and Adolescent Health Policy and Plan this is outlined in several sections: including Section 5.5; and Appendix 1: Projection of Paediatrician Training 2020-2030, which tabulates and outlines the required number of paediatric health workforce for the nation at all levels. Furthermore, Appendix 2: Projection of Paediatrician Sub-specialty Training 2020-2030, outlines the need for specialized training in the discipline. Indeed attaining and maintaining the right number of the paediatric health workforce will ensure the proper implementation and achievement of the Child Health Policy and Plan. There is a need for scaling up the training of paediatric nurses, general nurses and other cadres of health workers including laboratory staff and biomedical technicians who have a role in activities relating to health service provision for children and mothers.

## Welfare of health workers

The welfare of nurses, doctors and other health care workers is a high priority issue. This has become even more important during the Covid-19 pandemic, where the safety and health of all health care workers is paramount, but it is also important for other reasons.

The performance of health staff is greatly enhanced when their welfare is adequately addressed and satisfied. Basic family concerns such as housing, security, transport, telecommunication, water and electricity, depending on the station of assignment, should be ensured.

As we have seen during Covid-19, the health and safety of health workers depends on infection control, adequate equipment including personal protective equipment for certain infectious diseases, guidelines and training.

But health care workers also need support to help with the stresses that come with the role, such as sadness when patients who they have cared for die, or feelings of fear when faced with an angry family member, or fatigue if they work many shifts in a row. These are modern-day stresses for health care workers and they need to be taught the skills to deal with these situations, to know they can only do their best, and be supported and protected. The mental health and well-being of health care workers is a big issue that we all need to consider.

## Service delivery – Universal Primary Health Care and good quality secondary and tertiary health care

Achieving the SDGs for maternal and child health require a realisation of Universal Primary Health Care in service delivery at a community level, in rural and urban areas. Up-scaling and improving the quality of services in the provincial and district hospitals is also needed. A resumption of

services at closed aid posts or community health posts is needed. Management authorities need to prioritise resource allocation to these stations as their role and services are vital for early management and referral of very unwell mothers and children, and for preventative health care.

Laboratory services should be available at all district hospitals. Basic diagnostic instruments and equipment should be made available to health centres for early diagnosis of conditions such as malaria and anaemia. Chest radiographs, full blood examinations, biochemistry, bacteriology facilities (including cerebrospinal fluid microscopy and culture and blood culture and bacterial antigens), diagnostics for tuberculosis including GeneXpert, HIV testing (PCR for early infant diagnosis and CD4 counts or viral load for monitoring treatment) and Covid-19 testing should be available at all provincial hospitals.

## Medical products and technology

The Child and Adolescent Health Policy and Plan requires the maintenance of adequate medicine and drug supplies in all health facilities. The further development of basic equipment and technology appropriate to the level of health services provided should also be ensured.

- Provision of all medicines contained in the Standard Treatment Manual.
- The introduction of new medicines to treat resistant infections including multi-drug resistant (MDR) tuberculosis and multi-resistant bacterial infections, and second-line therapy for HIV.
- An oxygen supply program based on oxygen concentrators and pulse oximeters in all provincial and rural hospitals and major district health centres in the country. Where power supplies are inadequate solar power will be trialled. Oxygen generators that fill cylinders on site is also a method of oxygen provision that is effective and being piloted.
- To improve immunization coverage, health facilities including community health posts need a functioning refrigerator. Missed opportunities in vaccination lead to disease outbreaks.
- The use of medical communication technologies is a priority for provincial and rural hospitals. Modern methods of communication such as mobile phones, radio or telemedicine via the Internet should be explored to improve the quality of care in remote areas, timely medical referrals, and continuing education for remote health staff.
- Newer diagnostic technologies for tuberculosis should be evaluated and introduced if they are found to be effective. Guidelines will be developed for the appropriate use of GeneXpert MTB/RIF to help detect multi-drug resistant tuberculosis.
- Rapid diagnostic tests for other diseases, such as encephalitis and meningitis should be introduced.
- The Paediatric Hospital Reporting (PHR) program should be supported and extended to all hospitals or health facilities caring for children as inpatients.

## 1.6. A People-Centred Approach

People-centred health services is an approach that listens to the perspectives of individuals, families, and communities, and sees them as participants as well as beneficiaries of health care. People-centred health care responds to their needs and preferences in respectful, humane, and holistic ways. People-centred care requires that people have the health education and support they need to make decisions and participate in their own care. It is organised around the health needs and expectations of people rather than diseases.<sup>9</sup>

## 1.7. Population issues and family planning

The Paediatric Society of PNG and Family Health Services Division of the National Department of Health are aware that one of the factors in PNG that has the potential to derail all the positive gains made so far is uncontrolled population growth. PNG now has almost a 3% population growth rate with a projected doubling time of 20 years. This means that in 10 years time the paediatric population will have been increased by around 2 million.

This will put immense pressure on resources with requirements for increases in number of health facilities, personnel, schools, jobs etc. Moreover there will most likely be detrimental effects on overall socio-economic status of families, provision of education and increase in social discord, urban drift, food insecurity, degradation of the environment and land shortages.

In addition, for the health of families there are major consequences of unplanned pregnancies and lack of access to family planning. Narrow birth spacing has an adverse effect on child health and mortality. Infant mortality is very high for children born following a birth interval of less than two years after the previous birth; IMR is 71 per 1,000 live births compared with 42 per 1,000 live births for children born three or more years after the previous birth.

The Obstetrics and Gynaecology Society, the Paediatric Society and Family Health Services advocates that population policy and family planning availability needs to be dealt with at the highest levels, with the utmost urgency. The country's political leadership must be made aware of the need to address this and commit to a concerted effort. This will require mobilisation of all segments of the community as the ill effects of over-population will impact on all areas of life.

The Paediatric Society will undertake to more actively promote family planning in the clinical setting as well as advocate for wider solutions to over-population.

## CHAPTER 2. POLICY BASIS AND BACKGROUND

This plan is needed as a blueprint for addressing child health needs in the next decade, and to outline PNG's commitment to the Sustainable Development Goals regarding child and adolescent health. The Plan is consistent with the National Health Plan 2021-2030 and provides more details on each of the NHP priorities for child health.

### 2.1. Audience

It is designed to be a blueprint for paediatricians, other health care workers, national, provincial and district managers, community groups, international partners and NGOs involved in child and adolescent health. It is designed to help plan their child health programs at a national, provincial, district, and local levels.

The policy and plan will be shared with international development partners, donor agencies, NGOs and other stakeholders both within the public and private sector.

### 2.2. Policy goals

The goals of the Child and Adolescent Health Policy and Plan are to reduce newborn and child mortality and to improve the quality of health, development and well-being of the children and adolescents of Papua New Guinea.

### 2.3. Policy objectives

The objectives of the Child Health Policy are:

- The ultimate goal is to help families raise healthy, well educated children who are socially prepared for adulthood and enjoy a good state of health and well-being.
- To improve the quality, access and delivery of health services to children and young people of Papua New Guinea
- To reduce the neonatal, infant and under five year old mortality as per the Sustainable Development Goals
- To reduce the burden of childhood tuberculosis and HIV
- To address chronic non-communicable diseases of children and adolescents
- To promote preventative health and wellbeing for children and adolescents through different platforms outside the health sector: schools, churches, community and sporting groups. To promote mental health and education, healthy lifestyles, and safety.

### 2.4. Policy principles

It is the right of every child to good health and protection from harm. The Government of Papua New Guinea recognizes that and had been signatory to the 1989 United Nations Convention of the Rights of the Child.

Furthermore, the Government of Papua New Guinea recognizes that the future of this young and developing nation depends on the wellbeing of its most important resource - the children, who will be the leaders of the nation.

Thus the Government of Papua New Guinea recognizes this Child Health Policy as the instrument through which its vision and goals of developing a better Papua New Guinea becomes a reality.



## Guiding principles of partnership in Child and Adolescent Health Policy

The scope and level of partnership for child health in Papua New Guinea depends on the following principles:

### Responsibility for Policy

The overall responsibility for health policy formulation (including the Child Health Policy and Plan), monitoring and evaluation and the health status of the children of PNG is maintained by the Government of Papua New Guinea through the National Department of Health. The National Department of Health will consult its partners and aims for consensus in all cases of common concern. The Paediatric Society of PNG is the peak professional body contributing to this Plan.

### Responsibility for Service Provision

Provision of health services to the children of Papua New Guinea pertains to the different service delivery partners: Government agencies (hospitals, health clinics, provincial, district and public health offices), church health services, non-government organizations (NGO), private health care organizations, schools and universities of health care worker training and development partners (local and international partners and agencies).

### Complementarities

All external partners shall strive to support and complement the services of Government and other institutional agencies, and align with the content of this policy and plan, rather than run parallel services.

### Identity and Autonomy

The identity and autonomy of each partner is respected.

### Equity

The allocation of resources for implementation of the Child and Adolescent Health Policy and Plan shall be made in accordance with disease burdens, the most effective use of resources, and with the aim of reducing inequity.

### Transparency and Accountability

Inputs, outputs and outcomes pertaining to the attainment of the child health goals are agreed to, reported by, and shared among partners.

## 2.5. Core Government commitments and policies

This Child and Adolescent Health Policy and Plan complements PNG's overall National Health Plan (2020-2030). The aim of the National Health Plan is to improve the health of all Papua New Guineans through the development of a health system that is responsive, effective, affordable, acceptable and accessible to all people. This Child and Adolescent Health Policy and Plan shows the detail of the child health component of the overall National Health Plan, and sets out activities and programs that will support the SDGs being achieved.

Thus, this Child and Adolescent Health Policy and Plan applies to:

- The total health care system in Papua New Guinea provided by government, faith-based organizations, NGOs and private health services.
- All health care facilities and non-facility based services such as those provided in homes and villages, schools and communities, and within the private sector
- All registered health care workers

The Child and Adolescent Health Policy and Plan can be read together with other key policy documents, including:

- Constitution of Papua New Guinea (1975)
- Papua New Guinea National Strategic Plan: 2010-2050 (September 2008)
- Organic Law for Provincial and Local Level Government (Department of Provincial and Local Level Government Affairs, November 1998)
- National Health Plan 2021-2030 (National Department of Health, 2021)
- National Health Standards, 2<sup>nd</sup> edition (National Department of Health)
- Minimum Standards for District Health Services in Papua New Guinea (National Department of Health, May 2001)
- Policy on Partnership in Health (National Department of Health, 2002)
- National Immunization Strategy 2021-2025 and beyond up to 2030 (National Department of Health 2021)
- National Nutrition Policy (Revised 2015)
- National Policy on Family Planning (National Department of Health, 2009, Revised and updated 2014)
- National Policy on Sexual and Reproductive Health (National Department of Health, Revised and updated 2014)
- Village Health Volunteer Policy (National Department of Health, July 2000)
- Health Workplace Policy on HIV and AIDS (Ministry of Health, December 2005)
- Community Health Posts Strategy (Ministry of Health, 2009)
- National Health Reform Legislation 2009

## 2.6. Legislation

The Child and Adolescent Health Policy and Plan (CHPP) in its formulation and implementation notes the importance of a sound legislative environment to support the goals, objective and strategies of the plan

The CHPP acknowledges the presence of the following Legislations under the Ministry of Health that have bearings on the health of children in the country.

- National Health Administration Act 1997
- Organic Law on Provincial and Local Governments
- Public Hospital Act 1994
- HIV/AIDS Management Act
- Provincial Health Authorities Act 2007



- Christian Health Services Act
- Medicines and Cosmetics Act
- Food Sanitation Regulation 2001
- National AIDS Council 2007 (Amendment) Act 2007
- Institute of Medical Research (Amendment) Act 2007
- Other Legislation relevant to child health but placed under the administration of other government departments includes the following.
- Adoption Law
- Civil registration
- Child Welfare Act
- Education law (for primary school education)
- Deserted Wives and Children Act
- The CAHPP is also mindful of Government's commitment to the international agreements and obligations relevant to adolescent and child health as listed below.
- Millennium Development Goals
- Convention on the Rights of the Child (CRC)
- International Conference on Population and Development (ICPD)

In the term duration of the CHPP, it is recommended that the following new legislation be considered by the NDoH for the promotion of health of children.

- Code of Marketing of Breastmilk Substitutes
- Food safety and Food Standards
- Child Protection– Lukautim Pikinini Act 2009

## CHAPTER 3. PROGRAM AREAS

### 3.1. Expanded Program of Immunization

Every effort should be made to increase coverage of childhood immunization in all provinces and districts. Childhood vaccines have been responsible for major advances in child health and reductions in mortality in PNG in the last 40 years. The EPI is a major component of the Child Health Policy and Plan. The policy aims and the strategies required to achieve these aims are carefully described separately within the *National Immunization Strategy 2021-2025 and beyond up to 2030*. This Strategy outlines the catastrophic situation where immunization coverage in the last 20 years has dropped from 70% in the 1980s to less than 40%. The Strategy is based on an urgent “resuscitation” phase (2021-22), a “rehabilitation” phase (2021-25) and a “sustaining” phase from 2025-30.

Immunization services are provided through the network of around 700 Maternal and Child Health (MCH) clinics run from health centres and hospitals. Modes of delivery are static, outreach and opportunistic, and services are routine and supplementary. It has been estimated that 30% of the children are reached through outreach services, although the frequency and regularity of outreach services is variable and have diminished over time.

There is now a policy to extend EPI delivery to a community health post level. This will require the upgrading of aid posts, training of more community health workers, and installation of cold chain equipment at an aid post level, many of which will require solar-powered vaccine refrigerators.

Supplemental immunization activities (SIA) were done in 1996 for polio eradication and again in 2018, 2019 and 2020 in response to re-emergence of vdpv1. Measles SIA were conducted in 2003-2005 and again in 2008-09 and 2014 in response to epidemics of measles. These were remarkably successful, at one stage bringing the measles vaccine coverage to an estimated average level of 86% of one-year old children. Now, integrated MCH outreach activities are being encouraged from the national level and SIAs will be conducted at sub-national levels where routine coverage is below average.

Administratively, EPI is under the Population & Family Health Branch under the Public Health Division of the National Department of Health. At the national level, the EPI management structure consists of, an EPI Manager, a Cold Chain Logistics Officer, Vaccine Management Officer, a VPD Surveillance Officer and an admin officer.

At the regional level, there are four Regional Cold Chain Logistics Officers based in one province within the region; all are funded by DFAT and supported by WHO. Provincial Cold Chain Logistics Officers are responsible for the management of vaccines at provincial level with support from the provincial family health coordinator. At the district level, EPI is managed by the district manager through the health facility nurse in charge.

The Health Department is strengthening disease surveillance, including that for diseases targeted under EPI through the introduction of an integrated surveillance system in the Disease Control Unit to which most of its reports flow through NHIS and sentinel reporting.

#### The aims of the EPI program

- High quality immunization services that reach every child and mother.
- Elimination of measles.
- Maintenance of PNG’s polio-free status. Based on WHO recommendations, to replace oral polio vaccine (OPV) with inactivated (injectable) polio vaccine (IPV) in 2018 to achieve the “End-Game for Global Eradication of Polio”.

- Elimination of maternal and neonatal tetanus.
- Control of hepatitis B and improve birth-dose coverage.
- Introduction of new vaccines against the commonest causes of mortality in children.
- Introduction of the COVID-19 vaccine, according to the National Immunisation Strategy 2021-25.
- Revive the school health vaccination programs for measles-rubella and tetanus vaccines.
- Introduction of Human papilloma virus (HPV) vaccine in school health and adolescent health programs.
- Improving vaccine preventable disease surveillance system. This includes Acute Flaccid Paralysis (AFP) and Acute Fever and Rash (AFR) surveillance through the National 8 Syndromic Surveillance System, plus outbreak identification of whooping cough and cholera. The Paediatric Hospital Reporting system also provides a mechanism for hospital-based surveillance for VPDs utilizing a network of paediatricians at provincial hospitals.
- Ensure all children receive at least 2 doses of vitamin A, at 6 and 12 months, according to the Vitamin A policy. Expand vitamin A supplementation in to second year of life by adding two additional doses at 18 and 24 months.
- Consideration of the role of rotavirus vaccine in reducing deaths from diarrhoea, and the gathering of disease-burden information.

The targets and strategies required to achieve these aims are more fully described within the *National Immunization Strategy 2021-2025 and beyond up to 2030*.

Key activities include management and planning at a national, provincial and district level, training and supervision, monitoring and evaluation, surveillance and laboratory support, cold chain and logistics, effective schedules for service delivery, improving communication and community links and revitalizing school-based immunisation programs. Strengthen the integration of vaccine distribution with other programs and activities, including long lasting insecticide-treated mosquito net distribution, vitamin A, hospital services, and family planning will be important for efficient delivery of child health interventions.

Supporting birth registration will be important for better understanding coverage of vaccines at a village level.

## Vaccine preventable disease surveillance

With the introduction of new vaccines, there is a need to increase the quality, timeliness and accuracy of vaccine-preventable disease surveillance. In 2008 there was a strengthening of vaccine-preventable diseases (VPD) reporting. The system is coordinated at the Health Department, jointly by the Disease Control Branch and Family Health Services. These departments work with provincial and national health offices, aiming for timely responses to reported outbreaks.

The PHR also enables reporting of hospital presentations of all vaccine preventable diseases: measles, rubella, acute flaccid paralysis, pertussis, tuberculosis, Hib and pneumococcal meningitis, tetanus.

## Key messages for Provincial and District Health Staff

- Immunisation coverage has dropped considerably in the last 20 years, and to reverse this will take a big effort by provinces and districts, supported by the National Department of Health and partners. Immunisation is everybody's business.
- Support immunizations at every opportunity especially in all Children Outpatient Departments, Paediatric In-Patient Wards and any child health clinics.
- Outreach MCH services are an important way to reach many rural children and mothers, make sure these are functioning in your province.
- Improve the facilities and services at community health posts to increase coverage of vaccines in remote villages.
- Support and organise targeted Supplementary Immunization Activities (SIA) sub-nationally, especially in the poor performing districts.
- The Hib vaccine and the pneumococcal conjugate vaccine will prevent many cases of meningitis and pneumonia.
- Raise awareness of the importance of vaccination and these new vaccines.
- During immunization activities, do growth monitoring (plot weight on the growth chart, do MUAC), give vitamin A, deworming tablets and offer family planning.
- Introduce the COVID-19 vaccine when it is available.
- Support EPI and MCH staff through refresher trainings, supervisory visits and use of EPI monitoring tools.

## 3.2. Neonatal Care

The birth rate in PNG is about 27 per 1000 population. That means, in a population approaching 9 million, there will be 243,000 births annually. Many of these births occur outside well equipped health facilities, and mothers are denied access to clean, good quality support when they are giving birth. Consequently many babies are born too small, or too early, or get infections or suffer birth trauma or asphyxia. And many babies die or are disabled by illness in the newborn period, and many mothers die from avoidable complications in pregnancy and labour. The way to avoid such tragedies is to improve quality and access to obstetric care, and birth control.

Neonatal deaths are those that occur in the first 28 days of life. The neonatal mortality rate in PNG is estimated to be about 24-28 per 1,000 live births, comprising about 40% of infant mortality. Two thirds of neonatal deaths are associated with high risk pregnancies, labour and delivery. Although there are many factors, prematurity, low birth weight, deliveries that are not supervised by skilled health workers and early neonatal sepsis account for the majority of neonatal deaths in PNG. Only about 55% of mothers deliver their babies in a health facility with a skilled birth attendant. Most births are not officially registered; so many still-births and neonatal deaths are often not counted.

Efforts to reduce neonatal mortality are closely linked to safe motherhood programs, including the National Strategic Action Plan to Reduce Maternal and Newborn Mortalities and the WHO Integrated Management of Pregnancy and Childbirth (IMPAC). Regularly conducted antenatal clinics (ANC) are important to prevent neonatal illness.

