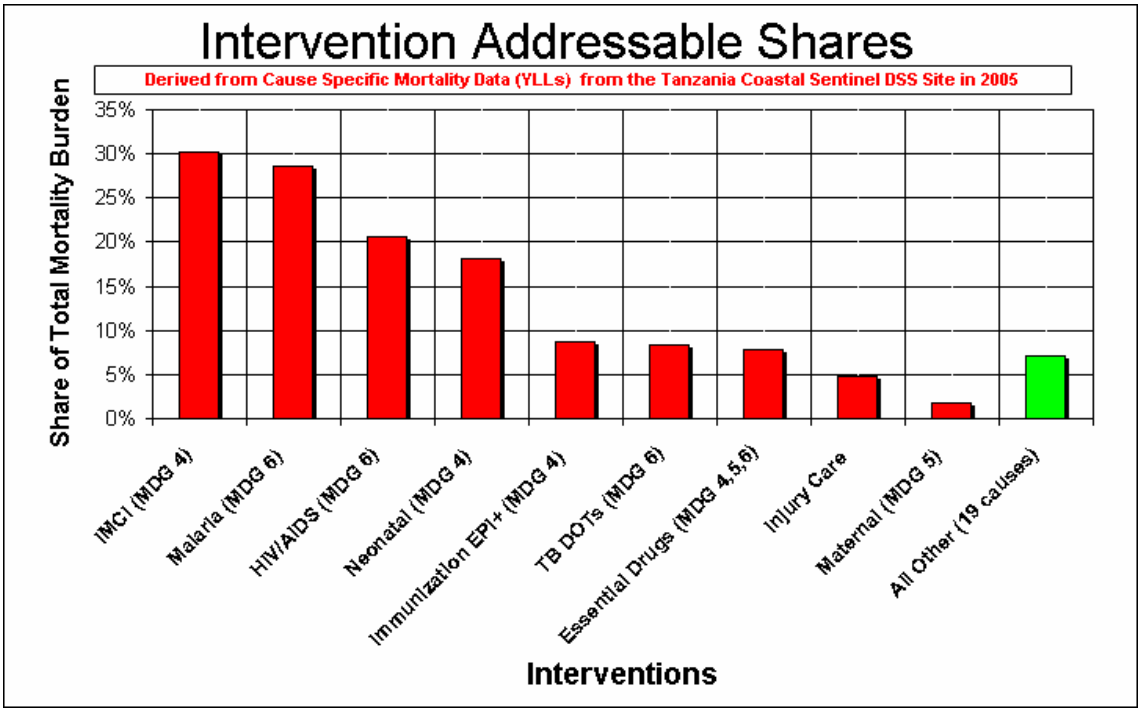
Tanzania

Ministry of Health and Social Welfare

DISTRICT HEALTH PROFILE 2006

A Chart Book of Selected Health and Demographic indicators



Health Information for Council Health Management Teams
2005-2006 District Health Year and 2007 Planning Cycle

- For Tanzanian Rural Coastal Districts -
Lindi, Mtwara, Pwani and Tanga Regions

Based on the Coastal Sentinel Demographic Surveillance System

Data Source:	Coastal Sentinel Demographic Surveillance System data from 2005 Tanzania Ministry of Health and Social Welfare, HMIS National Sentinel Surveillance System (NSS)
Tool Version:	TEHIP Burden of Disease Information Tool, Version 2.0
Document Version:	Tanzania Coastal District Health Profile 2006: Version 2.1

DISTRICT HEALTH PROFILE - 2006
RURAL COASTAL DISTRICTS

Coastal Sentinel District Information for Rural Districts of Lindi, Mtwara, Pwani and Tanga Regions

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DISTRICT HEALTH PROFILE 2006

Coastal DSS Sentinel District Information for Districts of Lindi, Mtwara, Pwani and Tanga Regions

Part 1: Introduction

The purpose of this document is to simplify, package, and communicate complex information on vital statistics and the local burden of disease in a practical, accessible format for district health planning. It is intended for use by Council Health Management Teams who serve several million people in rural districts of the coastal zone of Coast, Lindi, Mtwara and Tanga Regions and other parts of Tanzania having socio-economic, cultural, and ecologic circumstances broadly similar to those of the rural coast. This information should be considered as part of the situation analysis for the annual District Health Planning cycle. All information is provided in a graphical format with short explanatory captions and minimum text to provide "pictures" of the current demography and disease burden.