The policy aims in neonatal care are to provide the highest possible level of care for newborns in health facilities and within communities:

- Encourage access to the highest possible quality ANC and delivery care by skilled birth attendants
- Ensure that Essential Early Newborn Care is provided to all newborns, including skin-to-skin contact (Kangaroo Mother Care) <sup>10,11</sup>
- Implement Minimal Standards of Neonatal Care in provincial and district hospitals and health centres
- Promotion and early initiation of breast feeding (see also breast feeding, nutrition and micronutrients section of this plan, below)
- Provide understandable information on newborn care available to all mothers
- Develop centres of excellence for neonatal care and training at Port Moresby General Hospital and major provincial hospitals
- Support a program of neonatal care and resuscitation training for nurses, midwives and doctors, as part of WHO Hospital Care for Children training.

Quality antenatal care (ANC) is important in the prevention of maternal complications and neonatal illness. ANC interventions include maternal screening for common diseases like malaria, syphilis and HIV, and haemoglobin checks to identify anaemia. All pregnant mothers should have a minimum of three ANC visits during pregnancy, have two tetanus toxoid injections if primiparous (and one if multiparous), and take prophylactic anti-malarials and iron / folate throughout the pregnancy. All mothers with high risk pregnancies need qualified medical personnel to supervise the delivery, and emergency obstetric care must be available.

Increasing health facility deliveries and improving the quality of early essential newborn care is vital to reducing neonatal mortality in PNG. This will require increased number of nurses who have midwifery skills, improvements in primary and district health facilities, and community demand.

## Early essential newborn care

Many newborn babies do not receive basic care in the first hour after birth. Babies born in a village without a skilled attendant are at risk of asphyxia (lack of oxygen), birth trauma, cold exposure or infection, and these are often not recognized or treated in timely and appropriate ways. However, even babies born in a hospital or health centre may miss out on essential newborn care. They may be left alone and become hypothermic, they may be excessively suctioned leading to stress, and they may be separated from their mother and not have the opportunity to feed from the breast and stay warm. Each of these stresses lead to an increased risk of infection, hypothermia, hypoglycaemia and death. Early essential newborn care requires that babies are dried thoroughly, put immediately in skin-to-skin contact with the mother, assessed for adequacy of breathing, have delayed cord clamping for 1-3 minutes until pulsations stop, are allowed to suck on the breast early so they receive colostrum, and not be separated from their mother. It is very important for the health care workers to know that it is not the best interest of the mother and the baby to be separated, even if the neonate is very sick. Moderately unwell newborns can still be with their mothers, and Special Care Nurseries will need to be redesigned to accommodate mothers.

It is essential for a newborn baby to receive good nutrition at the start of his or her life to ensure good growth and development. Breast milk provides all that the baby needs to grow and be healthy. In the 2005 National Nutrition Survey, 84% of mothers started breast feeding within 24 hours. However, few mothers breast fed in the first hour. In some health facilities, “pre-lacteal” artificial feeding (i.e. feeding of formula before breast milk) is still done. Breast feeding should be initiated within one hour of birth, and skin-to-skin contact established to encourage early initiation of breast feeding. Improving breast feeding techniques and support for new mothers will help eliminate pre-lacteal feeding.

The *International Code of Marketing of Breast-Milk Substitutes* is an important instrument to promote exclusively breast fed in all communities and health facilities, and this was ratified by the PNG Parliament in the Infant Feeding Act.<sup>12</sup>

Early Essential Newborn Care, the WHO *Action plan for healthy newborn infants in the Western Pacific Region (2014–2020)*, also includes the care of the sick and low birth weight newborn.<sup>10</sup>

## Models of neonatal care

Improving neonatal care requires models of care that are appropriate at each level of the health service: health centres, district hospitals, referral hospitals. The model of care involves training for nurses, CHWs and doctors, guidelines, basic equipment, physical infrastructure, drugs, referral criteria, audit and reporting of outcome data. The model of care will focus on the management of common illnesses in newborns: neonatal sepsis, low birth weight, birth asphyxia and congenital malformations.

Improving training in neonatal care is important, as currently the number of nurses trained in neonatal care is inadequate, and all who deliver newborns should be trained in early essential newborn care.

Needs assessments will be conducted of what is required for provincial and district hospitals, and health centres to achieve minimal standards of neonatal care in equipment, staffing, physical facilities. Standards of neonatal care at different hospital levels have been developed, endorsed by the Ministry of Health and published by the Paediatric Society in the PNG Medical Journal.<sup>15;16</sup>

## Care of the low birth weight baby

Low birth weight (LBW) babies should be nursed with their mothers, so they receive the benefit of skin-to-skin warmth and breast feeding.

Guidelines for the management of very low birth weight babies (VLBW 1000-1500g) are contained in the WHO *Pocketbook of Hospital Care for Children*, and the *PNG Standard Treatment Manual*.<sup>13,14</sup> Training on care of the LBW and VLBW baby is contained within the Hospital Care for Children training program.

The target for improving survival in low birth weight infants will be those that are more than thirty weeks gestational age or weighing 1000g or more. Currently the mortality rate for VLBW babies (1,000-1,500g) is high (30-40% in 2015-2020). With improved models of neonatal care, especially rooming in of mother and VLBW baby, this can be reduced.<sup>11</sup>



Figure 3. Skin-to-skin contact keeps baby warm and encourages breast feeding.

(From Early Essential Newborn Care, WHO Western Pacific, 2014)

## Neonatal sepsis

Sepsis is a common cause of neonatal death. Umbilical cord infection is a common cause of neonatal sepsis in PNG, and much of the problem occurs in babies born in villages. Appropriate cord care would prevent this.

To increase the proportion of newborns receiving this essential newborn care, an information brochure for mothers and a pre-packed newborn cord care kit is being developed. This kit will include a vial of gentian violet, cotton wool swabs and soap, plus the New Mother's Brochure, which will explain all the interventions that every newborn should receive (early breast feeding, Vitamin K, Hepatitis B and BCG vaccines). Also regular simple hand hygiene routinely by mothers and health care workers will prevent nosocomial infection within the hospital.

## The Baby Friendly Hospital Initiative

This was started in 1989, supported by WHO and UNICEF and was implemented in three hospitals in PNG. However, donor funds ceased and the impetus for continuing was less. The BFHI concept remains important, with increasing pressures on mothers to feed in alternative ways, the mounting evidence that early solid feeding is a major risk factor for pneumonia, HIV and uncertainty around breast feeding, and the lack of enforcement of the Baby Feeds Supply (Control) Act 1984. Having



policies of exclusive breast milk feeding in hospitals in PNG is important to showing a lead to mothers and the community on the importance of breast feeding. A recent initiative in ANGAU Hospital showed that the BFHI can be successfully introduced without external funding.

## Centres of Excellence for Neonatal Care

PNG needs a facility for training nurses in good quality neonatal care, and the large population of Port Moresby requires a facility for sick newborns to receive the best care that can be provided. There are over 14,000 babies born in Port Moresby each year. The Neonatal Unit at PMGH admits more than 1500 sick newborns each year, mostly with low birth weight, prematurity, sepsis and birth asphyxia. In the first five years of this plan a new neonatal unit was built. Having centres of excellence in neonatal care in major provincial hospitals: Early Essential Newborn Care, keeping mothers and sick babies together, low cost technology (non-invasive forms of respiratory support, e.g bubble CPAP and oxygen concentrators and oxygen blenders for premature babies) and standard treatment provide a good model for other provincial hospitals throughout the country. The aim is safe, high quality care for babies with very low birth weight, sepsis, birth asphyxia, correctable congenital malformations, and other sick babies, with their mothers. Improvements are needed for many neonatal units in provincial hospitals in the next five years.

## Activities

Below are some other important activities in neonatal care in provinces:

- Promote and train staff in early essential newborn care.
- Restructure health care facilities for the care of sick newborns so that mothers can stay with their babies in the Special Care Nursery, and provide skin-to-skin contact and feeding, even if the baby is critically unwell.
- Review hospitals to assess what would be required to achieve minimal standards of newborn care (space, basic equipment, essential drugs, human resources, training, auditing, infection control measures, etc)
- Train staff in care of the sick newborn, neonatal resuscitation and early essential newborn care through the Hospital Care for Children training. Train staff in kangaroo mother care as part of the quality of care for all sick or low birth weight babies.
- A Neonatal Resuscitation flow chart has been developed for labour wards and special care nurseries. This will be distributed to all hospitals and health centres where babies are born. Neonatal resuscitation training will be done, integrated within the WHO Pocketbook of Hospital Care for Children course.
- Improve the reporting of neonatal diseases (low birth weight, birth asphyxia, neonatal sepsis and congenital malformations) through the Paediatric Hospital Reporting program, V12.1.
- Providing educational information via brochures or social platforms to mothers on breast feeding, kangaroo mother care, hygiene, danger signs, and immunisation.
- Monthly perinatal death audits should be compulsory in all hospital within the country between the Neonatal and the Maternal units.



## Key messages for Provincial and District Health Staff

- Support Family Planning services in your Province, this is essential for reducing maternal and neonatal deaths.
- Restructure health care facilities for the care of sick newborns so that mothers can stay with their babies in the Special Care Nursery and provide skin-to-skin contact and feeding, even if the baby is critically unwell.
- Train staff in care of the sick newborn, neonatal resuscitation, and early essential newborn care through the Hospital Care for Children training
- Review hospitals to assess what is required to achieve standards of newborn care (space for mother and baby rooming in the special care nursery, basic equipment, essential drugs, human resources, training, auditing, infection control measures, referral guidelines, etc.)
- Undertake facility improvements to labour wards and special care nurseries
- Encourage skin-to-skin care (kangaroo mother care)

### 3.3. Improving Quality of Paediatric and Child Health Care

Families will bring their children to health facilities if they are confident they will receive good care and are treated with kindness and respect. Improving community demand requires quality health services, community engagement and awareness of the signs of childhood illness.

In some hospitals and health centres there are problems in supplies of drug and basic equipment, buildings and facilities, limited training and support for health staff, and lack of a family and child friendly environment. Improving the quality of paediatric care will improve outcomes and generate community demand. Improving the management of malnourished children, triage and emergency care, oxygen administration, supportive care and monitoring is relevant whether children have pneumonia, tuberculosis, HIV, or less common conditions. This can be addressed by a program of training for nurses, better use of guidelines, better facilities and equipment (including oxygen), and improved data collection to follow outcomes and measure impact. Efforts to improve the availability of food supplies on hospital wards, improve the detection of children at high risk of malnutrition, and improve malnutrition management are also crucial.

Paediatricians and child health nurses have important roles in improving quality within hospitals and throughout their provincial and district health services.

#### Paediatric Quality Improvement Program

The components of this program include:

1. A quality improvement team in each provincial hospital.
2. Use of a Quality Improvement Checklist for paediatric health services, to identify gaps and make changes.
3. Regular mortality and morbidity audits, and training in how to learn lessons from these and implement changes.
4. Training on care of seriously ill children, through the WHO Hospital Care for Children training.
5. Establishment of intensive care areas in the paediatric wards for the care of the sickest children.
6. Paediatric monitoring and response charts with early warning indicators and escalation processes.
7. Infection control and antibiotic stewardship, including measures to protect staff from infections including TB and COVID-19.
8. Improved systems for managing children with chronic conditions (neurodevelopmental, epilepsy, chronic cardiac, respiratory, cancer).
9. Improved diagnostics, especially diagnostics to guide antibiotic use.
10. Continuing professional development for paediatricians and paediatric nurses.

#### A quality improvement team in each hospital

A quality improvement team is important, as one person cannot make all the changes needed to improve quality. The size and composition of a QI team depends on the size of the health facility or hospital; it may be simply the lead paediatrician or medical officer and one or two senior nurses.

Sometimes it is also useful to have representatives from pharmacy, nutrition, medical records, laboratory, radiology services and infection control. This will help in taking a system thinking approach and allow people to understand challenges in other sections of the hospital, and the important roles all staff have in improving quality of care. A quality improvement team helps gain insight from different viewpoints and opinions and solve problems together. The quality improvement team carries out the action plan that arises from quality assessments, mortality audits and the data from the Paediatric Hospital Reporting program.

## Quality Improvement Checklist

Use the Quality Improvement Checklist to identify areas where improvements are needed. Assess the key quality indicators to highlight strengths, identify gaps, and make changes.

<http://pngpaediatricsociety.org/wp-content/uploads/2020/12/Quality-indicators-Dec-3-2020.docx>

## Mortality auditing

Hospitals are encouraged to have regular paediatric mortality and morbidity meetings. How to conduct these meetings is outlined in: <https://pngpaediatricsociety.org/child-death-review-meetings/>

The other important audit meeting in the provinces is for Paediatrics collaborating with Obstetric counterparts to run monthly Perinatal Mortality Meetings.

Mortality audit meetings should follow the principles of being non-blameful, supportive, educational, respectful, and acknowledge all health workers' efforts.

Have a reporting structure which allows the management to be aware of issues that need to be addressed, such as manpower and resource allocation, staff training needs. Only by informing management of the outcomes of death audits can they respond to identified issues promptly.

Include non-clinical support staff in some meetings also, ward clerks, drivers, laboratory staff, pharmacy, physiotherapy, or radiographers to allow for multidisciplinary and multi-facility quality assurance activities that extend beyond the Paediatric unit.

The Quality Improvement Team is responsible for following up on the findings and initiating and monitoring changes.

## WHO Pocketbook of Hospital Care for Children training course

Training in clinical guidelines and quality of care is designed to improve the holistic management of sick children at a hospital level. It was adopted in 2009, and many training courses conducted in provinces in the Highlands and New Guinea Islands provinces.

The training addresses all the stages of management of any sick child, and teaches health workers how to use the guidelines in everyday clinical practice.

The 5-day training course is a vehicle for teaching about current issues and changes to treatment (such as the improvements in the management of childhood TB, changes to Prevention of Parent to Child Transmission, new vaccines, improved management of malnutrition, Early Essential Newborn Care, Mortality auditing, and COVID-19 preparedness and infection control). The course content is updated before each course and it is a mechanism for Continuing Professional Development for paediatric health care workers.

## Improving oxygen supplies and the management of severe pneumonia

In PNG the most common cause of death among children less than five years of age is pneumonia. Hypoxaemia (low oxygen levels in the blood) is the major complication of pneumonia leading to death. Hypoxaemia is also a complication of other common diseases, particularly among newborns. Children with severe pneumonia need both antibiotics and oxygen, but oxygen shortages are common due to the cost and complex logistics of transporting oxygen in cylinders. Detection of hypoxaemia using clinical signs can be difficult, and pulse oximetry is the most reliable, non-invasive way of detecting hypoxaemia. In 2003 the Health Department and the Paediatric Society started a trial of oxygen concentrators, machines that generate oxygen from ambient air, and pulse oximeters. It was hoped that the installation of a reliable, sufficient and cheap source of oxygen in hospitals coupled with the use of pulse oximetry would make a significant difference to child survival rates in PNG. The oxygen concentrator / pulse oximeter project has been implemented in many provincial hospitals and district health facilities since 2005, reducing mortality from pneumonia by 35-50%.<sup>15,16</sup>

Between 2021 and 2030 there will be an expansion of the oxygen program, including piloting whole-of-province solutions: including the use of small oxygen plants that can generate enough oxygen to fill 10-15 large cylinders per day for a major central hospital, plus oxygen concentrators for remote health centers.

Funding will be required for equipment, installation, commissioning and training (for clinical staff and hospital engineers), and for the oxygen team (paediatrician, biomedical engineer and nurse administrator) to provide regular support to each of the hospitals involved.

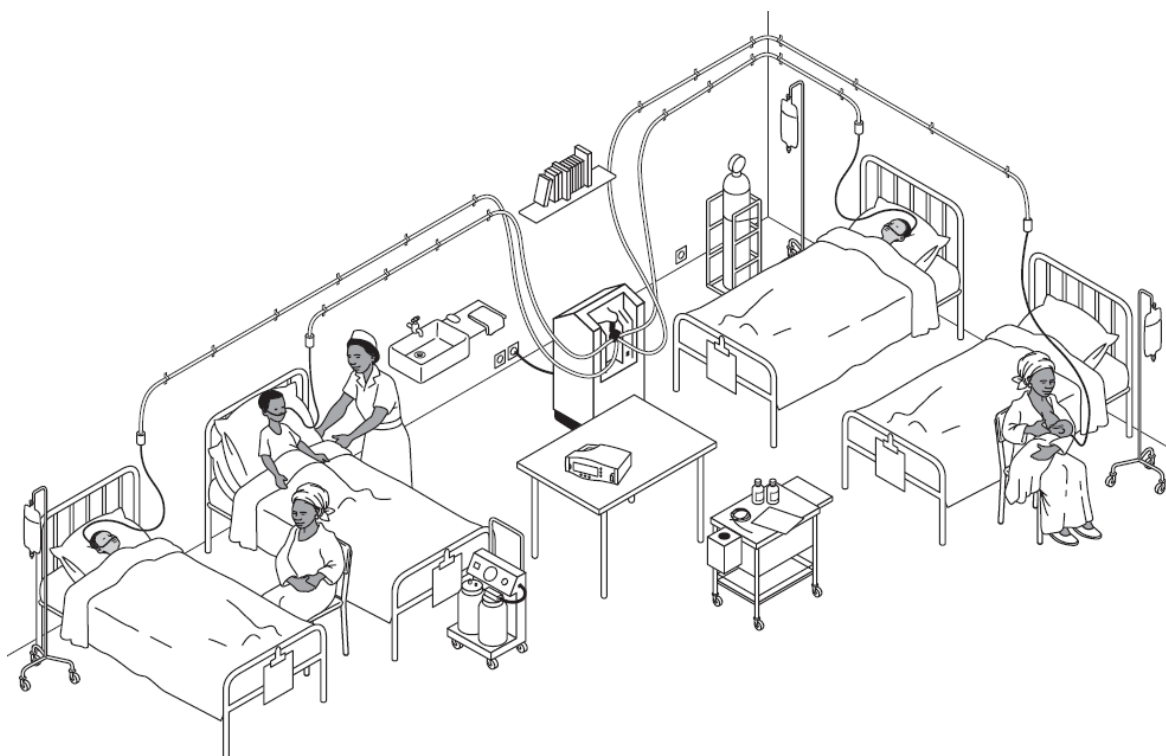


Figure 3. A high dependency unit in a provincial hospital will improve quality of care

## Paediatric Hospital Reporting (PHR) program

The Paediatric Hospital Reporting (PHR) was introduced to standardize hospital statistics, understand disease burdens and monitor mortality rates and quality of care. The program records all admissions and outcomes, common diagnoses in sick children, and outcomes. This program produces standardized reports and calculates case fatality rates. The diagnostic classifications used are consistent with ICD-11 classification system, WHO guidelines and PNG standard treatment classification systems. A data summary sheet is generated by the program for any selected time period (e.g. annually or monthly) describing admissions, deaths and case-fatality rates for common diseases, co-morbidities, vaccine-preventable diseases and age-specific mortality rates. The data from all hospitals are combined, and the lessons in terms of policy and practice are considered by the Child Health Advisory Committee. Annual reports of child morbidity and mortality have been published (2010-2020). The program has enabled the reporting of the causes and outcomes of nearly 200,000 admissions in 24 hospitals over 11 years.

The PHR has been revised in recent years to include chronic illnesses in children, congenital anomalies, and emerging diseases including COVID-19. A maternal component is also included in the latest version of the PHR, to include maternal health outcomes and complications.

## Improving the care of children and adolescents with chronic illnesses

In every district or province there are children with chronic non-communicable illnesses: epilepsy, asthma, rheumatic or congenital heart disease, cerebral palsy, diabetes, cancer, or the long-term effects of neonatal illness. While each condition is uncommon compared to pneumonia and febrile illnesses, taken together these chronic conditions comprise a very large burden of disease.