The data source is the Tanzania Ministry of Health and Social Welfare's National Sentinel Surveillance System (NSS). The specific data in this profile comes from the Coastal Sentinel Demographic Surveillance System located in Rufiji District for the year 2005. This sentinel profile provides over 800 health and demographic statistics and is updated annually since 1999. In the year 2005, the Rufiji Demographic Surveillance System monitored a population recording 79,747 person-years lived in 16,912 households. This sample is very much larger than the DHS and other national household surveys. In the year 2005, the system documented 3,293 births and 831 deaths, including the causes, rates and trends of these deaths.

Health reforms in Tanzania expect Districts to go beyond just managing diseases, to managing health systems from a perspective of health equity. It is difficult for health systems to target the poor accurately. However in all societies, the poor carry the heaviest burden of disease and it is possible to target major components of the Burden of Disease (BOD), thus increasing equity in resource allocation with more emphasis on the poor. For districts, this means a greater focus on cost-effective interventions that address the largest shares of the burden of disease. In Africa, 78% of the burden[1] comes from premature mortality. The causes of this mortality also cause most of the disability that makes up the remaining 20%. Therefore we can use cause-specific mortality burden as a guide to setting priorities. Since most mortality occurs at home or outside of health facilities, we cannot rely entirely on health facility-based Health Management Information Systems' attendance data for information on the burden experienced by communities and households. Instead we can use household derived demographic surveillance data from the National Sentinel Surveillance System for understanding the current burden and its trends in various parts of the country.

In **Part 2** of this document we convert current remaining disease-specific mortality into *intervention addressable* shares of the total burden of disease and present this in a pictorial format as follows:

Distribution of the total household burden of disease by:

- Broad causes (e.g. communicable; perinatal, maternal, nutritional; external; etc.)
- Broad population groups (e.g. under-fives, adults, and women of child-bearing age);
- Cost-effective interventions available to CHMTs and rural district health services;
- Individual conditions addressed by cost-effective intervention strategies.

The above information is essential for identifying the most important health intervention priorities (as opposed to disease priorities) and in allocating appropriate and proportionate resources for the support of selected interventions at district level.

In **Part 3** we provide additional graphical information for planning the health system such as distribution of births and deaths by month and season, and by place of birth or death.

In **Part 4** we provide a demographic breakdown of the sentinel population structure by age, sex, current fertility and age specific mortality rates. These are applied to the current district populations to predict the numbers of births, infants, under-fives, pregnancies, and deaths to be expected at district level in the next planning year.

In **Part 5** we provide a one-page summary and conclusions, as well as contacts for further information on the NSS and the Rufiji (Coastal) DSS.

Part 2: Intervention Addressable Burden of Disease Graphics

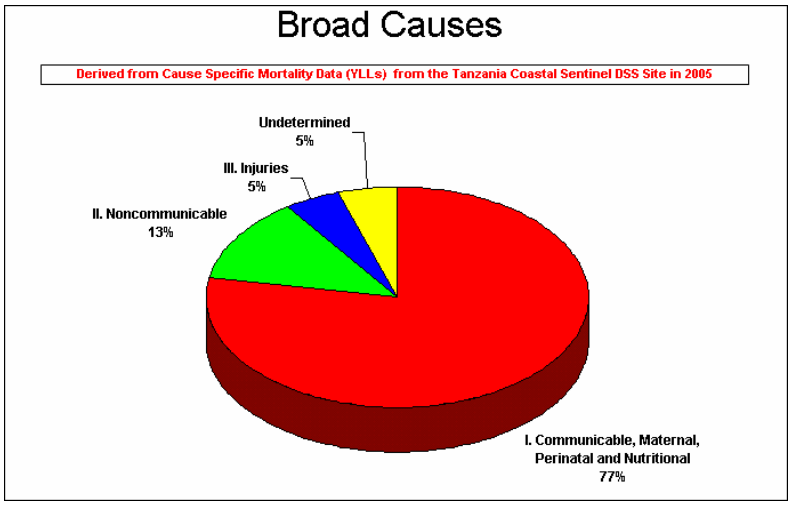


Figure 1. Broad Causes of the Burden of Disease in 2005
In Figure 1 above, the total burden of disease in the Coastal Sentinel is divided into three broad groups of causes. Group I (red) contains all communicable, maternal, perinatal and nutritional causes. In the Coastal Sentinel district, these account for 77% of the total burden. Group II (green) represents the non-communicable diseases and accounts for 13% of the total burden. Group III (blue) is all external causes such as injuries and contains about 5% of the burden. The remaining 5% of the burden is undetermined by available methods (yellow). This overall pattern indicates that the health transition towards non-communicable and life style diseases is not yet very advanced in coastal regions of Tanzania and that there is a large unfinished agenda of preventable conditions to address. The Coastal pattern is similar to the rest of Africa, except that the proportion due to injuries is much less. This is due to the current heavy burden of injury inflicted by war and civil conflicts in several African countries, which does not occur in Tanzania.

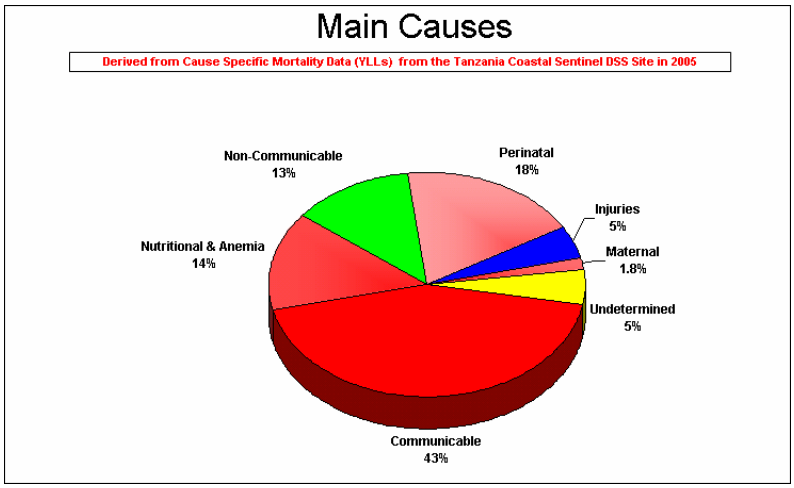


Figure 2. More Detailed Main Causes of Burden of Disease
In figure 2 (above), Group I (red) is further sub-divided into its components to show the communicable, perinatal, maternal and nutritional shares for the Coastal Sentinel district. Communicable diseases dominate the pattern and contribute over 43% of the total burden. Malnutrition as a direct cause of mortality is relatively uncommon in Tanzania, but it should be appreciated that malnutrition is a common underlying cause of other mortality and deserves more attention than this picture might suggest. The relatively large share (18%) of the burden of disease due to perinatal mortality is a cause of concern and emphasizes the importance of addressing the health problems of the neonate and mothers through a greater emphasis on neonatal interventions in **IMCI**, and through **Reproductive Health** and **Control of Sexually Transmitted Infections.**