Preventable complications, including malnutrition, poor control of the primary disease, non-compliance with prophylaxis and loss to follow up lead to a large burden on the health system of complications and preventable deaths, and a large social and economic burden on families and communities.

Children with chronic conditions need consistent long-term follow up and care. Models of care for chronic conditions need to include basic and ongoing care at a primary health and district level, and specialist care at a provincial hospital level. This requires clear treatment plans, effective communication between primary and referral levels, parental education and empowerment, and mechanisms to provide medicines for less common diseases near where the patients live.

Even less addressed than chronic physical conditions are mental health and developmental problems. Some services for children with developmental problems such as cerebral palsy, impaired vision and deafness exist, but are rudimentary and often dependent on philanthropy. Services for disabled children need to be better coordinated and supported, and specific skills in holistic care for such children need to be taught in health training curricula for nurses, doctors and paediatricians.

## Hospital outreach services

Hospitals should support rural health services by regular outreach to rural health clinics. These can be coupled with teaching, assessments of equipment, drug and infrastructure needs, clinical reviews of patients and encouragement for rural health staff.

## Targets

Overall paediatric mortality rate to less than 4%
Pneumonia case fatality rate to less than 3%
Severe pneumonia case fatality rate to less than 6%
Severe malnutrition mortality to less than 10%
Mortality of very low birthweight babies to less than 20%
TB treatment completion rate to 90%
Extra-pulmonary TB case fatality rate to less than 10%
HIV PCR positivity rate among infants who are HIV-exposed <10%
Children who are HIV PCR positive on effective ART – to 90%
Meningitis / encephalitis case fatality rate to less than 10%
Systems in place for the care and follow-up of children with chronic illnesses

## Key messages for Provincial and District Health Staff

- Each province needs *at least* 2 paediatricians to care for sick children and to support provincial child health programs. If you do not have the required number, consider creating a provincial position. Ideally provinces need 3 paediatricians with one functioning as a community paediatrician focused on preventative and community child health.
- Hospitals should adopt the Quality Improvement Program, which includes continuing training for staff, using a checklist for quality assessments, regular mortality auditing, and the participation in the Paediatric Hospital Reporting program.  
<https://pngpaediatricsociety.org/quality-improvement/>
- Good quality hospital care depends on trained staff, including child health nurses, consider sending nurses for post-basic training in midwifery or child health nursing
- Make sure all health workers who treat children have a copy of the PNG Standard Treatment Manual and the WHO Pocketbook of Hospital Care for Children
- Conduct training in WHO Hospital Care for Children for your provincial and district health staff who treat children
- Use the Quality Improvement Checklist to identify areas where improvements are needed. Assess the key quality indicators to highlight strengths, identify gaps, and make changes.
- Oxygen is an important intervention for children with pneumonia and other common problems, invest in oxygen concentrators and pulse oximeters, and if needed solar power for health centres and district hospitals. Oxygen generators are being trialed in the life of this Child Health Plan, which may provide a whole-of-province solution. Small oxygen generators can fill 15 cylinders a day, and provide sufficient oxygen for provincial hospitals

and urban health care facilities, whilst district health services use bed-side oxygen concentrators.

### 3.4. Standard Treatment Manual and Clinical Guidelines

The first edition of the PNG Standard Treatment Manual was published in 1975, and the tenth edition in 2016.<sup>14</sup> The *PNG Standard Treatment Manual* is probably the longest running evidence-based treatment guideline in a developing country, and has a unique place in the health culture of PNG.<sup>17</sup> The research underpinning the original STM and its subsequent editions have also influenced development of global paediatric treatment recommendations, such as the WHO programs for Acute Respiratory Infection and IMCI.

The original aim of the Standard Treatment Manual was, according to the preface to ‘allow the busy nurse, health extension officer or doctor to prescribe quickly standard treatments that are simple, safe and effective.’

Child health has become increasingly complicated in the last two decades, but there is still a need to keep it as simple as possible for front-line health workers.

The activities required in the life of this plan include:

- Revision of the Standard Treatment Manual in 2022 (11<sup>th</sup> Edition), and again in 2026 (12<sup>th</sup> Edition)
- Other technical resources will need updating and printing in the life of this plan, including Paediatrics for Doctors in PNG, and Child Health for Nurses and HEOs.
- The WHO Pocketbook of Hospital Care for Children will need to be distributed annually, and training maintained.

#### Key messages for Provincial and District Health Staff

- Distribute Standard Treatment Manuals to all health care workers in your province.
- Encourage all health staff to carry and use the STM whenever they provide care for a child
- Support training courses for health staff in WHO Hospital Care for Children, which trains staff in how to use the STM and WHO guidelines.



### 3.5. Pneumonia and acute respiratory infections

Acute lower respiratory infection (ALRI) is the most common cause of serious illness and death in children in PNG, accounting for 19% of all hospitalisations in 2020. Pneumonia and bronchiolitis are particularly prevalent in highlands provinces, where they accounts for a higher percentage of all admissions. A comprehensive strategy to address pneumonia is outlined in this Child Health Policy and Plan.

Interventions to reduce pneumonia morbidity and mortality are included in many program areas, but are brought together in this section to illustrate the multi-faceted strategy required.

#### Causes

Many cases of pneumonia and bronchiolitis, the two commonest types of ALRI, are caused by viruses, or the combination of viral and bacterial infection.

The major bacteria causing pneumonia are *Streptococcus pneumoniae* (pneumococcus or Sp) and *Haemophilus influenzae* (Hi). The most common Sp serotypes that cause disease are 2, 5, 6B, 7, 14, 19F, 23F. Both typable and non-typable strains of Hi cause pneumonia in PNG children; about 20% of all Hi strains are Hi type b.

Viruses, particularly respiratory syncytial virus (RSV) and influenza are common, and occur in seasonal outbreaks. Bacterial pneumonia is often preceded by a virus infection..

In HIV affected children *H. influenza* and *S. pneumoniae* are the most common causes; however, *Pneumocystis jiroveki*, *Staphylococcus aureus* and *Mycobacterium tuberculosis* are also common.

Gram negative bacilli (such as *Klebsiella* spp and *E. coli*) are found sometimes causing pneumonia in HIV-infected, or children with severe malnutrition, or in pneumonia which is acquired in hospitals.

Tuberculosis is a common pathogen in HIV-infected and uninfected children, presenting as acute or chronic pneumonia.

Risk factors for pneumonia include:

- Indoor air pollution, including smoke from fires for cooking or warmth inside poorly ventilated houses.
- Parents smoking (throughout infancy and childhood, and in-utero exposure to cigarette toxins).
- Low birth weight and prematurity.
- Absence or inadequate of breast feeding, such as among adopted children.
- Feeding of solids and semisolids in the first weeks or months of life, a common practice in some parts of PNG.
- HIV infection.
- Not being vaccinated.

Pneumonia mortality is highest in children with malnutrition, neonates, young infants and those with HIV.

In this Plan, given its importance to child health and mortality, pneumonia is relevant to almost all program areas: EPI, neonatal care, quality improvement in hospital care, paediatric surveillance, standard treatment and clinical guidelines, human resources and others.

## Treatment of pneumonia

Treatment of pneumonia occurs in primary health centres, district and provincial hospitals and referral hospitals. For decades the Standard Treatment Manual has guided treatment of pneumonia. In recent years health workers have been trained in IMCI algorithms, although the roll-out of this has been fragmented. STM and IMCI case management instructions are consistent with each other, and the IMCI Checklist is incorporated into the STM. Lack of availability of standard antibiotics in some health facilities at various times has reduced access to good treatment.

Absence of basic equipment such as oxygen, oxygen cannulae, nasogastric tubes and intravenous cannulae are common everyday problems in many hospitals, and need to be addressed.

Training on the management of severe pneumonia is provided in the WHO Hospital Care for Children training course. This includes management of complex and simple cases, and identification and management of complications and comorbidities including hypoxaemia, malnutrition, HIV, anaemia and heart failure. It includes all stages of management, including triage, history, examination, diagnosis, treatment, supportive care and monitoring, discharge planning and follow-up.

A program to improve oxygen supplies and pneumonia treatment has produced good results. The oxygen concentrator / pulse oximeter project has been implemented in many provincial hospitals and district health facilities since 2005, reducing mortality from pneumonia by 35-50%.<sup>15,16</sup>

During the life of this plan, a simple system of CPAP (continuous positive airway pressure) will be trialled in an effort to further reduce mortality from ARI and neonatal respiratory distress. CPAP is effective in Western countries, and is increasingly being used in developing countries in Africa and Asia, and has been shown to reduce mortality in children with pneumonia in Bangladesh. In some cases of severe disease, CPAP may be an adjunct to antibiotics, oxygen and good supportive care.

## Prevention of pneumonia

### Immunisation

Immunisation with existing vaccines in the EPI schedule (pertussis, BCG, measles) helps prevent certain types of pneumonia. In 2008 PNG introduced the Hib vaccine (as part of Pentavalent vaccine), which prevents pneumonia due to *Haemophilus influenzae* type b. In 2014 introduced the vaccine against *Streptococcus pneumoniae* (pneumococcal conjugate vaccine PCV, given at 1, 2 and 3 months).

### Other types of prevention

These are as important as immunisation and include:

- Reducing indoor air pollution by reducing cigarette smoke exposure throughout pregnancy, infancy and childhood, and reducing cooking smoke exposure in homes
- Improving rates of exclusive breast feeding and childhood nutrition
- Improving nutrition in very low birth weight babies and other maternal strategies to reduce prematurity
- Prevention of parent to child transmission of HIV
- Early care seeking when children have signs of pneumonia

## Pneumonia surveillance

There are two methods of surveillance: laboratory and clinical. In 2007 a laboratory-based surveillance system for meningitis was established in eight sentinel sites. This system was designed to monitor the effectiveness of the introduction of Hib and pneumococcal vaccine, and provide valuable information on pneumonia. Revitalising this system will depend on hospitals purchasing test kits for detecting CSF pathogens.

The Paediatric Hospital Reporting system enables the standardised reporting of hospital admission data on pneumonia and other common childhood illness, and case fatality rates. In the 11 years 2009-20 the PHR documented over 50,000 cases of pneumonia, with an overall case fatality rate of just under 5%. Severe pneumonia makes up more than 40% of all pneumonia cases admitted to hospitals and has a case fatality rate of about 10%, although this has improved in recent years. Sustaining the PHR surveillance system will require some small ongoing resources, computer being purchased for the paediatric wards, and having ward clerks and nurses trained in basic data entry.

## Key messages for Provincial and District Health Staff

- Create community awareness of the dangers of indoor air pollution (cigarette smoke and cooking smoke) on children's lungs.
- Support high vaccine coverage, for pneumococcal conjugate vaccine (PCV 13), Pentavalent, measles, BCG, pertussis, and vitamin A, which all protect against types of pneumonia.
- Promote the importance of good nutrition: exclusive breast feeding, avoidance of early solid feeding before 4 months, and a balanced health diet without junk food.
- Make improvements to services at community health (aid) posts, to include immunization services and standard treatment.
- Training in Hospital Care for Children in your province, to train staff on pneumonia care, oxygen therapy, and improved quality of supportive care, monitoring, follow-up.
- Improve oxygen supplies in your province, through concentrators, an oxygen generator and pulse oximeters.

### 3.6. COVID-19 and the pandemic

COVID-19 is a relatively mild disease in most children, rarely causing death. However, children with chronic underlying diseases are susceptible. Children with cerebral palsy, chronic lung disease, congenital heart disease, type 1 diabetes, immune problems, and cancer, are more likely to be hospitalised and at higher risk of dying. Many children with chronic illness can survive COVID-19 however, so the treatment of these patients should be the same as others.

Rarely COVID-19 in children is associated with shock (hypotension), myocarditis, encephalitis, coagulopathy, lymphopenia. It can look like toxic shock syndrome from Staph or Streptococcal infection, or a condition called Kawasaki disease. This can occur during the acute COVID-19 infection or 2-4 weeks after.

Despite being a mild infection in most children, the COVID-19 pandemic carries big indirect risks for children: disruption to health services, social isolation, malnutrition from poverty or food insecurity, and economic stress may cause more child deaths than the virus. Therefore, the priorities of COVID-19 in paediatrics are to protect health care workers with vaccination, and Personal Protective Equipment (PPE), and continue high quality routine health services for children. It is vital that all health workers are protected by two doses of the COVID-19 vaccination.

National guidelines for COVID-19 in paediatrics are available at [www.pngpaediatricsociety.org](http://www.pngpaediatricsociety.org)

### 3.7. Malaria

Malaria is endemic in all coastal provinces of PNG, and with climate change and travel is also found in the highlands region. In the early 2000s it was estimated that 7% of mortality in children under the age of five years was from malaria. This has improved markedly, with less than 2% of paediatric deaths in hospitals being due to malaria in 2020. Reductions in malaria deaths have been largely due to better prevention methods, particularly the use of insecticide-treated bed-nets.

Malarial drug resistance is a resurgent problem. Rates of resistance to chloroquine and amodiaquine are high. In the 2005 Standard Treatment Manual artemisinin-based combination therapy was introduced, but use of insecticide-treated bed-nets is falling, and resistance to new therapies emerging.

Current principles of treatment and malaria control include:

#### Prevention with insecticide-treated mosquito nets

Insecticide-treated bed-nets are one of the safest methods of preventing and controlling malaria. Studies from other countries have found that use of these insecticide-treated materials leads to a 19% reduction in child mortality, 40-60% reduction in infection, and also a reduction in maternal anaemia, pre-term delivery and low birth weight. Use of insecticide treated nets also has an important effect on population-based malaria control. The blood meal is denied for the female mosquito and this prevents development of eggs and results in a reduction in vector population and reduced transmission. Bed-nets were widely distributed in PNG, but their use, and renewal of old nets are major problems.

Vivax malaria - not as well prevented by bed-nets as Falciparum malaria - remains a major problem.

People living in endemic areas, and travelers to such areas, should be encouraged to adopt protective habits and use protective measures against mosquito bites. These include closing doors

and windows in the evenings to prevent entry of mosquitoes into houses; using mosquito repellent lotions, creams, mats or coils, and regular use of insecticide-treated bed nets.

## Diagnosis and treatment

Investigations for malarial parasites, either a blood slide or rapid diagnostic test, should be done in all cases of fever, and treatment with effective doses of antimalarials should be administered, according to severity classification based on the Standard Treatment Manual. Many patients fail to complete treatment due to either lack of understanding, belief that when feeling well treatment is no longer necessary, and sometimes due to perceived or real adverse effects.

## Activities and future directions

Improvements in the management and control of malaria in children will be closely aligned with the overall malaria control program.

Key issues in the next few years include:

- Improve supplies of artemether-lumefantrine, and increase use of rapid diagnostic tests to guide treatment of children with fever.
- Ensuring that the formulations of all standard antimalarial drugs are appropriate for children.
- Considering intermittent chemoprophylaxis measures for infants (IPTi)
- Using artesunate suppositories for pre-referral treatment in health centers
- Improving reporting mechanisms for malaria cases and case fatality rates from hospitals, through the PHR.
- Establishing the extent of other causes of fever, such as dengue and viruses, by using new technologies for diagnosis.
- Improving the tendering process, procurement and supply of all essential drugs and supplies. Establish a sustainable mechanism to deliver antimalarial drugs and related supplies to all levels of the health service
- Create a position of National Coordinator of childhood malaria, to establish sites for surveillance, provide evidence for treatment and prevention recommendations, and link other child health programs (hospital care, standard treatment) and with the malaria department.

## Key messages for Provincial and District Health Staff

- Artemether-Lumefantrine (Coartem) is highly effective treatment for malaria.
- Coartem is safe and effective, but costs more than older drugs, so it is important that we improve diagnosis of malaria. Support the use of rapid diagnostic tests in deciding who to treat
- Insecticide-treated bed-nets save lives. Distribute them at every opportunity, replenish old bed-nets, teach communities the benefits of using them.
- Review other environmental measures to control malaria and other mosquito vector born diseases.

### 3.8. Tuberculosis

Childhood tuberculosis (TB) is a huge burden in PNG. PNG is considered a high-burden country for both TB and drug-resistant TB (DR-TB, or MDR TB). Each year there are about 30,000 TB cases diagnosed in PNG. Most concerning is the high proportion of TB cases in children, where 27% of all TB cases occur in children. Worldwide children make up only 10% of cases. Reasons are many but reflect the high TB transmission rate in the community and adults not being diagnosed and treated earlier. At least 2,000 children are admitted with TB each year in PNG, with a case-fatality rate between 8-11% over the last 5 years. This represents a fraction of the cases of TB in children, and children present late with TB disease and are too sick. If children can be found earlier, diagnosed, and started on treatment, many children could be saved. Healthcare workers should try to identify ways to get into communities to reach more families and children at risk of having TB. Working closely with the adult TB clinics is important, as it is the adults with TB who transmit to children. If there is an adult with TB and they have children at home, these children need to be evaluated and treated or given TB preventive therapy (TPT).

Malnutrition and HIV and important co-morbidities that exacerbate the problems of TB. Children with TB should all be screened for these co-morbidities (and vice versa).

Treatment completion rates are far too low, and children ceasing treatment even before the completion of the intensive phase is a common reason for relapse with worse forms of TB, many untreatable, and this leads to severe chronic disability and many preventable deaths. Pulmonary and extrapulmonary TB contribute substantially to child mortality, malnutrition and impaired neurological and cognitive development. Improving the detection, prevention and management of children with TB is a major priority. Ensuring children with TB are identified and complete treatment under supervision should be the primary aim.

Progress in child TB will require improvements in the way TB is treated. Case finding in the community is essential. Some other recent improvements to the management of TB in children include:

- Introduction of a child-friendly fixed-dose combination therapy. The drugs dissolve in water and tastes like fruit - making it easier to administer to children.
- Increased availability of GeneXpert testing. Xpert detects the presence of *Mycobacterium tuberculosis* DNA and rifampicin resistance if it is present.
- Training health workers on child TB management. Training on tuberculosis is now incorporated within the Hospital Care for Children course
- The option of treating TB infection (latent TB) with 3 months of daily Rifampicin and Isoniazid (RH).
- An injection free all oral-medication treatment schedule for children with drug resistant TB (often called MDR TB)

#### Essential measures to reduce child TB

- *Improve diagnosis:* TB in children is diagnosed based on clinical features: epidemiology, history, and examination. Chest x-ray, acid-fast bacilli testing and GeneXpert MTB/RIF on gastric aspirate or sputum for older children, and Mantoux testing are useful if available. It is important to remember that Gene Xpert **can never** be used to rule out TB disease in children due to its limited sensitivity.
- Screening should be done for
  - All child contacts of adults with TB.



- Children with malnutrition should be screened for TB symptoms
- Children with HIV should be screened for TB symptoms

Screening does not need complex tests, it can be done by based on symptoms (fever, cough, weight loss, and playfulness/activity) and clinical signs. Thus, can be done in health centres and district hospitals. A chest x-ray is not needed in younger children < 5 years if they have no clinical symptoms.

- *Do not discharge patients with TB too early.* Keep all children in hospital for the full duration of their intensive phase treatment (2 months) whenever this is feasible. To do this child and family friendly health facilities are needed, where children can go to school while they receive supervised treatment.
- Counsel the patient and families. Tell them they have TB and by completing the treatment they will be cured. Be supportive, encouraging, and positive. Teach them about TB.
- Check comorbidities: all children with TB need an HIV test and a mid-upper arm circumference (MUAC) to check for malnutrition.
- *Address community follow-up:* have outreach TB nurses follow-up patients from hospital wards to home and supervise their care.
- *Address poor drug supplies:* ensure TB drug availability in all health facilities where TB is treated and train health staff in their use.
- *Prevention:* ensure that in TB clinics a nurse screens all exposed children and starts isoniazid preventative therapy if the child does not have symptoms of TB. If a child does not have any symptoms, they do not need a chest x-ray.