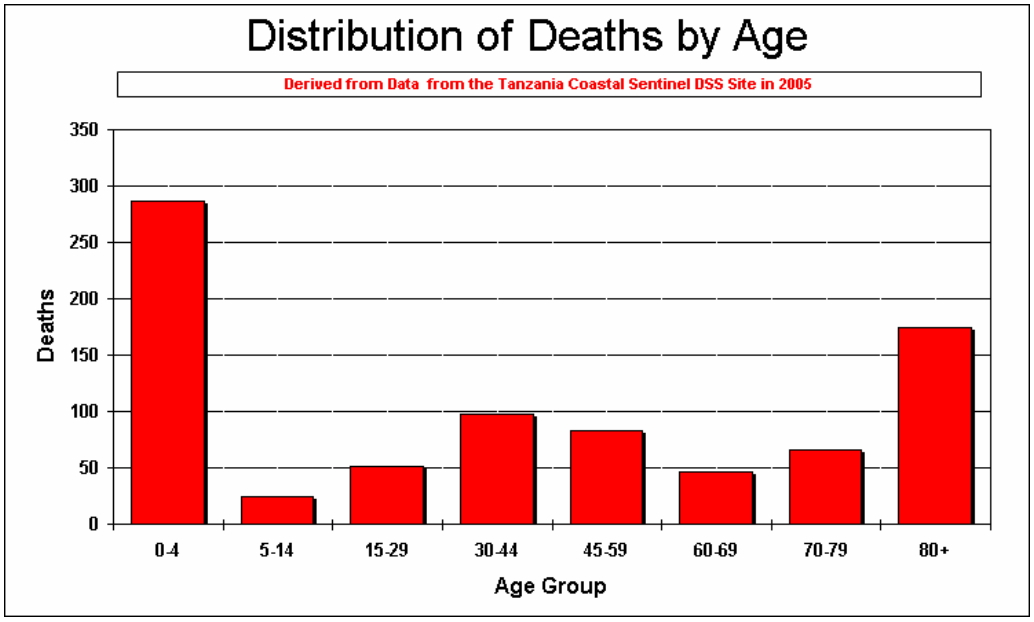


Figure 3. Mortality by Age Group
Figure 3 above shows that much of the total population's mortality is still experienced during the first five years of life. This is due to preventable child illnesses. A second preventable peak occurs in young adults and is largely due to the effects of HIV/AIDS, TB and maternal mortality.

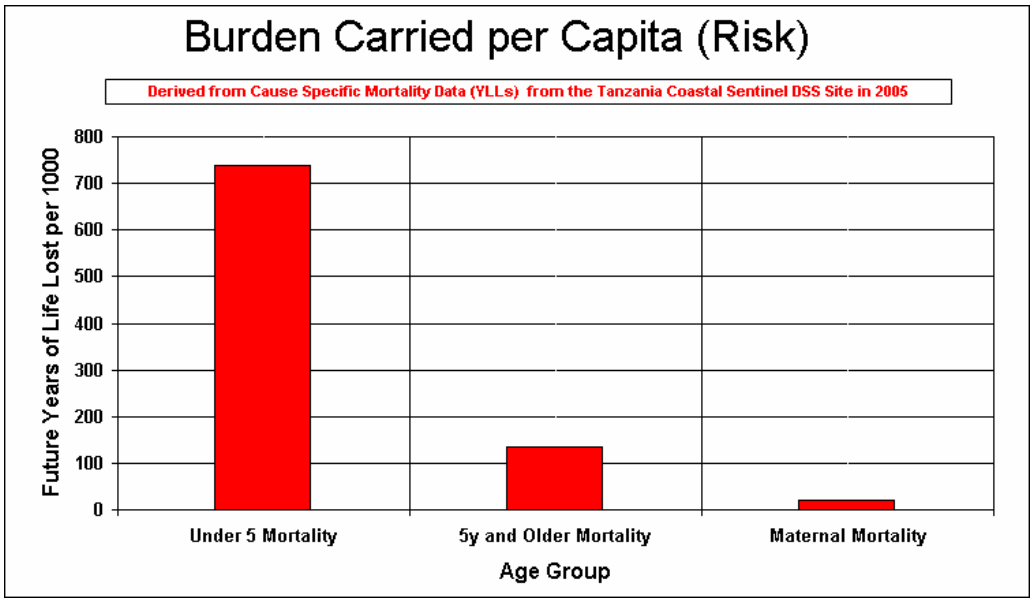


Figure 4. Per Capita Mortality Risk by Age Group
Both Figures 3 and 4 illustrate the disproportionately high risk of disease burden carried by children. Figure 4 shows the relative burden of disease (risk) on a *per capita* basis for each of the three categories. This graph adjusts for the fact that age categories are unequal in size. The under-fives represent a 5 year age class and contain only 17% of the population, yet carry about 53% of the mortality (YLL) burden. The 5-year and older age group spans over 80 years and includes 83% of the population but carries only 47% of the burden. Included in this group is the maternal age group that spans 35 years and includes 21% of the total population and suffers a loss of 1.8% of total life years due to maternal mortality. Under-five mortality clearly demands high priority. (Maternal mortality is also part of the 5-year and older mortality).

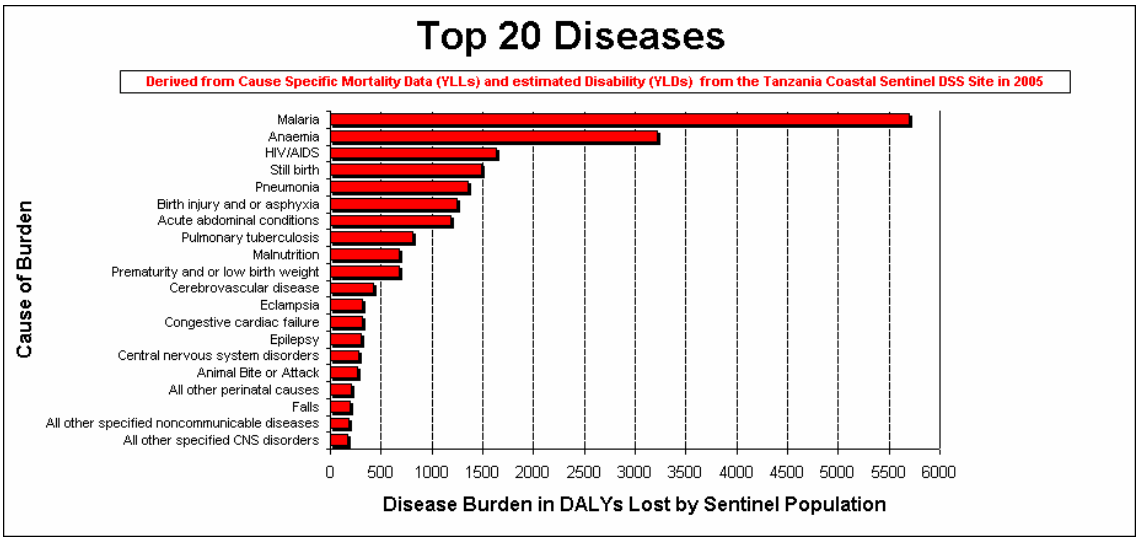


Figure 5. Top 20 Diseases Across all Ages
This graph displays the top 20 conditions contributing to the burden of disease in terms of lost disability adjusted life years (DALYs) in 2005 in the sentinel population. Malaria mortality, anemia morbidity and HIV/AIDS mortality and morbidity dominate, followed by a variety of peri-natal, neonatal and under-five problems such as pneumonia, still birth, birth injury and asphyxia. Aside from the HIV/AIDS components, many of the top causes occur in children under five. The main causes of the under five mortality are therefore shown below.