## TB and HIV

Where HIV PCR testing is available, HIV-exposed newborns should have a PCR test at 6 weeks of age. If the HIV PCR test is negative, BCG should be given. In health facilities where the PCR test is not available, BCG should be given to all newborns of HIV affected mothers at birth, and the infant closely followed up. New ways of doing HIV PCR testing of HIV exposed newborns, including with the GeneXpert HIV PCR test, will be introduced in hospitals during the life of the Child Health Policy and Plan.

HIV-infected children who do not have a clinical diagnosis of TB should be started on isoniazid prophylaxis to prevent TB.

Ensure availability of tuberculin solution (purified protein derivative, PPD) in hospitals. Mantoux testing still has an important role in child TB diagnosis and it should be available at all hospitals.

## GeneXpert testing and drug-resistant TB (DR-TB)

GeneXpert MTB/RIF testing capacity has rapidly expanded to most provincial hospitals. GeneXpert diagnoses TB disease and the presence of rifampicin resistance, and is the first step in identifying children with drug resistant TB (DR-TB) DR-TB includes MDR multi-drug resistant TB and XDR extensively drug resistant TB, the GeneXpert test only identifies resistance to rifampicin. The GeneXpert can never be used to rule out TB, as it is insensitive. TB is still diagnosed on the basis of clinical features (epidemiology, history, examination, and radiology, Mantoux testing and Xpert if available).

GeneXpert testing should be done on all children when feasible, but must be done in:

- Contacts of known MDR cases or suspected MDR cases

- Relapsed or re-treatment cases (about 20% of re-treatment cases are MDR)
- HIV positive
- Failing treatment despite supervised treatment and proven adherence, such as a child who is not picking up weight or symptoms not resolving after 1 months of treatment

Gastric aspirates will be needed for most children less than 8 years if they cannot produce sputum. Ideally it will be early in the morning before the child moves their bowels, but children can be fasted for 4 hours as well. Having an appropriately sized feeding tube (sizes 8, 10, 12) is important and is now in the medical catalogue.

Guidelines for treatment of MDR-TB are available from the National TB program and will be finalised and incorporated into training.

## Adolescents and TB

The World Health Organization (WHO) defines adolescence as the decade between 10-19 years of age. It can be challenging to provide care to this age group. They may not have good support at home, they may be left to take medicines on their own (dangerous), they may have difficulty adhering to their medications, and are at high risk for lost to follow up.

It is important for health care workers to explain to both the adolescent and the family the nature of their disease and that it is curable. It is critical that an adolescent has a treatment support with a caregiver or family member who is supportive. A caregiver should supervise the treatment, that is they watch them swallow the medication.

For adolescents TB treatment can cause interruptions to education and depression, which are made worse by prolonged isolation or hospitalization for TB treatment. Try to limit isolation and hospitalization for TB when it is safe. Isolation policies should be implemented only based on evidence for whether the patient is still infectious. **Like adults, adolescents are no longer infectious after taking 2 weeks of effective TB therapy.** Adolescents should be allowed back to school, vocational training, or work as soon as they are no longer infectious, and with appropriate support and treatment adherence measures and follow-up.

## TB preventative therapy for children and adolescents

When we say someone has “TB” we are generally referring to “TB disease”. These are people that are *infected* with TB and have *clinical symptoms*, who we then place on full TB treatment.

Children with “TB infection” or *latent TB* - are infected with TB but are clinically well without any symptoms or signs of TB. These children would have a positive tuberculin skin test (TST) or PPD/Mantoux if it were performed. These children, who are infected with TB but not unwell, can be given TB preventive therapy (TPT) to stop them from getting TB disease.

Following infection with TB after exposure to an adult with TB, the risk of developing TB disease is 33% in children < 5 years and 20% for children ages 5-14 years. In PNG all children less than 5 years of age in close contact of an adult with TB should be offered TB Preventative Therapy (TPT), and consider giving TPT for those up to 14 years of age. Good counselling is needed for the child and the family in order for adherence.

The new term TPT is used (rather than IPT or INH prophylaxis) as other drug options to treat TB infection are becoming available other than INH. These include:

1. Rifampicin and Isoniazid daily for 3 months,
2. Isoniazid daily for 6 months

Shorting the duration of treatment to 3 months can improve completion rates for TPT. Other options may become available as directed by the National TB Programme.

## **Key messages for Provincial and District Health Staff**

1. Children with TB should not be discharged until they complete the intensive phase of TB drugs
1. Proper counselling is important. Parents or caregivers should understand the disease and the importance of adherence to TB medicines.
2. Children need a safe and supportive environment to go home to. If children are discharged early there is a high risk of defaulting and relapse with a worse form of TB. This causes many preventable deaths of children.
3. When an adult is diagnosed with TB, it is important that family members are screened, especially children. An exposed child < 5 years who is well can be started on TB preventive therapy, and consideration for TPT for children up to 14 years of age.
4. Contact tracing is important – either asking contacts to come to the health facility (passive case finding) or going to the house of an adult with TB (active case finding). Active case finding can be done successfully if there are outreach services.
5. All children with TB should receive an HIV test and an assessment of their nutrition.
6. Every province needs paediatric TB nurses and a disease control officer who can liaise between hospitals, health centres and families affected by TB, conduct outreach case finding and contact tracing, and supervise treatment in the home.
7. Support training for health staff in child TB management, as part of the Hospital Care for Children course.

### 3.9. HIV in children

Papua New Guinea has the highest prevalence of HIV in the region. There are, on average, 9 new infections per day, and among them one child is infected each day. Approximately 55,000 people in PNG are infected with HIV with a prevalence of 0.9%, however only 64% are on effective anti-retroviral treatment (ART). Most infections occur among the economically productive age group 15-49 years, and a majority are young women.

The National HIV Program scale up plan, which includes prevention, care and treatment with multiple initiatives. The NDoH is committed to the UN AIDS 90-90-90 targets: 90% of people living with HIV should know their status; 90% of people who know they are HIV positive on anti-retroviral treatment; and 90% of people on ART having suppression of their viral load. According to Spectru 2019, in PNG 71% of people living with HIV should know their status; 62% of people who know they are HIV positive are on anti-retroviral treatment; and 52% of people on ART have suppression of their viral load. The rates are likely to be even lower for children: less than half the children with HIV are on effective ART.

The coverage of measures to prevent the parent-to-child transmission of HIV are still not sufficient and have declined in recent years. This leads to preventable HIV in vulnerable children. Although anti-retroviral therapy is available, not enough children get access to this early in life because of delays in testing and identification of infants who were exposed to HIV. In 2020 the rate of vertical transmission from parent-to-child was reported as 28%, alarming rates, from antenatal clinics where ART coverage was 65%. If effective ART can be given to pregnant women, and other effective measures to prevent parent-to-child transmission, the rate should be 5% or less.

Increasingly there is anti-retroviral drug resistance, such that many ART drugs used between 2000 and 2015 are no longer effective, and the NDoH and WHO have recommended adoption of newer generation ART, including Integrase Inhibitors (Dolutegravir) as the main backbone ART drug, or Protease Inhibitors (Lopinavir / ritonavir). And eliminate use of Nevirapine, as there is widespread resistance.

See new HIV Treatment Guidelines 2019: <https://pngpaediatricsociety.org/treatment/>

To effectively address childhood HIV involves strengthening prevention strategies for adults and addressing specific areas of disease prevention and treatment among newborns and children. The policy aims in childhood HIV between 2020 and 2030 include to:

- Ensure that all children living with HIV are on effective ART, particularly Dolutegravir based therapy, according to the new HIV treatment guidelines
- Improve the prevention of HIV infection in newborns by greater use PCR or GeneXpert testing for HIV at 6 weeks of age for HIV exposed infants.
- Improve the monitoring of paediatric HIV, so that treatment failure (clinical, virological, immunological) can be identified early. All children on ASRT should have a viral load test at least every 6 months.
- Improve coordination and leadership of child HIV

#### Prevention of parent-to-child transmission

The best way in preventing children from being exposed to the HIV virus is to keep their parents negative (Primary Prevention). However, the data shows that PNG has a generalized epidemic with heterosexual transmission being the most common mode of transmission. This, in combination with the slow start in trying to control the epidemic, has exposed many parents and their children to the HIV virus and subsequently many children have developed AIDS.

A major priority in HIV among children is the Prevention of Parent to Child Transmission (PPTCT). Antiretroviral programs for mothers and children are now available in many of the major hospitals. The human resource implications of scaling up HIV treatment and prevention programs has not been fully appreciated and is providing stresses and challenges for provincial health systems, and those at Port Moresby General Hospital. There is an urgent need for providing a paediatric HIV nurse and a midwife trained in PPTCT in each province. In order to achieve zero HIV transmission to infants, we should:

- Increase antenatal testing of HIV in and commence all positive mothers on ART as soon as possible for viral load suppression
- Supervised deliveries of all HIV opositive pregnant mothers
- Effective ART prophylaxis and follow-up of all HIV exposed infants
- Improve the prevention of HIV infection in newbiorns by greater use of PCR or GeneXpert testing at 6 weeks for all exposed infants

Since 2017, the Department of Health has adopted a policy of “Test and Treat” for all HIV-positive women diagnosed during pregnancy, regardless of whether a CD-4 count can be done or not, and irrespective of the WHO staging. This is in line with WHO recommenations.

For children with HIV infection in PNG, life until recently has been of poor quality with numerous recurrent infections and malnutrition requiring multiple admissions to the children’s wards. HIV has been a huge burden on individual families and on an overburdened health system. Introducing ART has increased survival and improved quality of life for many HIV-positive children. However emerging ART resistance and weak systems threaten to undermine this earlier progress.

To assist with nutrition, ready-to-use therapeutic food (RUTF, e.g. Plumpi-Nut) has been made available since 2007, but is not widely used. Moreover, malnutrition in this setting requires more than RUTF and hence it is recommended that each facility providing care for HIV infected children must set up its own nutritional rehabilitation program.

Paediatric HIV management should be an integral part of management of childhood illnesses and must be included in training for those who run MCH services. Paediatric HIV and AIDS have been included in the standard treatment for children in into the Hospital Care for Children training course.

## Priorities in paediatric HIV

- Strengthen the implementation of the PPTCT program in provinces. Increase couple or index partner counselling and testing, PPTCT and ART in all provincial hospitals.
- Sustainable supplies of effective antiretroviral therapy with paediatric formulations in all sites and provincial hospitals. This includes child formulations of Integrase inhibitors (II) and Protease inhibitors (PI).
- Cotrimoxazole prophylaxis for HIV exposed infants and HIV positive children
- TB preventative therapy for all TB exposed babies or children with HIV
- Training on HIV in the WHO Hospital Care for Children course, including greater awareness of the new ART guidelines. <https://pngpaediatricsociety.org/treatment/>
- Feeding and nutrition

- Exclusive breast feeding for the first six months of life for all HIV exposed children should be encouraged because its protective effect outweighs the risk of breast milk related transmission.
- Emphasise avoiding mixed feeding (formula and breast milk) because of the increased risk of HIV transmission.
- Strengthen and support nutritional programs in health care and community settings for HIV exposed and infected children, including the use of RUTF.
- Replacement formula feeding in exceptional cases, where it is safe, feasible, available, affordable. Discuss with a paediatrician first.
- Emphasise involvement of fathers (husbands) and the supportive role that the wider family can play. Fathers' involvement is important: for family planning, further contact tracing, and support to the whole family financially and providing a safe and loving home.
- Increase training for paediatricians and child health nurses providing care and treatment to children infected and affected by HIV, especially the use of new ART regimens. Incorporate PPTCT and paediatric HIV training into inservice paediatric and midwifery curricula.
- Family planning practices should be discussed during clinic visits.
- Improve adolescent services for primary prevention of HIV.

### **Key messages for Provincial and District Health Staff**

- Prevention of Parent to Child Transmission of HIV is a high priority and will reduce the number of HIV affected children. Please support the PPTCT program, childhood ART and HIV care in your province. There should be a PPTCT coordinator to identify gaps and issues at provincial level, and work towards rectification of problems and gaps to achieve low vertical transmission rates.
- Support the training of paediatric nurses and midwife trained in HIV, to coordinate the HIV prevention and treatment program. Incorporate PPTCT and paediatric HIV training into inservice paediatric and midwifery curricula.



### 3.10.Nutrition and Malnutrition

Nutrition is a vital part of health care in Papua New Guinea. The rates of malnutrition are unacceptably high and contribute substantially to high child mortality, poor growth, poor development, and high infectious disease morbidity. About 11% of all paediatric hospital admissions have severe malnutrition. An even greater percentage of children in hospitals and the community suffer from moderate malnutrition, which increases the risk of death from pneumonia, diarrhoea, tuberculosis, HIV and malaria. Two-thirds of all child deaths are associated with moderate or severe malnutrition. Between 2020 and 2030 the National Department of Health aims to:

- Substantially reduce rates of undernutrition in the community
- Promote and support exclusive breast feeding from birth up to 6 months
- Support adequate complementary feeding from 6 months onwards, including dietary diversity
- Ensure continuous supply of milk feeds, ready-to-use therapeutic feeds (RUTF) and zinc sulphate for children with malnutrition
- Increase human resource capacity for child nutrition among nurses, doctors and nutritionists
- Improve co-ordination between programs
- Community promotion of proper breast feeding practices and adequate complementary feeding
- Improve vitamin A coverage
- Achieve high coverage of deworming
- Improve health facility and community services for management of malnutrition
- Support programs for school health and nutrition

#### Malnutrition

The rate of malnutrition is unacceptably high and contributes substantially to high child mortality, poor growth and neurodevelopment and high infectious disease morbidity. The Paediatric Hospital Reporting program data indicates that 11% (11.4%) of 97,000 214,000 children admitted to hospitals between 2009 and 2019 had severe malnutrition, and the mortality rate was 18% (16.4%). A 2014 survey at Port Moresby General Hospital showed the rate of severe malnutrition to be as high as 20% among in-patient children. Most of the malnutrition at PMGH was associated with other chronic illnesses, but under-feeding and low calorie intake is a potent cause. In addition, many other children suffer from moderate malnutrition, which increases the risk of death from pneumonia, diarrhoea, tuberculosis, HIV and malaria.<sup>10;11</sup> Two-thirds of all child deaths in PNG are associated with moderate or severe malnutrition, and nearly one quarter are linked to severe malnutrition.

The 2005 National Nutritional Survey showed over half of all children under five years of age had some degree of malnutrition. Contributing factors towards malnutrition include early weaning, inappropriate feeding, adoption and infections. Improving rates of exclusive breast feeding for six months and improved quality of complementary feeding is crucial to achieving better nutrition throughout childhood.

The National Nutrition Survey showed that stunting and underweight are a serious public health problem (prevalence above 40%). Levels of stunting and wasting are particular high in the first two

years of life. The prevalence is higher in rural than in urban areas, and Momase is the region where the highest proportion of children are affected. The 2016-2018 Demographic health survey still acknowledged malnutrition to be a serious concern.

Given the high prevalence of malnutrition in the second year of life, nutrition services should be expanded, and opportunities must be created to reach children between 13 and 24 months old. Many children do not attend well-baby clinics once immunizations are completed. More emphasis should be placed on education on adequate complementary feeding, both in quality and quantity, and on growth monitoring and plotting the weight chart with each vaccine.

## Breast feeding promotion

There is a need to promote proper breast feeding practices, and to integrate different programs that have a nutrition component. Existing programs include IMCI, Infant and Young Child Feeding (IYCF) and the Baby Friendly Hospital Initiative (BFHI). IYCF trains health workers to support breast feeding and effective complimentary feeding, and aims to improve knowledge and skills among adolescents and soon-to-be-parents. Apart from health workers, targeted groups for training include village health volunteers, school health workers, and mothers of high risk babies (such as low birth weight), nutritionists and teachers.

The WHO recommends initiation of breast feeding within the first hour of life, exclusively breast feeding for the first 6 months of life, and continued breast feeding until two years of age or older. Reviews have shown that initiation of breast feeding within the first 24-hours of birth is associated with a 45% reduction in all cause and infection-related neonatal mortality, and is thought to mainly operate through the effects of exclusive breast feeding.

There are impediments to improving infant nutrition in PNG, including private businesses and public service facilities that don't provide breast-feeding friendly work environments, infant formula companies that promote their products to midwives and young mothers, and pharmacies and other outlets illegally selling infant feeding bottles. These obstacles need to be addressed by education, updating of the existing legislation by including provisions of the International Code of Marketing Breast-Milk Substitutes and enforcing existing legislation.

## Complementary feeding

Health workers should know what to advise mothers on the introduction of adequate complementary feeding, and practice this. Mothers and caregivers often introduce foods too early, and very often complementary foods are not sufficiently energy dense, not frequent enough, and have low protein content.

## Micronutrients

Support should be given to efforts to fortify staple foods, such as rice and flour with multiple micronutrients including iron, iodine, zinc, thiamine, riboflavin and folate. Locally grown foods that are naturally full of micronutrients should identified and be encouraged to be grown in family food gardens. This will require collaborative effort from the different stakeholders such as agriculture.

## Vitamin A

The target population for vitamin A supplementation is children six months to five years. The current Standard Treatment Manual recommends two doses, given at six and 12 months. To improve vitamin A coverage it would be valuable to expand vitamin A supplementation into the second year of life, by adding additional doses at 18 and 24 months. Vitamin A is delivered through

EPI. There is a need to record vitamin A administration in the NHIS and Baby Health Record Book. Include a dose of vitamin A to post-natal mothers. The 2016-2018 National Demographic and Health Survey (DHS) showed only one third of the children (5-59 months) had received a dose of vitamin A in the preceding 6 months.

## Deworming

De-worming with albendazole should be given with vitamin A at 12 months of age, then at regular intervals thereafter, every 3-4 months if possible. Only one fifth of surveyed children in the 2016-2018 DHS had a received deworming medications in the preceding 6 months.

## Zinc

Zinc is part of standard treatment for children with diarrhoea and malnutrition. Zinc is currently not widely available in PNG, and efforts should be put into distribution of zinc to all health facilities.

## Growth monitoring every time a child receives their vaccines

Growth monitoring is an important part of child health. Its impact is dependent on whether staff have weighing scales, are able to understand how to plot a weight chart accurately, understand the meaning of a flat or falling weight line, and counsel the caregiver appropriately. In remote areas in PNG there is a lack of weighing scales. Health workers can take a history of the child's dietary intake and counsel mothers and other caregivers on feeding appropriate for the child's age. In addition, evaluation of milestones is helpful to assessing the nutritional and development state of the child. Measuring mid upper arm circumference (MUAC) is useful in areas where scales are lacking. Regular growth monitoring is an important part of child health in PNG, and it should occur at least at every vaccine visit and every presentation with illness.

The ability to measure height would allow identification of severe acute malnutrition (SAM) and moderate acute malnutrition (MAM). Again, impact will be highly dependent on staff understanding how to measure and plot height, and their acceptance.

## Nutritional support to sick and malnourished children

The mortality rate for severe malnutrition in provincial hospitals is 20%. Currently, in most hospitals, children with acute severe malnutrition do not receive the frequency or volume of feeds they need, basic complications such as hypoglycaemia and hypothermia are not monitored for. A staged, systematic approach to the management of acute severe malnutrition follows WHO and PNG standard treatment guidelines, and is part of the Hospital Care for Children training course. Improvements in the management of severe acute malnutrition in PNG hospitals may reduce the very high mortality rate among children with severe malnutrition.

- There is a need for hospitals to improve services, both for in-patients and in the community for children with poor nutrition.
- In most hospital Nutrition Rehabilitation Units (NRU) have been closed down or operating under difficult circumstances. The re-establishment of nutrition rehabilitation units and the appointment of nutritionists in hospitals are important.
- Training in the management of acute severe malnutrition.
- Training in the outpatient management of moderate acute malnutrition
- There is a need for provincial health offices to work with departments of agriculture to support better nutrition in the community.