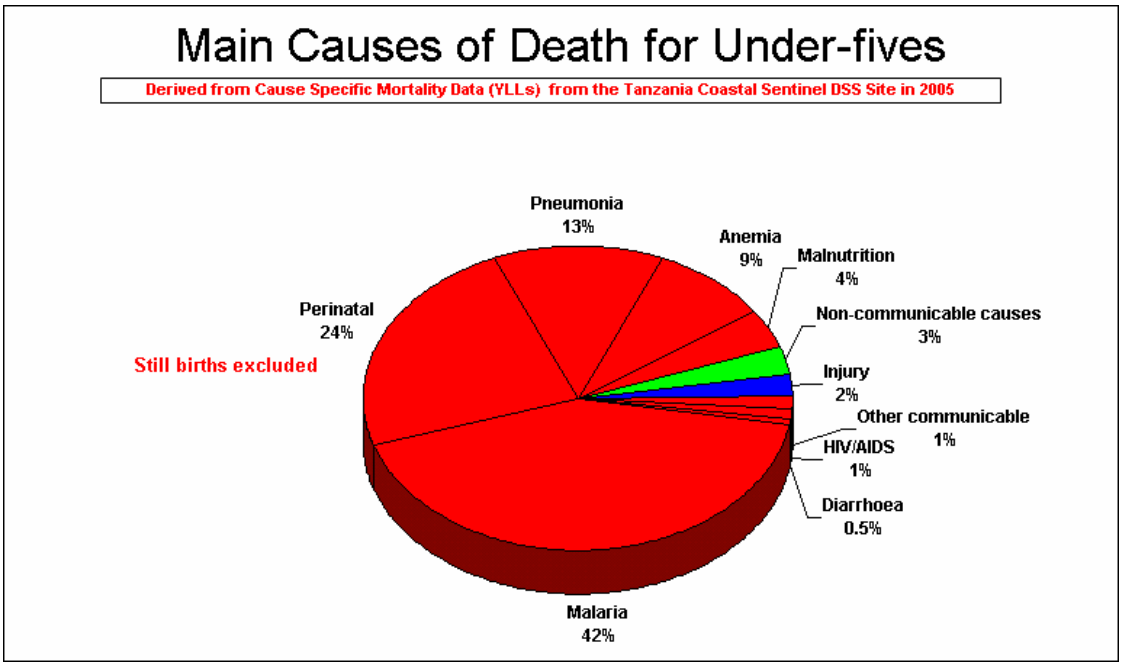


Figure 6. Main Causes of Death in Children Under Five.
Given the high burden of preventable mortality in children under-five, we show here the proportions for the main causes of death across this age group. Malaria dominates, followed by conditions in the perinatal and neonatal period. Diarrhoea and measles are now well controlled and at relatively low proportion. Interventions for neonatal, child and maternal causes are critical to address this largely preventable burden. It is difficult to plan health services from a disease by disease perspective. Strategies and packages that integrate across causes and age groups are more effective to manage and prioritize. The remainder of this profile focuses on such intervention strategies rather than individual diseases. These interventions are described in the following graphics.

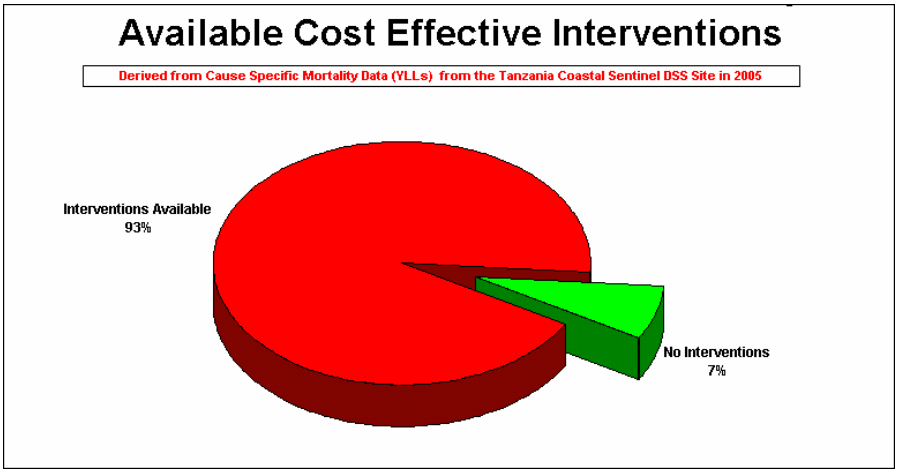


Figure 7. District Disease Burden Addressable by Available Cost-Effective Interventions
Although it is not possible to prevent all premature mortality, the above graph shows the good news that 93% of the year 2005 remaining disease burden is amenable to health care and addressable by cost-effective interventions available through Council Health Plans. As new cost-effective interventions become available for the non-addressed 7% of the burden, these can eventually be considered for inclusion in the National Package of Essential Health Interventions for rural districts.