- Some countries have replaced NRU's with community-based distribution of RUTF (ready-to-use therapeutic foods). Development of local manufactured RUTF is crucial to sustaining supply. This requires coordinated inter-sectoral collaboration (including DAL, NARI, UNITECH, SMHS, DOH-Nutrition and Food Safety).

## Human resources for nutrition

It is of concern that the number of nutritionists has decreased over the years. PNG has no dietitians in the Department of Health, let alone dietitians specializing in child health. Use of ready-to-use therapeutic feeds should be explored in children with malnutrition, tuberculosis and HIV. There is a great need for dietitians and nurses to assist with the implementation of nutrition programs in hospitals and the community.

The Health Department Nutrition Unit has proposed to create at least one position for dietitians at Level 1 and Level 2 (combined with a training program for local dietitians). Dietitians could advise on food services for malnourished children.

Given the central importance of nutrition there is a need for a paediatrician trained in nutrition to help provide national leadership in this area.

## Essential nutrition requirements

Affordable and proven nutrition interventions through actions at health facilities, in communities and through communication channels are available. In summary, these include:

- Exclusive breast feeding (EBF) from birth to six months
- Adequate complementary feeding from about 6–24 months with continued breast feeding for at least two years
- Appropriate nutritional care of the sick and severely malnourished children
- Adequate intake of vitamin A for women and children
- Adequate dietary intake of iron for women and children
- Adequate supplementation to pregnant women with: iron, folic acid, and calcium
- Adequate intake of iodine by all members of the household
- Reduction in malnutrition and its consequences therefore depends on interventions started before or during foetal development and infancy.

## Key messages for Provincial and District Health Staff

- Every time a child attends a health centre to receive vaccines, they should be weighed and have their weight plotted on their growth chart in the Infant Record Book. A flat or falling weight curve indicates the child requires help. Don't wait until a child has severe malnutrition to do something about it
- Build a Nutrition Rehabilitation Unit in your province
- Train staff in nutrition and the management of acute severe malnutrition, using IYCF training and the WHO Hospital Care for Children courses
- Create a position for a nutritionist in the province and nutrition officers for your districts

- Promote exclusive breast feeding from birth up to six months of life, and support education for mothers in complementary feeding
- Have breast feeding friendly policies in all work environments
- Enforce the Baby Feeds Supply (Control) Act 1984 (under revision: this Act after it is completed will be called the Infant and Young Child Feeding Act, and will prohibit the selling of infant feeding bottles without a prescription from a paediatrician)
- Support your hospitals to be accredited as 'Baby Friendly'

### 3.11. Adolescent health and school health

Adolescence is somewhere between 12 and 20 years of age. It is a time of change and can lead to various crisis, it is often a time when mental health issues arise. A healthy adolescence requires informed and safe choices about risk-taking behaviour such as smoking, alcohol and other drugs, sexual activity, diet and relationships. Adolescence is a time when interventions and healthy choices may reduce the risk of chronic physical illness in adulthood and reduce the risk of adverse mental health and substance abuse problems. During adolescence health workers can help young people make good choices for healthy living; and if they stumble, help them onto a safer path. However, we need to try to understand, reach, and help adolescents.

The programs currently in place to address issues affecting adolescence are very limited. The policy aims in this area are to:

- Stress the importance of adolescence as an important time for development of a child's potential
- Provide facilities for adolescents to access appropriate and acceptable health care services
- Improve human resources for adolescent health
- Provide training for a paediatrician in adolescent health, to act as a national resource person for this area
- Provide training for other health workers in adolescent health

The WHO definition of an adolescent is an individual between the age of 10 and 19 years, an age group that overlaps the paediatric with the early adult population. In Papua New Guinea, almost a quarter of the population (22.5%) is made up of adolescents. The adolescent population in PNG are being marginalised as a result of the lack of appropriate health and social services. Health programs and services targeting adolescents require multi-sectoral approaches and should involve the NDoH, National Department of Education, National Youth Commission and Department of Community Development.

The School Health Program jointly carried out by the Family Health Services in the National Department of Health and the Department of Education aims to deliver immunization to school aged children, and education on sexual and reproductive health (SRH). SRH problems are among the major health challenges facing adolescents and there are many barriers in delivering an effective SRH education and services to adolescents by the School Health Program. These barriers include lack of teacher training, lack of education materials, low school attendance by girls and the very high school dropout rates. The NDoH has no existing health program for adolescents in urban and rural areas of PNG.





Non-governmental organizations and churches deliver the bulk of services for the adolescent population in PNG. The services provided include education and related SRH services such as STI and HIV prevention and treatment, life skills training and involvement in activities that deter them from involving in social problems such as smoking, alcohol and drug abuse. The lifestyle choices made by adolescents have a major impact on the rate of non-communicable diseases in adulthood. The prevention of teenage and unwanted pregnancies will contribute towards addressing population growth concerns. Therefore, the NDoH should support these organizations in carrying out their programs with funding and technical resources.

The Paediatric Society should support the Adolescent Health section of NDoH in the development and finalizing of the National Youth and Adolescent Health Policy. This policy aims to set guidelines for the provision of health services targeting the adolescent population in the community. Paediatricians should support and be involved with existing programs and activities of government and non-governmental organizations that target adolescents in the community within the provinces they work in.

The care of sick adolescents admitted to hospitals in Papua New Guinea should be shared between the paediatric and adult medical units. The current cut-off age for admission to a paediatric ward is 12 years old while the adult wards admit 18 years and above. The management of chronic cases such as congenital or acquired heart problems, epilepsy, cerebral palsy and multiple congenital abnormalities in this age gap is also an issue. There is currently no allocated ward space and appropriate facilities for sick adolescents in hospitals within PNG.



## Adolescent services within a hospital

Hospitals in PNG should support appropriate clinical care of sick adolescents by the introduction of an adolescent unit. The allocated ward space could be part of the children's ward, with appropriate facilities that contribute towards improved clinical outcomes. An adolescent unit could be made up of a paediatrician, an adult physician, an obstetrician, a social worker and nurses who deliver non-judgemental clinical service and education to adolescents. The continuity of care of adolescents with chronic clinical problems could be coordinated between paediatricians, adult physicians and obstetricians within the adolescent unit. An adolescent consultation clinic should be set up for follow up care. The unit should also work in collaboration with other government and non-government organizations in the community that deliver preventative and curative health services for adolescents and youths.

There is a need for interested paediatricians, adult physicians, obstetricians, social workers, and nurses with interests in adolescent health to receive appropriate training.

## School health programs

There should be school health programs in every district. School is an ideal place to emphasise the adoption of healthy lifestyles, to have identification of physical and learning difficulties, the integration of children with disabilities or chronic illness, catch-up immunization, and to teach good health messages on nutrition, alcohol and drug education, illness recognition, and sexual and reproductive health including family planning. There is a National School Health Policy, which outlines this program.

## Key messages for Provincial and District Health Staff

- Establish an adolescent centre in your province which can provide services to adolescents
- Involve your hospital paediatrician, obstetrician or physician in programs targeting adolescents and youths in the community
- Support school health programs including immunization activities
- Support the training of health workers in adolescent health
- In the life of this plan immunization against HPV, the cause of cervical cancer will be introduced

### 3.12. Children with disabilities

Many children in PNG live with a disability. They can live happy and healthy lives if given enough support in a loving family, many can attend school and contribute to their communities. Sometimes children with a disability will have an extra insight or ability that makes them special to their families, their friends or to others. We need to not focus so much on the *disability*, but on the child's abilities. Unfortunately many children with a disability suffer stigma, but children with different abilities have as much right thrive, be loved and reach their full potential as any other child.

#### Causes of childhood disability and complications

Disabilities include cerebral palsy, the most common physical disability in childhood, sensory loss such as blindness, deafness, or intellectual and learning problems, and epilepsy.

Diseases causing disability include congenital problems, birth asphyxia, low birth weight, meningitis, chronic infection including HIV and tuberculosis, trauma, and malnutrition.

Complications of disability are often preventable, and include malnutrition, increased risk of pneumonia, skin problems, dental decay or seizures. In addition to direct health consequences children with disabilities are vulnerable to social exclusion, economic disadvantage. More than 90% of children with disabilities in developing countries do not attend school.

Children with disabilities are also at increased risk of abuse and neglect. For example, the annual incidence of violence experienced by children with disabilities in some countries is several times greater than the rate experienced by children without disabilities.

In spite of the extent of these problems, research into the situation of children with disabilities in PNG is limited. This policy aims to:

- Recognise the rights of children with disabilities to lead fulfilling and happy lives and be given every opportunity to thrive and reach their full potential.
- Prevent disability through improved newborn care, vaccines, improving rates of breast feeding and child nutrition and improving child safety through legislation
- Improve developmental screening, referral and support services for children with disability

Our national disability policy emphasises the protection of human rights, inclusiveness, barrier free services and partnerships for an estimated 1 million people living with a disability in PNG. An estimated 5% of children in PNG have a disability although there is little data on exact numbers. Most live in rural areas with ~2% being able to access support services such as community based rehabilitation and special education resource centres.

#### Support services for children with disabilities

Many disabilities in children are not preventable, and children will continue to live with disability despite optimal prevention strategies being in place. Improving support to services for children living with disabilities is essential to improve their quality of life, health and development, and entails a cross-sector approach as well as a multi-disciplinary approach in health.

Support services for children with disabilities are mostly run by community-based organisations, with limited external funding. These community organisations face many challenges, including lack of data on number and type of disabilities in PNG or where and how CWD live; and poor infrastructure hindering access to CWD. There are also challenges in terms of inclusive education and health for CWD which include accessibility to these services as most live in rural areas, and there is a lack of local expertise. In regard to health, our lack of local expertise in areas such as

developmental screening, audiometry, speech therapy, Braille instruction, occupational therapy, physiotherapy, optometry, orthopaedics and ENT remain some of our biggest challenges.

Services for children with disabilities can be improved by:

- Improve school participation for children with disabilities
- Birth registration for all children, including babies born with disabilities
- Strengthen referral pathways for children with disabilities from all provincial peripheral health facilities to enable registration
- Strengthening or establishment of developmental screening programs for children at early education centres and in major hospitals.
- Increasing support to community organizations who work with disabled children.
- Strengthening multi-disciplinary health services for children with disabilities
- Training of nurses and paediatricians in supporting children with disabilities and their families

## Prevention of disability

- Some forms of childhood disability are preventable, therefore a focus on disability will require strategies for prevention, many of which are outlined in this Plan. These include:
  - Vaccines to protect children from meningitis, including Hib (Pentavalent), *S. pneumoniae* (PCV), and BCG
  - Strategies to improve newborn care: encouraging facility-based deliveries, skilled midwives, neonatal resuscitation
  - Improving rates of exclusive breast feeding, reducing malnutrition, reducing anaemia and micronutrient deficiencies
  - Strategies to improve child safety, such as car seat belt legislation, bicycle helmets, fire safety
  - Strategies to improve water and sanitation
  - Folic acid supplementation for pregnant women to prevent neural tube defects, such as spina bifida

## Key messages for Provincial and District Health Staff

Provinces and communities should have programs to support children and adults who have disabilities, to offer them every opportunity to thrive and reach their full potential, and to be contributors to the community.

Services for children with disabilities can be improved by:

- Encourage school participation for children with disabilities.
- Increasing support to community organizations who work with disabled children and adolescents.

- Strengthen multi-disciplinary health services for children with disabilities.
- Start a parent-support group for caregivers of children with disabilities, this can really support partents who otherwise feel isolated.
- Train nurses and paediatricians in supporting children with disabilities and their families.

### 3.13. Children with chronic illnesses

As infectious diseases become better controlled, a higher proportion of the patients in paediatric wards and in clinics have chronic conditions - communicable and non-communicable, congenital and acquired.

Chronic illnesses in children are varied and involve different systems. They include asthma and other chronic lung diseases, congenital and rheumatic heart disease, cerebral palsy, epilepsy and developmental problems, kidney disease, diabetes, cancer, long-term complications in preterm babies, thalassaemia and sickle cell disease, and mental health conditions. The spectrum of chronic conditions also includes congenital conditions such as Down syndrome. Tuberculosis and HIV remain common chronic infective conditions.

In chronic illnesses one system may be involved (such as in asthma) or all systems may be potentially involved (such as in HIV). Hospitals are well set up for acute conditions, but for chronic conditions a different model of long-term care is needed. For chronic illnesses, discharge planning, follow-up and systems of holistic care in the community are important.

Although chronic health conditions have many different presentations and treatments, children living with such conditions share some things in common. These are outlined below:

**Age:** Chronic illnesses affect children of all ages, but compared to common acute infections such as pneumonia or diarrhoea, a higher proportion of such conditions occur in school-aged children and teenagers.

**Vulnerability:** Children with chronic illnesses are vulnerable to acute infections, and comorbidity from poor nutrition, anaemia, and developmental problems.

**Continuity of care by a trusted child health worker:** Children with chronic health conditions need to see a paediatrician or specialist initially and can often later be managed in their community. All such children need an individualised treatment plan. It is helpful to them and their family to have at least one trusted doctor or child health nurse who understands their condition and their family's situation. That health care worker can provide regular review and continuity of care.

**Achievable goals of treatment:** All children need achievable goals of treatment that are important to them (patient centred goals). For many children with chronic health conditions normal development is a challenge. Achievable goals of treatment are individualised to the child's abilities, and may be medical, activity or development related.

**Involvement of allied health services:** Early involvement of physiotherapy, or other allied health care professionals can help children achieve their goals, and optimise their development. For example:

- Physiotherapy for cerebral palsy to improve mobility.
- Physiotherapy for bronchiectasis to reduce recurrent infections.
- Audiology for children with speech or hearing problems.
- Optometry and glasses for children with visual problems.
- Wheelchairs and other mobility aids.

These are practical things that avoid complications, keep children out of hospitals, and enable children to fully participate in life at school and in their community.

**Medication adherence and supply:** Many children with chronic illness have problems in adhering to medications. This occurs for many reasons, such as bitter taste, nausea or other adverse effects. In some settings there are problems with continuity of supply of certain less commonly prescribed medications, such as insulin for diabetes, anticonvulsants for epilepsy, or iron-chelating agents for thalassaemia. This may be because such medications are not on essential medicines lists, or the families live in locations where their hospital is not supplied with these drugs, or the cost is high and parents cannot afford to buy them. Health care workers have a role to advocate for these medications being available to children who need them, wherever they live, and whatever their means.

**Quality of life:** Measures should be in place to optimise development and quality of life, and improve school attendance for children with chronic conditions. Sometimes such children are kept out of school because their parents are scared they will become unwell while at school, they may fear the teachers will not understand their illness, or they fear stigma or teasing of their child. Children with chronic conditions benefit greatly from school participation, and have an equal right to education as well or able-bodied children.

**Importance of health education:** Many parents of children with a chronic illness can acquire a deep understanding of their child's condition, and how they can contribute to his or her care. They become experts in their child's care and are the best judges of when he or she is sicker than usual. Children with a chronic illness can also gain an understanding of their condition and be empowered to help themselves. They too can become experts in their condition.

**Home environment:** The home environment is very important for children with a chronic illness. It must be free of physical dangers and environmental hazards, have a clean water supply and sanitation to avoid infections, have access if a child is physically disabled, and have safe areas to play. Some environments will be unsuitable for the optimal care of children with a chronic illness, then the health worker has to work closely with families to improve their understanding of the care needs of the child, and work with social welfare services to improve the environment and care provided at home.

**Mental health and stigma:** Some children with chronic health conditions have mental health concerns; they may be anxious or depressed, especially if they face stigma or discrimination or if they are excluded from school and other normal activities. Recognising and acknowledging this is important. Practical things that can help include writing a note to the child's teacher to explain their condition and their abilities, the treatment they may need at school, and the normal things that they can do.

**Social and economic support:** Chronic health conditions can be costly for families – the health and other costs can drive some families into poverty. However, there are many individual, societal and health care costs for complications that we fail to prevent. Children who receive appropriate treatment for their chronic health condition can go on and make contributions to society and return far more than the treatment costs.

**Continuity of care and transition:** Ultimately older teenagers with a chronic illness need transition to adult services, and this should be done in a way that ensures continuity of care, and is patient centred, with careful planning and timing.

**Palliative care:** More children are surviving and reaching adulthood with chronic conditions, but for some children with a serious chronic illness there are important end-of-life care issues that families have to face, and a trusted senior health worker can support a family by providing good palliative care.

## Key messages for Provincial and District Health Staff

- Children with a chronic illness should have a written management plan.
- Provide education to district and primary health-care workers on chronic disease management and on when to refer to specialty care.
- Develop links between specialist services and rural health centres, for consultation, referral and ongoing care.
- Increase training for paediatric nurses, to provide holistic care of children with chronic diseases, care coordination, and carry out written management plans.
- Training in chronic care, rehabilitation, developmental medicine for doctors, nurses and allied health workers (such as physiotherapists, optometrists)



### 3.14. Childhood cancer

Cancer in children, although not as common as infections and nutritional problems, is fairly common. Cancer is reported to be amongst the top 10 causes of admissions in major hospitals in the country, although the true burden of paediatric malignancies in PNG is unknown. Many types of cancer in children are treatable if detected early and good support systems are in place. Therefore adequate resources need to be allocated to ensure the effective management of childhood malignancies. This should include the availability of effective chemotherapy and appropriate supportive care for children with the intent to cure and humane palliation for children with complicated or advanced cancers.

The following are common childhood malignancies among hospital admissions (in order of decreasing incidence):

1. Leukaemia – acute lymphoid leukaemia (ALL), Acute myeloid leukaemia (AML)
2. Lymphomas (Burkitt Lymphoma, Hodgkin Disease, non-Hodgkin lymphoma)
3. Neuroblastoma
4. Retinoblastoma
5. Wilms tumour
6. Brain tumours

There has been a notable difference in the pattern of clinical presentation compared to other parts of the world, and a change in the incidence of leukaemia in the last three decades. Studies done in the 1970s reported that leukaemia was not very common in PNG; however, more recent studies have shown that it has become the commonest malignancy in children, similar to many high-income countries.

The barriers to adequate management of paediatric cancers in PNG include:

- Late presentations and delayed diagnosis
- Inadequate diagnostic facilities and manpower: pathology, medical imaging, timely surgical services
- Unavailability of standardized cancer protocols
- Unavailability of drugs for chemotherapy, supportive care, palliative care
- Inadequate supportive care and facilities: nutrition, blood products, isolation areas
- No central data base for cancer surveillance
- Poor social support of patients and their families during treatment
- Limited ward space for children needing radiotherapy referral.

### Future plans

- Increase the paediatric cancer unit in PMGH to 20 beds (from 10 beds currently) and establish a paediatric cancer unit in Lae. Identify 2-4 beds in provincial hospitals for use by cancer patients
- Paediatricians to work with provincial health authorities and NDOH to run community awareness programs that encourage early health seeking behaviour, and awareness for health care workers on early identification of cancer

- To work in collaboration with CPHL and NDOH to improve diagnostic services: Pathology: Haematology, Biochemistry, Histopathology, and Medical Imaging: X-rays, Ultrasound, CT scan
- Establishing an arrangement between provincial hospitals and CPHL to enable biological specimens to be sent for analysis and results sent back to hospitals in a timely manner
- Revise paediatric cancer management on Paediatric Society website and develop a standard cancer management manual for paediatricians
- To work with hospital pharmacies and the PNG Pharmaceutical Board to ensure the availability of drugs required for chemotherapy, supportive care and palliative care
- Encourage active involvement of hospital social workers department in the support of patients and families during treatment
- Improve facilities for supportive care like nutrition, hand washing and hygiene, and blood products, and child friendly facilities
- Support central co-ordination and improve data collection and surveillance on pattern of childhood malignancies and treatment outcomes
- Establish a twinning relationship with an overseas paediatric oncology unit for specialist advice and opinion
- Identify nurses for skill development in childhood cancer especially in safe chemotherapy preparation, administration and recognition and treatment of chemotherapy side effects (possibly one in each major hospital)
- More paediatricians to train in oncology
- Short courses for registrars and nurses on management of cancers and palliative care

## **Key messages for Provincial and District Health Staff**

- Many children with cancer can be cured if they are diagnosed early and receive early treatment
- All children with suspected cancer should be referred to the provincial paediatrician. We have a paediatrician who has specialised in children's cancer who can provide advice

### 3.15. Children with heart disease

The problem of heart diseases in PNG is relatively small compared to the other major infectious diseases and nutritional health problems. However, heart diseases are an important cause of illness and mortality in infants, chronic disease in children, with poor quality of life, high rates of hospitalisation and high costs to families if left untreated.

Congenital heart disease is the largest group. Although there are limited population-based data in PNG, congenital heart disease affects 0.6-0.8% of infants born in all countries; therefore in PNG we could expect 1000 infants affected per year.

Rheumatic heart disease, caused by Group A streptococcus infection is also common in PNG because of the frequency of streptococcal skin infections.

Cardiomyopathies are uncommon and lifestyle cardiac diseases are seen in the adult population.

Pericardial disease is mainly infective with tuberculosis the predominant cause, and *Staphylococcus aureus* pericarditis is linked to common skin disease, impetigo and nutritional deficiencies.

Management of cardiac disease in children was established in 1993 with annual visits by an Australian team of volunteers working together with the local PNG team with surgery performed at Port Moresby General Hospital.

Provincial paediatricians identify and manage cardiac patients who are then entered into regional cardiac registries. Each year the two paediatricians with cardiology training visit the regional and provincial centres to review children on the registries. This screening process is to identify children who may benefit optimally from cardiac surgery: those who require one procedure for a complete repair, and likely to subsequently have a normal quality of life without major complications.

Final selection for surgery takes place at PMGH in consultation with the visiting cardiac surgery team. The results have been very good with a mortality rate of less than 2%, and good long-term quality of life for the vast majority of children.

Over the last decade there has been increasing training and responsibility transferred to the local PNG team, to the extent that in most closed heart operations and a number of open cases are performed by the PNG national team.

Funding for the operations comes from a number of sources including the Australian Government, NDoH, PNG business entities, fund raising by the public and volunteer services of the Australian volunteers.

### Future plans in the management of cardiac disease

Cardiac disease and the need for surgical services will continue to pose a significant problem for resource-poor countries like PNG. Establishing a local cardiothoracic unit that can perform all closed operations and some open heart surgery is needed, given that visits by overseas teams may be limited. There will be a need for substantial training of selected personnel in overseas units. Components in this plan should include:

- Formation of cardiothoracic unit at PMGH
- Continuing training for the paediatrician currently under cardiology training, and to identify a second paediatrician for further training
- Identification and training of at least two anaesthetists / intensivists

- Identification of an additional surgeon for future training
- Supporting training of two persons identified as perfusionists
- Continuing training of operating theatre and intensive care unit staff

### **Key messages for Provincial and District Health Staff**

- The cardiac program in PNG has been running since the 1990s. Children with heart disease can receive medical treatment, and some can receive surgery and be fully cured. Refer early to your paediatrician

## 3.16. Child protection and social services

### Child abuse and neglect

Children are vulnerable in any society they are raised in, and are wholly dependent on parents or other adults for food, shelter and security, as well as for emotional and social support. Children with special needs such as orphans, children affected by HIV and AIDS, and children with disabilities are the most in need of protection from violence and abuse. The number of orphans is increasing because of HIV and the breakdown of traditional village structures. Natural disasters or civil conflict give rise to displaced children, unplanned urbanization is increasing, all meaning the number of at risk children is increasing. The consequences are extreme, including malnutrition, physical and emotional injury, preventable infection with HIV and other sexually transmitted infections.

- Improved reporting, documentation and surveillance systems for child abuse and neglect are needed
- Improved preventative and treatment services need to be in place for children in need of protection from neglect and abuse
- Health workers can make a major contribution to identifying at-risk, abused or neglected children and through liaison with social and legal services help to mitigate the effect on health and development of the child

Legislation, strategies and training for health workers in protection, prevention and management of child abuse and neglect are required

There is a need to support social services for children. All paediatricians need to be advocates for marginalised and at risk children. More support is needed for community groups working with at-risk children and their families. More social workers are needed. Developing a postgraduate training component for child protection and child abuse management is an aim for the next two years. Having a paediatrician within the National Department of Health who is trained in the area of child abuse and other areas of child protection is an aim for the next five years.

### Reducing domestic violence

In PNG, there is a growing concern of the effect of violence against children. Domestic violence against mothers and physical and sexual abuse against children destroy families and destroy the psychological, emotional, spiritual and physical developments that are necessary in childhood and adolescence. In the 2016-18 PNG Demographic and Health Survey 59% of women surveyed had been victims of physical or sexual violence, including 43% of 15-19 year old girls. 72% of women sought help from family members, and 10% of women who experienced physical or sexual violence sought help from police.

Children of mothers who have suffered domestic abuse are at an increased risk for poor health outcomes. Children's exposure to intimate partner (domestic) violence, even if they are not directly affected, increases the risk of poor psychological, social, and emotional development and well-being,<sup>18</sup> and also carries increased risks of common physical illnesses in the child. Mothers are less likely to receive antenatal care in the first trimester of their pregnancy if they have experienced violence, and are more likely to have a stillborn child. Children of mothers who have experienced domestic violence had higher under-five mortality rates in 7 of 9 countries where this has been studied.<sup>19</sup>



It is the responsibility of everyone to speak out against such violence, and to build communities and families in which such violence is unacceptable. Health workers, teachers, community groups and neighbours need to identify and report child abuse and domestic violence.

Contact numbers and resources for dealing with family violence and child protection are at:

<https://pngpaediatricsociety.org/wp-content/uploads/2020/10/Child-protection-resources.pdf>

<https://pngpaediatricsociety.org/wp-content/uploads/2020/10/1-Tok-Kaunselin-Helpim-Lain-Service-Provider-Directory-2017.pdf>



## Universal education

In the longer term child survival and improved child health and development cannot be achieved without concurrent increases in access to education. Achieving universal primary education, higher participation in secondary and tertiary education and maintaining quality of education will be as important for child and maternal health as any interventions within the health sector. There are several barriers, including school fees and available places. These need to be addressed by advocacy and legislative change.

## Birth registration

Vital registration of births and deaths is important for public and population health. Health workers can promote vital registration when dealing with pregnant mothers, at delivery, and at times of infant immunization. They should also register any death appropriately. Birth registration will be emphasised on the Infant Record Book, and in health worker training in newborn care.

### Key messages for Provincial and District Health Staff

- We must do everything we can to reduce domestic violence, it has a devastating effect on mothers and children.
- Provide a health facility proforma for all district and primary health care workers for the management of child abuse and when to refer to specialist services.
- Strengthen links between hospitals, child protection services, the police, and the courts system for all criminal cases of child abuse.



### 3.17. Urban and environmental health

The health of children in urban environments is of increasing concern. Well planned, child friendly and clean urban and rural environments can contribute to child health and development, but unsafe environments lead to transmission of infectious diseases, malnutrition, injuries, and psychological problems that can have devastating consequences. Additional effort will be needed in the coming years to provide services that address these needs. These require a multi-sector effort, involving health and education authorities, town planning, other city or local government departments, and community organisations.

#### Features of a healthy environment for children:

- Lack of crowding in housing
- Public safety measures (e.g. speed limits on roads, seat-belt legislation, smoke detectors in homes)
- Sewage and sanitation
- Hygienic waste disposal
- Clean water
- Healthy food, fresh fruits, and vegetables
- Access to preventative health care (vaccines, growth monitoring), primary health care and referral level health services
- Access to schools and education so children can reach their full potential
- Parks and playgrounds, sporting ovals and sporting teams for children to join
- Trees and gardens
- Clean air, limiting pollution
- Music
- Books
- Freedom from domestic violence and abuse of all kinds
- Freedom from bullying and peer violence
- Drug free environments



Paediatricians and other child health workers have a role in advocacy for healthy environments for children, in both rural and urban areas.

NCD health is developing primary care services. In the life of this plan there may need to be better definition of the role and credentialing of General Practitioners who look after children.

### Reducing deaths and injuries from road trauma, burns and drowning

As urbanisation increases, road traffic injuries are a significant cause of injuries and deaths among children and adolescents. Reducing road injuries requires a multi-faceted approach: enforcement of speed limits, especially around areas where children commonly walk, enforcement of alcohol limits and drug bans for drivers, teaching children about road safety in schools, appropriate supervision of children walking to and from school and the use of brightly-coloured clothing, and wearing of helmets on bicycles.

Burns are a cause of child injury, which cause many deaths and long-term disfigurement. Burns also have serious psychological consequences in children. Burns occur in villages and cities because of inadequate supervision of young children around fires, in homes from cooking, throwing of flammable liquid or use of accelerants to light fires when children are around, falls into a fire during an epileptic fit, clothing (including grass skirts) catching alight, and burns from a motorcycle exhaust when a child or adolescent is being carried as a passenger. Burns can be prevented by parental education about fire safety and hazards in the home (such as making cooking utensils out of reach of children), supervision of children around fires especially those with epilepsy or other impairments, proper regulation and design of industrial products such as kerosene stoves, proper storage of flammable substances, and teaching burns first-aid in schools.

Drownings are also common in PNG, most commonly in children 1-4 years of age, and also among school-aged children 5-14 years drownings have been identified as one of the commonest causes of death.<sup>20</sup> WHO and many countries in the South-East Asian and Western Pacific Region have strategies to reduce childhood drownings. These include:

- Swimming and water safety skills training for children.
- Implement proven drowning prevention strategies, tailored to their own circumstances and risk groups.
- Improve data on drowning.
- A national water safety plan with clear implementation.

Paediatricians and child health workers can take a lead in advocating for better prevention of trauma, burns and drownings, better home and community safety, and education for parents and community leaders of how to prevent these avoidable deaths and injuries.

## Chapter 4. Human resources for child health

### 4.1. Training of paediatricians for the next 10 years

Paediatricians are crucial to maintaining progress in child health and survival. The role of the paediatrician in provinces is multi-faceted. They need to provide the highest standard of care to all children, to oversee the child health services in their province and support public health services and primary health care providers, and teach other health workers about child health and paediatrics. Particularly in provinces, they need to liaise with the Provincial Health Authority to ensure that child health programs (immunisation, , nutrition, maternal and child health services) are planned for and implemented in their provinces.

Increasingly there is a need for community paediatricians who focus more on preventative health and organising primary child health services in their province or urban district, rather than being full-time in a hospital.

Much of the progress in child health in the last decade has been because of the leadership and technical support provided by provincial paediatricians. The policy aims in this area include:

- Achieve the National Health Minimum Standard for specialist paediatricians.
- Ensure that paediatrician workforce planning matches the changing needs in child health, and addresses curative and preventative health; hospital and community services; rural and urban services; and has sufficient general and community paediatricians, and those with sub-specialty skills and training.
- Support programs for continuing professional development for paediatricians, paediatric trainees, child health nurses and other child health workers.

The paediatrician's primary role in a provincial hospital is to provide the highest standard of appropriate care to all children. However, it is equally important for him/her to play a supportive role to public health services, surrounding district hospitals, and primary health care providers.

It is necessary to increase specialist manpower to effectively provide a supportive role at the provincial level. The aim is to cover all provincial hospitals with an adequate number of paediatricians.

Currently at least 3 provinces (Manus, Oro, and Jiwaka) do not have a paediatrician. Another 4 provinces have paediatricians as fulltime administrators (Gulf, Central, Southern Highlands, West Sepik). Considering expected retirements by 2030, 34 newly graduated paediatricians will be needed between 2020 and 2030 (Appendix 1). That means 4 graduating each year.

As per National Health Minimum Standards on specialist (paediatrician) manpower requirement for hospitals, there must be a minimum of two paediatricians in all provincial hospitals and five in Level 1 hospitals (PMGH). In addition, there is a need to train young paediatricians in subspecialty areas and a need for young paediatricians to take on academic roles in teaching and research. If these standards are to be reached through this decade it is imperative that a minimum of six DCH candidates enter the programme each year and continue into MMed training. This requires active recruiting.

#### Sub-specialty training

To improve the standard of clinical practice and in line with the continuous medical education program the Paediatric division recognizes the need to support selected essential areas of sub-specialization. Currently these areas are paediatric cardiology, neonatology, HIV medicine, and paediatric oncology. To achieve the long term aims of the National Health Plan it will be necessary

to also train for the following areas: paediatric infectious diseases including malaria and tuberculosis, paediatric nutrition and malnutrition, and paediatric intensive care. It will also be necessary to strengthen paediatric input into disability services, child welfare services and adolescent health. It is important to ensure that there are positions established to allow those with subspecialty expertise to function effectively and efficiently. Appendix 2 outlines a plan for such training.

The training of Paediatricians in these areas should not detract from the primary aim of providing and maintaining high quality general paediatric services at provincial level.

## **Key messages for Provincial and District Health Staff**

- Every province needs at least two paediatricians to provide clinical care and to work closely with the provincial health office or Provincial Health Authority to implement the child health programs. If your province does not have enough paediatricians, create these positions.
- Provide support for young medical officers entering the training programme in child health (Diploma of Child Health) in your province.

## 4.2. Child health nurses

Child health nursing need a major increase in resources. In the first five years of this plan (2009-2013) there have been investments in midwifery training, with increased training places at School of Medicine and Health Sciences (SMHS), University of Papua New Guinea, and other midwifery schools, heavily supported by Australian Government, Department of Foreign Affairs and Trade (DFAT). However, the same has not occurred in child health / paediatric nursing. There were three post-graduate child health nursing courses in PNG, now there is only one. This is based at the School of Medicine and Health Sciences, University of Papua New Guinea, Taurama Campus. This school trains about 20 new midwives and 15 paediatric nurses annually. Previous paediatric nursing programmes in Goroka and Pacific Adventist University in NCD are no longer running such courses.

A review of PNG's nursing workforce in 2002-3 estimated that there was a need for 435 more midwives and 200 more paediatric nurses. So more post-graduate programmes in child health nursing are needed; one in each region. The establishment of these programmes will need considerable support in terms of suitably qualified staff, infrastructure, and resources. Selection processes, accreditation, recognition of skills and remuneration issues need to be addressed if paediatric nurses, once trained, are to stay in the clinical workforce.

### Key messages for Provincial and District Health Staff

- Each of the four regions in PNG should have a paediatric / child health nursing training course.
- There should be a child health nurse and a midwife in every health centre, and at least one on every shift in hospitals.
- Send some of your nurses for paediatric nursing training.
- Ensure your province has positions at the appropriate level for your staff when they have completed their training programs.





**Figure 4. Paediatric nurses are essential to running children's wards, improving public child health and implementing all aspects of this plan.**

### 4.3. Community Health Nurses

PNG is moving towards upgrading aid post to be community health posts. The intention is to have these staffed by three officers; including at least one community health worker with training and skills in maternal and child health care. The services that will be offered at community health posts for mothers and children will include all essential MCH services: antenatal care, deliveries, basic newborn care, immunizations, growth monitoring, and management of common childhood illnesses, and referral of very sick children. Staff will also help encourage the Healthy Islands concept within communities.

Given the number of aid posts to be staffed, there will need to be marked increases in the number of CHWs trained and major support given to CHW training schools.

### 4.4. Health extension officers

Many Health Extension Officers (HEO) work in provincial hospital paediatric wards, under the supervision of a paediatrician, and many work in district hospitals helping run the paediatric clinical service with nursing staff. However, there is no formal continuing education to upskill in paediatrics for HEOs, unlike for nurses and doctors. In the next decade we will develop a training course for HEOs in paediatrics and child health for continuing professional development.



## 4.5. Continuing professional development

A Continuing professional development (CPD) program is important for all child health workers in PNG. Various CPD-related activities exist currently however there is no systematic program. A CPD program needs to be developed for child health and general nurses, non-specialist doctors, HEOs and paediatricians. Attendance and participation in annual medical and nursing symposiums, in-service training, clinical attachments and postgraduate training for health workers should be supported. Health workers from rural and remote areas should to be included in these CPD-related activities.

The Paediatric Society of Papua New Guinea is a professional body made up of all paediatricians working in the country and membership is open to all child health workers. Members of the Society must aim to be up to date with new and emerging information on child health diseases and clinical practices around the world. A CPD program for paediatricians should be developed with the support of the Paediatric Society, the NDoH and the Medical Board of PNG. An accreditation process should be developed as part of the CPD program as a measure of a paediatricians' performance and professional standards. The CPD program should involve five main areas of a paediatricians' practice that contribute towards the accreditation process:

- Involvement in teaching and training of doctors, nurses and community health workers in child health
- Involvement and participation in regular monthly auditing of clinical practice and outcomes
- Involvement in research and access to relevant clinical journal
- Attendance and participation at annual Medical Symposia and Paediatric Society meetings
- Involvement as an active team member of either NDoH, Provincial DoH, non-government child health organizations, hospital or clinical units

A successful CPD program requires funding to be sustainable as most paediatricians have limited access to the internet and relevant medical journals. The program is to be supported with an accreditation process to be developed by the Paediatric Society in collaboration with the Medical Board of PNG.

Activities for the CPD program:

- CPD Scoring form incorporating five main areas of paediatricians practice to be sent out annually.
- Quarterly hard copies of journal articles on relevant topics and other relevant literature to be sent out.
- Annual CPD test/quiz Paediatric Society in collaboration with Medical Board to develop the Accreditation process for paediatricians.
- Paediatric Society and Medical Board to issue Certificate of Accreditation for successful completion of CPD program annually as a prerequisite for medical board registration.

CPD-related activities should be strengthened and supported for child health nurses, midwives, HEOs and other doctors involved in child health by their respective professional organizations, Paediatric Society and NDoH. In-service training, clinical attachments and postgraduate training for child health workers are some of the activities that need to be supported. Access to relevant child health literature and training in usage of clinical guidelines should be available to health workers involved in child health.

## Key messages for Provincial Health Office

- Support CPD activities for your midwives, child health nurses, HEOs, doctors and paediatricians in your province.
- Support and strengthen networking and sharing of information among all child health workers in your province.



## Chapter 5. Child health research

The Child and Adolescent Health Policy and Plan strongly supports the further development of child health research and research capacity in the country. All program areas mentioned in this Child and Adolescent Health Policy and Plan have research needs, and priorities should be developed according to research that will best address high burdens of morbidity and mortality. Some of the most useful research will be operational, to gain a better understanding of how to implement effective programs and interventions in the PNG context. Other research will be epidemiological or addressing key technical questions, such as the effectiveness of new preventative or treatment strategies or the precision of new diagnostic technologies for common diseases. For program areas that are relatively new in PNG, research may be required to develop and evaluate service delivery models. Training paediatricians in research methodology is important to sustain an evidence-based child health service. In the last five years high quality research projects have been done by paediatric registrars in training through the DCH and MMed, and this increases research capacity and addresses key issues in child health. Some examples of such research are available at: <https://pngpaediatricsociety.org/research-2020/>

## CHAPTER 6. CHILD HEALTH ADVISORY COMMITTEE

In line with the WHO Regional Child Survival Strategy a National Child Health Advisory Committee was established in 2006. The Child Health Advisory Committee has a key role in co-ordinating and supervising child health activities. This committee reviews all child health policy areas, new evidence and information and provides recommendations to the National Department of Health (NDOH). The committee has wide representation, including that from NDoH, UNICEF and WHO, University of PNG, and a community breast feeding support group. It meets quarterly, overseeing many child health activities. It is a vital link between child health workers, institutions and the NDoH. The CHAC has made recommendations or resolutions concerning all the activities mentioned in this document. A recent advance has been the appointment of an IMCI leader to be a member of the committee. General support to the policy, coordinating, and monitoring roles of the CHAC will be very important to maintaining a coordinated approach to child survival.

The CHAC comprises of:

- Director, Family Health Services
- EPI spokesperson
- Nutritionist
- Chief Paediatrician
- Professor of Child Health
- WHO representative
- UNICEF representative
- UPNG representative
- Susu Mamas representative
- Director, Office of Lukautim Pikinini, Department of Community Development

SECTION II

STRATEGIC IMPLEMENTATION PLAN 2021-2030

STRATEGIC IMPLEMENTATION PLAN: 2021-30											
PROGRAM AREA: POLICY DEVELOPMENT IN CHILD HEALTH											
Strategic objectives	Activities	Timeframe							Process indicators	Responsible persons	Resources required
		2021	2022	2023	2024	2025	2026	2027			
Policy development in child health	Printing of Revised <i>Child and Adolescent Health Policy and Plan 2021-2030</i>	X	X						<i>Child and Adolescent Health Policy and Plan</i> printed	NDoH	NDoH
	Support the Paediatrics Mid-Year meeting each June, and the Paediatric Symposium in September as major forums for child health policy development, continuing professional development and advice to the National Department	X	X	X	X	X	X	X	Meetings successfully conducted twice a year Meeting report and recommendations completed and submitted to CHAC Recommendations considered by CHAC Number of recommendations adopted and enacted	Family Health Services Paediatric Society	GoPNG DPs Donor Agencies
	Support the Child Health Advisory Committee as the major technical advisory body on child health	X	X	X	X	X	X	X	Meetings conducted quarterly Meeting report with recommendations completed and distributed	Family Health Services Chair, CHAC	NDoH



<b>STRATEGIC IMPLEMENTATION PLAN: 2021-2030</b>					
<b>PROGRAM AREA: EXPANDED PROGRAM OF IMMUNIZATION (EPI)</b>					
<b>Strategic objectives</b>	<b>Activities</b>	<b>Timeframe</b>	<b>Process indicators</b>	<b>Responsible persons</b>	<b>Resources required</b>
Refer to the Papua New Guinea Comprehensive Multi-Year Plan National Immunization Programme 2021-2030					

<b>STRATEGIC IMPLEMENTATION PLAN: 2021-2030</b>										
<b>PROGRAM AREA: STANDARD TREATMENT AND CLINICAL GUIDELINES</b>										
<b>Strategic objectives</b>	<b>Activities</b>	<b>Timeframe</b>						<b>Process indicators</b>	<b>Responsible persons</b>	<b>Resources required</b>
		<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>			
To have current evidence-based clinical guidelines for diagnosis and treatment of children available to every health worker	Revise the Standard Treatment Manual 11 <sup>th</sup> Edition (2022)	X	X					STM revised and submitted to publisher	Paediatric Society	NDoH (FHS and Office of Chief Paediatrician)
	Publish and distribute the 2022 Standard Treatment Manual to all health workers in the country	X	X	X	X	X	X	Approximately 30,000 copies printed, and appropriate numbers distributed to every PHO and every health facility in the country	Family Health Services Provincial Health Offices Technical Advisor Child Health Chief Paediatrician	GoPNG (National, PSIP, DSIP)
	Revision and reprinting of Paediatrics for Doctors in PNG			X	X			Paediatrics for Doctors in PNG revised, and 10,000 copies printed	Professors of Child Health Chief Paediatrician	GoPNG (PSIP, DSIP)
	Revision and reprinting of Child Health for Nurses and HEOs in PNG (Green book)	X	X	X				Child Health for Nurses and HEOs in PNG revised, and 10,000 copies printed	Professors of Child Health Chief Paediatrician	GoPNG (National, PSIP, DSIP)
	Distribute WHO Pocketbook of Hospital Care for Children	X	X	X	X	X	X	1,000 copies purchased per year from WHO Geneva	Technical Advisor Child Health Chief Paediatrician	GoPNG (National, PSIP, DSIP)

STRATEGIC IMPLEMENTATION PLAN: 2014-2020											
PROGRAM AREA: NEONATAL CARE											
Strategic objectives	Activities	Timeframe							Process indicators	Responsible persons	Resources required
		2021	2022	2023	2024	2025	2026	2027			
To implement Minimal Standards of Neonatal Care in provincial and district hospitals and health centres	Needs assessments of what is required for provincial and district hospitals, and health centres to achieve minimal standards of neonatal care (physical facilities, basic equipment, essential drugs, human resources, training, auditing, infection control measures)	X	X						Number of hospitals in which needs assessment conducted. Report produced	National Newborn Care Coordinator, Dr Roland Barnabas, Newborn Care Specialist Provincial paediatricians	GoPNG (National, PSIP, DSIP)
	Undertake a program to upgrade health facilities neonatal and labour ward services to achieve minimal standards			X	X	X	X	X	Number of hospitals in which upgrading of neonatal and labour ward facilities underway	NDoH Provincial Health Offices	Responsibility for funding will depend on needs per health facility – GoPNG (PSIP, DSIP, LLGSIP)
Promotion of breast feeding	Revitalisation of the Baby Friendly Hospital Initiative in Provincial hospitals	X	X	X	X	X	X	X	Number of hospitals accredited as Baby Friendly	Paediatric Society Family Health Services Provincial Hospitals Su-Su Mamas	GoPNG (National, PHAs)
Making information available to all mothers on newborn care	Publish the New Mothers brochure on newborn care	X	X						Brochure reviewed and submitted to printer	Dr James Amini Paediatric Society	
	Print and distribute Baby Book and New Mothers Brochure to all health facilities where babies are born or antenatal care is given, and to community mothers groups: 200,000 deliveries per year		X	X	X	X	X	X	250,000 Copies printed per year and appropriate numbers distributed to every PHO and health facility in the country	NDoH	GoPNG (National, PSIP, DSIP, LLGSIP)
Support a program of training in neonatal care and resuscitation for nurses, midwives and doctors	Print and distribute the neonatal resuscitation poster to all hospitals and health centres where babies are born	X	X	X					6000 copies of poster printed for every health facility Poster distributed	WHO Family Health Services	Go PNG DPs
	Conduct neonatal training including EENC within the WHO	X	X	X	X	X	X	X	Number of health workers trained in neonatal care	National NBC coordinator	Go PNG (PHAs, PSIP, DSIP)

	Pocketbook of Hospital Care for Children course									Provincial paediatricians National IMCI coordinator	
	Support neonatal clinical attachments (4-6 weeks) to level 1 and 2 hospitals for nursing offices from level 4 and 3 hospitals	X	X	X	X	X	X	X	Number of health workers from Level 3 and 4 hospitals completing such attachments (at least 15 per year)	Provincial Health Offices Provincial Hospitals Provincial paediatricians	PHAs, PSIP
Improved information on neonates	Reporting through the PHR Program	X	X	X	X	X	X	X	Number of hospitals reporting through the PHR program	Provincial paediatricians	

STRATEGIC IMPLEMENTATION PLAN: 2021-2030											
PROGRAM AREA: BREAST FEEDING, NUTRITION AND MICRONUTRIENTS											
Strategic objectives	Activities	Timeframe							Process indicators	Responsible persons	Resources required
		2021	2022	2023	2024	2025	2026	2027			
Increase human resource capacity for child nutrition	Recruit a Senior National Nutritionist	X	X						Nutritionist recruited and working within NDoH	NDoH	GoPNG
	Create a nutritionist position in all provincial hospitals	X	X	X	X	X	X	X	Positions created within new NDoH structure	NDoH, Provincial Hospitals	GoPNG
	Develop a training program for local nutritionists	X	X	X	X	X	X	X	Training program developed	Nutrition section, FHS SMHS	
	Have a paediatrician trained in nutrition and malnutrition to help provide national leadership		X	X	X	X	X	X	Paediatrician identified and trained	Paediatric Society	
Care of the child with severe malnutrition	Roll out the multi-faceted approach to improving severe malnutrition care in hospitals	X	X	X					Evaluation of the pilot program at PMGH done and the program rolled out to number of hospitals	Dr Michael Landi Paediatric Society	GoPNG DPs Donor Agencies
Community promotion of breast feeding and adequate complementary feeding	Conduct IYCF training in provinces	X	X	X	X	X	X	X	Number of provinces in which IYCF training conducted	Nutrition section, FHS WHO	GoPNG DPs
	Revise Infant and Young Child Feeding Act (revised Baby Feeds Supply (Control) Act 1984)	X	X	X	X	X	X	X	IYCF Act endorsed and passed by NEC and Parliament	Nutrition section, FHS Paediatric Society NDoH Su-Su Mamas Community groups	GoPNG DPs
Improve vitamin A coverage	Expansion of vitamin A supplementation into the second year of life, by additional doses at 18 and 24 months Add dose of vitamin A for post-natal mothers	X	X	X	X	X	X	X	Vitamin A supplementation extended to 18 and 24 months old and also percentage of postnatal mothers given vitamin A	Nutrition section, FHS Paediatric Society Child Health Advisory Committee NDoH	
Achieve high coverage of deworming	Albendazole for deworming, given with vitamin A at 12 months, and at 6 monthly intervals thereafter	X	X	X	X	X	X	X	Percentage of children receiving Albendazole at 12 months of age	FHS Child Health Advisory Committee Paediatric Society	

Improve health facility and community services for management of malnutrition	Increase the availability of zinc sulphate as treatment for children with diarrhoea and with malnutrition	X	X	X	X	X	X	X	Evidence of widespread availability of zinc in health facilities and appropriate use of zinc by health workers	NDoH Provincial Health Offices	Incorporated within normal operational activities
	Production of locally manufactured RUTF								Number of health facilities where RUTF is available	DAL NARI UNITECH SMHS DOH – Nutrition and Food Safety	
Support improved nutrition in the community	Encourage the fortification of staple foods, such as rice and flour with multiple micronutrients including iron, zinc, thiamine, riboflavin and folate								Inter-sectoral collaboration to encourage fortification	DAL Provincial Health Offices Nutrition section, FHS	

STRATEGIC IMPLEMENTATION PLAN: 2021-2030												
PROGRAM AREA: QUALITY IMPROVEMENT OF HOSPITAL CARE												
Strategic objectives	Activities	Timeframe								Process indicators	Responsible persons	Resources required
		2021	2022	2023	2024	2025	2026	2027				
Develop human resource capacity for child health	Training in Hospital Care for Children in every province	X	X	X	X	X	X	X	Training courses run in each province	WHO Family Health Services PSPNG Provincial hospitals	GoPNG Provincial health training funds	
Improve oxygen systems and the treatment of pneumonia	Expand the oxygen systems program to all provincial and rural hospitals and major district health centres in the country	X	X	X	X				Number of provincial and district hospitals which have improved and sufficient oxygen system	Provincial Health Offices Provincial Hospitals Family Health Services Health Facility Branch	NDoH PHAs PHO DHO DPs, donor agencies	
	Maintain the oxygen program with review visits and training				X	X	X	X	Number of hospitals in which annual review visits conducted	NDoH (Family Health Services, Clinical Services and Health Facility Branch)	GoPNG (PHA, PSIP, DSIP) DPs, donor agencies	
Standardized hospital data reporting and paediatric surveillance	Extend the Paediatric Hospital Reporting System to all provincial and district hospitals in the country	X	X	X					Number of hospitals participating by sending in data quarterly	Paediatric Disease Surveillance Officer, Edilson Yano Provincial paediatricians Prof Trevor Duke	GoPNG (NDoH, PHA, PSIP)	
	Support human resource capacity and logistics within Family Health Services and provincial hospitals for Paediatric Surveillance and Hospital Reporting	X	X	X	X	X	X	X	Position created within new structure Number of hospitals participating by sending in data quarterly	Paediatric Disease Surveillance Officer Family Health Services	National position created during restructuring	
Improved care for children with chronic conditions	Implement models of care for children with chronic conditions, including clear treatment plans, clear communication between primary and referral levels, parental		X	X	X	X	X	X	Number of hospitals that have adopted models for complex case management	Paediatric Society		



	education and mechanisms for supply of less common medicines at primary care level											
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<b>STRATEGIC IMPLEMENTATION PLAN: 2014-2020</b>					
<b>PROGRAM AREA: PNEUMONIA</b>					
<b>Strategic objectives</b>	<b>Activities</b>	<b>Timeframe</b>	<b>Process indicators</b>	<b>Responsible persons</b>	<b>Resources required</b>
See program areas: EPI; Standard Treatment and Clinical Guidelines; Neonatal Care; Nutrition and Malnutrition; and Quality Improvement of Hospital Care					

<b>STRATEGIC IMPLEMENTATION PLAN: 2021-30</b> <b>PROGRAM AREA: MALARIA</b> Improvements in the management and control of malaria in children will be closely aligned with the overall malaria control program										
Strategic objectives	Activities	Timeframe						Process indicators	Responsible persons	Resources required
		2021	2022	2023	2024	2025	2026	2027		
Improve the prevention and management of malaria among mothers and children	Update malaria guidelines in the 11 <sup>th</sup> Edition of the Standard Treatment Manual. Include artesunate suppositories for pre-referral treatment in health centres	X	X						Revised treatment guidelines included in STM Evidence of availability and use in health centres	Paediatric focal person for malaria
	Support efforts to increase the use of rapid diagnostic tests in clinical decision making	X	X	X	X	X	X	X	Evidence of increased use of RDTs	Family Health Services Global Fund for Malaria NDoH
	Consider the implications of research on intermittent chemoprophylaxis measures for infants (IPTi)		X	X					Studies reviewed by Paediatric Society and CHAC	Paediatric Society Child Health Advisory Committee
	Improve the tendering process, procurement and supply of all essential drugs and supplies. Establish a sustainable mechanism to deliver antimalarial drugs and related supplies to all levels of the health service	X	X	X	X	X	X	X	Antimalarials available at all levels of the health system	
Improved data and surveillance for malaria	Improve reporting mechanisms from the district to provincial health level and to NHIS, and improving the reporting of malaria cases and case fatality rates from hospitals	X	X						Reports on malaria CFR from the Paediatric Hospital Reporting System Number of hospitals providing reports	Paediatric Disease Surveillance Officer
	Develop sentinel site surveillance for malaria in 4 regions	X	X	X	X	X	X	X	Four regional sentinel sites established (comprising of one microscopist and one clerk)	National Malaria Program Paediatric focal person for malaria NDoH PHAs DPs Donor Agencies

<b>STRATEGIC IMPLEMENTATION PLAN: 2021-2030</b>											
<b>PROGRAM AREA: TUBERCULOSIS</b>											
Strategic objectives	Activities	Timeframe							Process indicators	Responsible persons	Resources required
		2021	2022	2023	2024	2025	2026	2027			
Improve the ability of health workers to prevent, diagnose and treat TB	Improve the availability of fixed-dose combination (FDC) therapy for childhood TB	X	X	X					FDC drugs distributed to all health centres that are Basic Medical Units, and hospitals	Paediatric TB focal person National TB Program Provincial Health Offices	NTP StopTB
	Update Standard Treatment Manual to include: improved paediatric regimens for FDC therapy; indications for the use of GeneXpert MTB / Rif; and when to suspect MDR-TB	X	X	X					STM updated	Paediatric TB focal person Paediatric Society	NTP StopTB
	Provide training for health workers in the use of fixed-dose combination therapy, child TB detection, case management, and MDR-TB using Hospital Care for Children training and National TB program guidelines	X	X	X					Number of provinces in which this child TB training is done	National TB Program	NTP StopTB
	Ensure all children complete Intensive Phase treatment under health supervision (in hospitals or other facility supervised by TB health workers), and ensure an effective model of better follow-up at a district and community level	X	X	X	X				Model of completion of IP in hospital trialled and evaluated	National TB Program Paediatric Society	NTP StopTB
	Implement TB preventive therapy for asymptomatic contacts of adult TB cases and HIV-infected children								Preventive therapy is available at all levels of the health system	Paediatric TB focal person Paediatric Focal person for HIV/AIDS National TB Program Provincial Health Offices	
Improve coordination and	Create and fund a position of TB		X	X	X	X	X	X	Position created within new	National TB Program	

leadership of child TB	Paediatrician, as the focal point for child TB								NDoH structure		
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<b>STRATEGIC IMPLEMENTATION PLAN: 2021-2030</b>											
<b>PROGRAM AREA: HIV AND AIDS</b>											
<b>Strategic objectives</b>	<b>Activities</b>	<b>Timeframe</b>						<b>Process indicators</b>	<b>Responsible persons</b>	<b>Resources required</b>	
		2021	2022	2023	2024	2025	2026	2027			
Improve the prevention of HIV infection	Increase voluntary counselling and testing, PPTCT and ART and ready-to-use therapeutic feeds to 20 hospitals	X	X						Number of health facilities where RUTF is available Number of health facilities where PPTCT and ART are available	Paediatric Focal person for HIV/AIDS Dr Gamini Vali	NDoH National HIV roll-out program
	Update to newer and more effective PPTCT and ART regimens, and ensure availability of these drugs	X	X	X					Treatment guidelines updated to include newer regimens	Paediatric Focal person for HIV/AIDS Dr Gamini Vali Paediatric Society	NDoH National HIV roll-out program
	Establish adolescent services that include primary prevention of HIV	X	X	X	X	X	X	X	Number of provinces in which appropriate adolescent services established	Adolescent health focal person Provincial hospitals Provincial paediatricians Community groups / NGOs	
Improve the care of children with HIV	Increase access to paediatric ART in all provincial hospitals	X	X	X	X	X	X	X	Number of provincial hospitals where paediatric ART is available		NDoH National HIV roll-out program
	Ensure all affected children receive Cotrimoxazole and isoniazid prophylaxis	X	X	X	X	X	X	X	Number of health facilities where preventive therapy is available	All health facilities All paediatricians Paediatric Society	NDoH PSIP DSIP
	Provide nutritional support to children with HIV, including ready-to-use therapeutic feeds	X	X	X	X	X	X	X	Number of health facilities where RUTF is available	Provincial and district hospitals CHAI PNG UNICEF	
Improve coordination and leadership of child HIV	Create and fund a position of HIV Paediatrician, as the focal point for child HIV		X	X	X	X	X	X	Focal position created		
	Train paediatric HIV nurse in each province								Number of provinces where HIV nurse are trained		

<b>STRATEGIC IMPLEMENTATION PLAN: 2021-2030</b>											
<b>PROGRAM AREA: PAEDIATRICIANS TRAINING</b>											
Strategic objectives	Activities	Timeframe							Process indicators	Responsible persons	Resources required
		2021	2022	2023	2024	2025	2026	2027			
Achieve the National Health Minimum Standard on specialist (Paediatrician) manpower as outlined in Appendix 1.	Over 10 years, train at least 34 new paediatricians, to achieve the minimal standards of at least two paediatricians in each province in 2020-2030	X	X	X	X	X	X	X	Number of new paediatricians trained each year (aim for 4+ graduating MMed II and deployed per annum)	SMHS Professor of Child Health Chief Paediatrician	GoPNG Donor partners
	Increase number of RMOs in Diploma of Child Health program to minimum of 6 per annum	X	X	X	X	X	X	X	Number of DCH candidates successfully completing	SMHS Professor of Child Health Chief Paediatrician PS PNG	
	Increase Paediatric Training positions at PMGH to from 6 to 8	X	X	X	X	X	X	X	Number of new trainees entering the DCH and MMed programs	SMHS Chief Paediatrician	GoPNG Donor partners
	Encourage provinces to create service positions for registrar training	X	X	X	X	X	X	X	Number of provinces with registrar positions	SMHS Chief Paediatrician	GoPNG Donor partners
Develop a paediatric workforce with appropriate subspecialty skills	Support training in cardiology, oncology, neonatology, HIV medicine, adolescent health, respiratory and TB, and nutrition	X	X	X	X	X	X	X	Persons identified to receive training in these specialty areas Training organized and completed Number of paediatricians fulfilling these roles Number of Higher Diplomas in these specialties	SMHS NDoH Other educational institution partners	GoPNG Development partners Donor partners
	Develop an accreditation process for paediatricians, supported by continuing professional development activities								Number of CPD activities offered Accreditation process developed	Paediatric Society NDoH Medical Board of Papua New Guinea	
Improving the evidence base for child health	Research projects for MMed/DCH		X	X	X	X	X	X	Research projects completed	SMHS	GoPNG Donor partners



<b>STRATEGIC IMPLEMENTATION PLAN: 2014-2020</b>											
<b>PROGRAM AREA: CHILD HEALTH NURSES, COMMUNITY HEALTH NURSES and HEALTH EXTENSION OFFICERS</b>											
<b>Strategic objectives</b>	<b>Activities</b>	<b>Timeframe</b>							<b>Process indicators</b>	<b>Responsible persons</b>	<b>Resources required</b>
		<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>			
To achieve the standard of one child health nurse in every health centre and at least one per shift in every hospital	Establish a course in post-basic paediatric and child health nursing in each of 4 regions	X	X	X	X	X	X	X	Number of graduate child health nurses	SMHS Pacific Adventist University Goroka University Other training colleges	GoPNG DPs Donor Agencies
Strengthen continuing professional development for child health nurses	In-service training, clinical attachments and postgraduate training should be supported								CPD activities offered		
Create a post-graduate training pathway for upskilling HEOs	Develop a training course for HEOs in paediatrics and child health, such as entry into the DCH or equivalent	X	X	X	X	X	X	X	Number of HEOs having post-graduate training in paediatrics and child health	Paediatric Society SMHS Other training colleges Professor of Child Health	

<b>STRATEGIC IMPLEMENTATION PLAN: 2021-2030</b>											
<b>PROGRAM AREA: ADOLESCENT HEALTH</b>											
<b>Strategic objectives</b>	<b>Activities</b>	<b>Timeframe</b>							<b>Process indicators</b>	<b>Responsible persons</b>	<b>Resources required</b>
		<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>			
Provide appropriate facilities for adolescent health services	Strengthen existing school clinics to provide information to adolescents	X	X	X	X	X	X	X	Number of school clinics where information is available	Department of Education	
	Establishment of adolescent drop-in centres in provinces	X	X	X	X	X	X	X	Number of provinces in which appropriate adolescent services established	Adolescent health focal person NDoH TA - YAH Provincial hospitals Provincial paediatricians Community groups / NGOs	GoPNG (PSIP)
	Create model of adolescent areas in children's wards in hospital		X	X					A model of adolescent hospital care is developed at PMGH	NDoH – TA YAH	PMGH GoPNG
Improve human resources for adolescent health	Provide training for a paediatrician in adolescent health, to act as a national resource-person for this area	X	X						Paediatrician having undergone some training in this area	SMHS Other educational institution partners	GoPNG DPs Donor Agencies
Support immunization programs for adolescents	Introduction of HPV vaccine		X	X					HPV vaccine successfully introduced	TA – YAH School Health and EPI	GoPNG DPs Donor Agencies
Strengthened national coordination, technical assistance and leadership	National Department of Health, leadership in adolescent health	X	X						YAH Program and Coordination mechanism already established at NDoH level	TA – YAH Program	GoPNG

STRATEGIC IMPLEMENTATION PLAN: 2021-2030											
PROGRAM AREAS: CHILDHOOD CANCER, HEART DISEASE											
Strategic objectives	Activities	Timeframe						Process indicators	Responsible persons	Resources required	
		2021	2022	2023	2024	2025	2026	2027			
Improve the management of childhood cancer and ensure wide access to services	Revise guidelines for managing paediatric cancer. Develop referral guidelines	X	X						Completion of paediatric cancer guidelines at <a href="http://www.pngpaediatricsociety.org">www.pngpaediatricsociety.org</a>	Dr Gwenda Anga Paediatric Society	GoPNG DPs
	Support central coordination and improve data collection and surveillance on pattern of childhood malignancies	X	X	X	X	X	X	X	Number of hospitals participating by sending in data quarterly	Dr Gwenda Anga Paediatric Society	See Paediatric Hospital Reporting System
	Improve diagnostic services, particularly histopathology services								Provincial hospitals have in place arrangements with CPHL for specimen analysis	CPHL Chief Pathologist Dr Gwenda Anga	NDoH national function
	Ensure appropriate drug regimens are available, including drugs for effective palliative care	X	X	X	X	X	X	X	Evidence of uninterrupted stocks of essential chemotherapy and analgesia		NDoH national function
	Support a young paediatrician to train in oncology (refer also to paediatricians training)								Completed in 2013-2014	SMHS Royal Children's Hospital, Melbourne	RE Ross Trust
	Establish Paediatric Cancer Units (10 beds ward) attached to PMGH and National Cancer Unit in Lae		X	X	X				Evidence of improved services for children with cancer	NDoH PMGH Paediatric Department Angau Hospital	GoPNG PMGH ANGAU
	Skill development for 5 nurses in childhood cancer	X	X	X	X	X			Number of nurses trained in childhood cancer management	PMGH Other educational institution partners	GoPNG PMGH
	Implement supportive care during treatment, including social workers and nutritionists								Supportive care available at PMGH and Lae		
	Develop a community awareness campaign								Community awareness campaign		
Improve the management of heart disease and support surgical	Support the annual Operation Open Heart	X	X	X	X	X	X	X	Number of children having surgery each year through OOH	Dr Cornelia Kila lang Dr Diana Olia 'a	GoPNG DPs Donor Agencies
	Support the training of two	X	X						Paediatrician identified and	SMHS	GoPNG

	paediatricians in cardiology								training completed	PMGH Other educational institution partners	Donor Agencies
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<b>STRATEGIC IMPLEMENTATION PLAN: 2021-2030</b>											
<b>PROGRAM AREA: CHILD PROTECTION AND SOCIAL SERVICES</b>											
Strategic objectives	Activities	Timeframe							Process indicators	Responsible persons	Resources required
		2021	2022	2023	2024	2025	2026	2027			
Improved reporting, documentation and surveillance systems for child abuse and neglect	Improve child abuse reporting in all provincial hospitals, through the PHR (inpatients) and through the Family Support Units Ensure reporting of all cases of suspected child abuse to police	X	X	X	X	X	X	X	Child abuse reporting systems in place	Provincial health authorities Provincial hospitals Provincial paediatricians FHS Chief Paediatrician	
Improved preventative and treatment services for children at risk of physical and sexual abuse, and neglect	Establish Family Support Units in all Provincial hospitals. These will provide medical, social, legal, and psychological support services to child victims of sexual or physical abuse, and to mothers suffering from domestic violence	X	X	X	X	X	X	X	Number of provinces with functioning Family Support Units, staffed with social worker, nurses trained in child abuse and access to legal services and mental health support services. Number of cases managed by these units annually.	Provincial health authorities Provincial hospitals Provincial paediatricians FHS Chief Paediatrician	
Health workers better prepared to contribute to identifying and managing at-risk, abused or neglected children	Paediatrician trained in legislation, strategies for protection, prevention and management of child abuse and neglect	X	X	X	X	X	X	X	Paediatrician trained in child abuse and child protection	Paediatric Society	
	Incorporation of training on child abuse and child protection in MCH courses and post-graduate child health nursing courses	X	X	X	X	X	X	X	Incorporation of training on child abuse and child protection in MCH courses and post-graduate child health nursing courses	Paediatric Society	
Strengthen leadership for child health	National Department of Health leadership/ technical assistance in child protection		X	X	X				Evidence of coordination between NDoH, police, legal and social services and other stakeholders	NDoH Paediatric Society	Go PNG DPs Donor Agencies

<b>STRATEGIC IMPLEMENTATION PLAN: 2021-2030</b>											
<b>PROGRAM AREA: CHILD DISABILITY</b>											
<b>Strategic objectives</b>	<b>Activities</b>	<b>Timeframe</b>						<b>Process indicators</b>	<b>Responsible persons</b>	<b>Resources required</b>	
		<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>			
Strengthened multi-disciplinary health services for children with disabilities	Establishment or strengthening of developmental screening programs in early education centres and major hospitals			X	X	X	X		Number of screening programs available in EECs and health facilities	Dr Beryl Vetuna Paediatric Society	GoPNG DPs Donor Agencies
	Improved referral pathways			X	X	X	X		Referral pathways in operation	Dr Beryl Vetuna Paediatric Society	GoPNG DPs Donor Agencies
	Increased support to community organizations who work with disabled children			X	X	X	X		Evidence of increased coordination with community organizations	Dr Beryl Vetuna Paediatric Society	GoPNG DPs Donor Agencies
Training of nurses and paediatricians in supporting children with disabilities	Incorporation of training on disability in MCH courses and post-graduate child health nursing courses			X	X	X	X		Disability included in MCH and child health nursing courses		
	Paediatrician trained in child disability and rehabilitation			X	X	X	X		Paediatrician trained in child disability and rehabilitation	Dr Beryl Vetuna Paediatric Society	GoPNG DPs Donor Agencies
	Nurse trained in developmental screening of children			X	X	X	X		Nurse trained in developmental screening	Dr Beryl Vetuna Paediatric Society	GoPNG DPs Donor Agencies
Improve awareness of child safety in the community to prevent disability	Advocacy for strategies to improve child safety, such as car seat belt legislation, bicycle helmets, fire safety								PHR program data to inform advocacy for child safety legislation	Paediatric Society	
Strengthen leadership to improve support for children with disability	National Department of Health leadership/ technical assistance in disability								Evidence of co-ordination between NDoH and other stakeholders	NDoH Paediatric Society	GoPNG DPs

## Appendix 1. Projection of paediatrician training 2021-2030

Hospital Classification	Current (2020)	Projected need by 2030	Additional required by 2030
<b>Level 6 Hospitals: National Referral Hospital</b>			
1. PMGH	5	7	3 *
2. UPNG (Lecturers)	4	5	2 *
<b>Level 5 Hospitals: Regional Hospitals</b>			
1. Angau, Lae	3	4	2 *
2. Mt. Hagen	1 (+2)	3	2
3. Nonga, Rabaul	2	3	1
4. National Capitol District	4	5	1
5. Goroka	3	3	1 *
6. Alotau	2	2	1 *
7. Madang	2	2	0
8. Wewak	1	2	1
9. Daru	0	2	2
10. Kerema	0	2	2
11. Popondetta	1	2	1
12. Kundiawa	1	2	2 *
13. Wabag	1	2	1
14. Mendi	1	2	1
15. Vanimu	1	2	1
16. Lorengau	0	2	2
17. Kavieng	1	2	1
18. Buka	2	2	1 *
19. Kimbe	1	2	1
20. Jiwaka	0	2	2
21. Tari	1	2	1
22. Central	0	2	2
<b>Total</b>		<b>64 paediatricians in clinical roles</b>	<b>32 additional paediatricians required from 2020 to 2030</b>

\* Assumes attrition / retirement



## Appendix 2. Paediatrician sub-specialty training 2021-2030

<b>Sub-Specialty Areas</b>	<b>2020</b>	<b>In-Training</b>	<b>2021-2030</b>
<b>Paediatric Cardiology</b>	<b>3</b>	<b>1</b>	<b>5</b>
Port Moresby	2	1	2
Momase Region	0	0	1
Highlands Region	0	0	1
New Guinea Islands	1	0	1
<b>Paediatric Oncology</b>	<b>1</b>	<b>0</b>	<b>3</b>
Port Moresby	1	1	2
Lae	0	0	1
<b>Neonatology</b>	<b>2</b>	<b>0</b>	<b>5</b>
Port Moresby	2	0	2
Momase Region	0	0	1
Highlands Region	0	0	1
New Guinea Islands	0	0	1
<b>Vaccines and Immunization</b>	<b>1</b>	<b>0</b>	<b>5</b>
NCD and NDoH	1	0	2
Momase Region	0	0	1
Highlands Region	0	0	1
New Guinea Islands	0	0	1
<b>Paediatric HIV Medicine</b>	<b>1</b>	<b>0</b>	<b>5</b>
Port Moresby	1	0	2
Momase Region	0	0	1
Highlands Region	0	0	1
New Guinea Islands	0	0	1
<b>Respiratory Medicine and TB</b>	<b>1</b>	<b>0</b>	<b>5</b>
Port Moresby	1	0	2
Momase Region	0	0	1

Highlands Region	0	0	1
New Guinea Islands	0	0	1
<b>Disability / Rehabilitation</b>	<b>0</b>	<b>0</b>	<b>2</b>
Port Moresby	0	0	1
Lae	0	0	1
<b>Nutrition / Malnutrition</b>	<b>1</b>	<b>0</b>	<b>4</b>
Port Moresby	0	0	1
Momase Region	0	0	1
Highlands Region	1	0	1
New Guinea Islands	0	0	1

The workforce plan does not mean an additional paediatrician should be trained in each of these sub-specialty areas in addition to the general paediatrician workforce projections in Appendix 1. Rather the skills in each of these areas should exist at a regional level. In most cases general paediatricians will have additional skills in these areas to provide services in their regions.

## Acknowledgements

An editorial sub-committee of the Paediatric Society led the revision of this document. The sub-committee members were Dr Cornelia Kilalang, Dr James Amini, Dr Fiona Kupe, Dr Mary Paiva and Prof Trevor Duke. Chapters were revised by the focal people listed in Appendix 3, and a wide consultation to all paediatricians and partners was undertaken.

Some photographs included in this document were taken by Edilson Yano at his community and church, with permission from the children and families depicted. The front cover photograph is courtesy of the Post Courier (Dec 8<sup>th</sup> 2017).

## Appendix 3. Child health contact addresses

Your provincial paediatrician will be able to guide you on all questions relating to child health and paediatrics. The following are resource people for program areas. They may change contact details during the life of this plan.

For updated information from the Paediatric Society of PNG, see [www.pngpaediatricsociety.org](http://www.pngpaediatricsociety.org)

### **EPI and vaccines**

Dr Fiona Kupe, Paediatrician NCD Health [dr\\_fkupe@yahoo.com](mailto:dr_fkupe@yahoo.com)

### **Standard Treatment Manual for Common Illnesses**

Your provincial paediatrician or

Dr Cornelia Kilalang, Chief Paediatrician, PMGH [cgkilalang@gmail.com](mailto:cgkilalang@gmail.com)

### **Newborn health**

Dr Roland Barnabas, Paediatrician, PMGH [rabarnabas@yahoo.com](mailto:rabarnabas@yahoo.com)

Dr Gamini Vali, Paediatrician, PMGH [gvboma@gmail.com](mailto:gvboma@gmail.com)

Freda Sui, Neonatal coordinator NDoH [freda\\_sui@health.gov.pg](mailto:freda_sui@health.gov.pg)

### **Nutrition, breast feeding and malnutrition**

Dr Michael Landi, Paediatrician, Tari: [mlandi@live.com](mailto:mlandi@live.com)

Susu Mamas Toll Free Hotline 7200 MAMA (720 06262)

### **Hospital Care for Children training program**

Dr Francis Pulsan, Lecturer, SMHS: [francis.pulsan@gmail.com](mailto:francis.pulsan@gmail.com)

Prof Trevor Duke: Professor of Child Health, UPNG: [trevor.duke@rch.org.au](mailto:trevor.duke@rch.org.au)

### **Malaria in children**

Dr Jimmy Aipit, Paediatrician, Madang [jimmyaipit@yahoo.com.au](mailto:jimmyaipit@yahoo.com.au)

### **Emergency paediatrics**

Dr Rupert Marcus, Paediatrician, PMGH: [rupertmarcus3@gmail.com](mailto:rupertmarcus3@gmail.com)

### **Tuberculosis in children**

Dr Henry Welch, Paediatrician, UPNG [henrydwelch@gmail.com](mailto:henrydwelch@gmail.com)

### **HIV in children**

Dr Gamini Vali, Paediatrician, PMGH: [gyboma@gmail.com](mailto:gyboma@gmail.com)

### **Paediatric training**

Dr Cornelia Kilalang, Chief Paediatrician PMGH: [cgkilalang@gmail.com](mailto:cgkilalang@gmail.com)

Professor John Vince, Deputy Dean SMHS UPNG: [jvince@datec.net.pg](mailto:jvince@datec.net.pg)

Prof Trevor Duke, Professor Child Health, UPNG: [trevor.duke@rch.org.au](mailto:trevor.duke@rch.org.au)

### **Adolescent Health**

Dr Mary Paiva, Paediatrician, Buka: [jaime7paiva@gmail.com](mailto:jaime7paiva@gmail.com)

Mr. Maluo Magaru, Coordinator School Health Program, NDoH: [maluomagaru@gmail.com](mailto:maluomagaru@gmail.com)

### **Childhood cancer**

Dr Gwenda Anga, Oncology Paediatrician, PMGH: [gwendaanga@gmail.com](mailto:gwendaanga@gmail.com)

### **Heart disease in children**

Dr Cornelia Kilalang, Cardiology Paediatrician PMGH: [cgkilalang@gmail.com](mailto:cgkilalang@gmail.com)

Dr Diana Olita'a, Paediatrician PMGH, SMHS [deeolitaa@gmail.com](mailto:deeolitaa@gmail.com)

### **Child disability**

Dr Beryl Vetuna, Paediatrician, Rabaul [bvetuna@gmail.com](mailto:bvetuna@gmail.com)

### **Child protection and child abuse**

Dr Mary Paiva, Paediatrician, Buka [jaime7paiva@gmail.com](mailto:jaime7paiva@gmail.com)

Dr Allanie Rero, Paediatrician, Alotau [allanierero7@gmail.com](mailto:allanierero7@gmail.com)

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**Continuing Professional Development**

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Professor Trevor Duke: [trevor.duke@rch.org.au](mailto:trevor.duke@rch.org.au)

For general information about this Child and Adolescent Health Policy and Plan and information on the Child Health Advisory Committee contact Dr Cornelia Kilalang, Chief Paediatrician.

## Appendix 4. Core indicators and monitoring

There are several systems for data collection that are relevant to children:

- The National Health Information System (NHIS)
- EPI program data
- Vaccine preventable disease surveillance
  - Acute Flaccid Paralysis surveillance
  - Acute Fever and Rash surveillance
- Demographic and Health Survey (DHS)
- Census
- Paediatric Hospital Reporting System
- National TB program
- HIV program data

To evaluate this Plan the following information will be collected and reported regularly:

Statistic	Mechanism for data collection
<b>Population based</b>	
Under-5 mortality rate	DHS / Census
Infant mortality rate	DHS / Census
Neonatal mortality rate	DHS / Census
Proportion of infants exclusively breast fed to 6 months of age	DHS / Census / National Nutrition Surveys
Percentage of children who are <80% expected weight for age (underweight or malnourished)	DHS / Census / National Nutrition Surveys
Coverage rates for vaccines	EPI program
Vaccine preventable disease incidence	NHIS / Paediatric Reporting System
Percentage of children who are fully immunized by age 1 year	EPI program vaccine coverage surveys / DHS
Percentage of babies who receive Heb B vaccine in first 24 hours of life	EPI program vaccine coverage surveys / NHIS / DHS / Paediatric Reporting System
Percentage of mothers attending 3 or more ANC's	DHS / Census
Percentage of primiparous mothers receiving 2 doses of tetanus toxoid	EPI program data DHS
Percentage of mothers receiving IPT	NHIS
Percentage of mothers having supervised health facility deliveries	NHIS / DHS
Percentage of children who sleep under a bed-net	NHIS / DHS / Census
<b>Health facility-based outcome data</b>	

Disease and age-specific case fatality rates for children	Paediatric Hospital Reporting System
Case fatality rates for neonates	
Case fatality rates for VLBW, birth asphyxia and neonatal infections	
Case fatality rates for severe pneumonia	
Case fatality rates for diarrhoea	
Case fatality rates for meningitis	
Case fatality rates for malaria	
Case fatality rates for severe malnutrition	
<b>Health facility-based program data</b>	
Proportion of health facilities that have a trained midwife	
Proportion of health facilities that have a trained child health nurse	
Proportion of health facilities with a microscopist or RDTs	
Number and distribution of health workers trained in Hospital Care for Children	



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