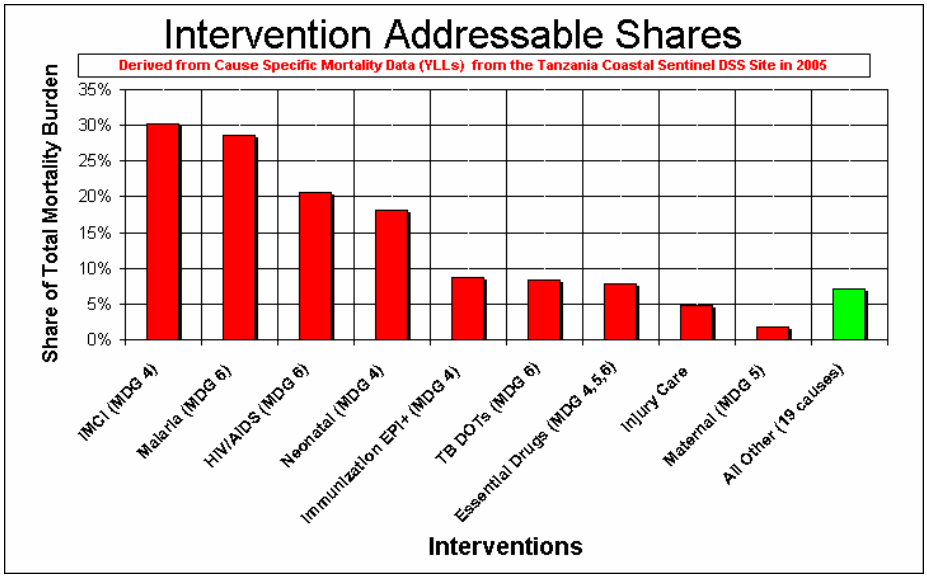


Figure 8. Intervention Addressable Shares of the Burden of Disease
The above graph shows how much of the total burden of disease is addressed by each individual cost-effective essential health intervention strategy currently available at District level. This core package includes nine groups of interventions and strategies, each of which are considered cost-effective and addresse at least 2% of the burden of disease. Together these represent a minimum package for such districts and include: **Integrated Management of Childhood Illnesses (IMCI) including new interventions for neonatal mortality; Malaria case management with artemisinin combination therapy (ACT), plus insecticide treated nets (ITNs) or indoor residual spraying (IRS), and intermittent preventive therapy (IPTp) for prevention of malaria; HIV/AIDS by antiretroviral therapy (ART), voluntary counseling and testing (VCT), prevention of mother-to-child transmission (PMTCT), STD syndromic management and Integrated Management of Adolescent and Adult Illness (IMAI); Essential Drugs (EDP); Immunization (EPI+); TB DOTS; Injury Care; and Safe Motherhood Initiatives (SMI) for maternal mortality**. Eight of these nine groups directly address Millennium Development Goals for health (MDG 4 Child Mortality; MDG 5 Maternal Mortality; MDG 6 HIV/AIDS, TB and Malaria). Since some diseases are addressed by more than one intervention package, these shares add to more than 100%. The category labeled *All Other* (7%) is all remaining disease burden not yet addressable by any of the listed cost-effective essential health interventions (see below).

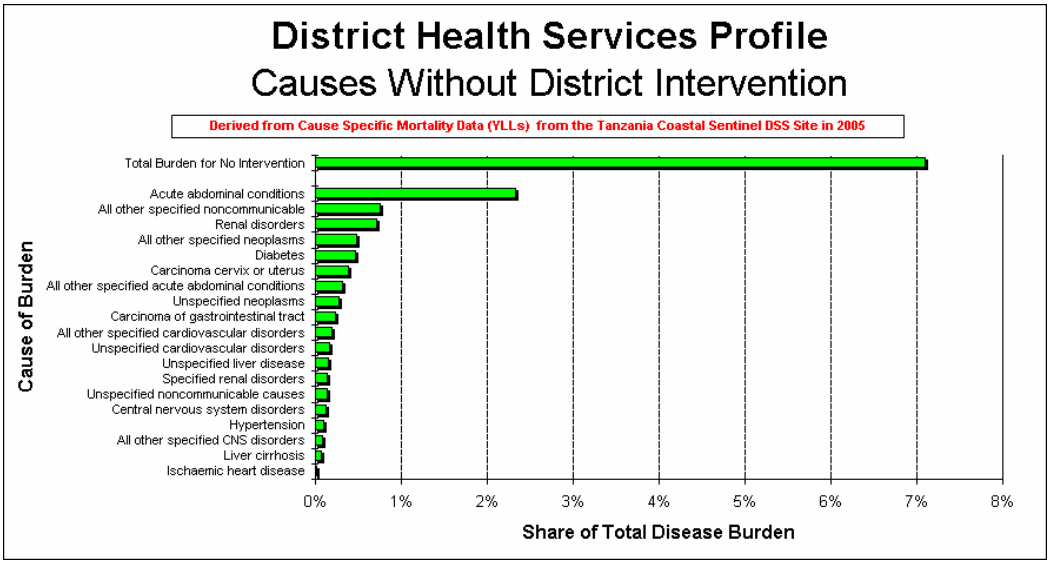


Figure 9. Causes without Cost-Effective District Intervention
There are 19 causes of death that make up the 7% share that is currently not yet addressable by cost-effective essential health interventions at rural level. Most of these causes individually constitute less than 1% of the total burden of disease in the population and will be difficult to address cost-effectively without high opportunity costs.

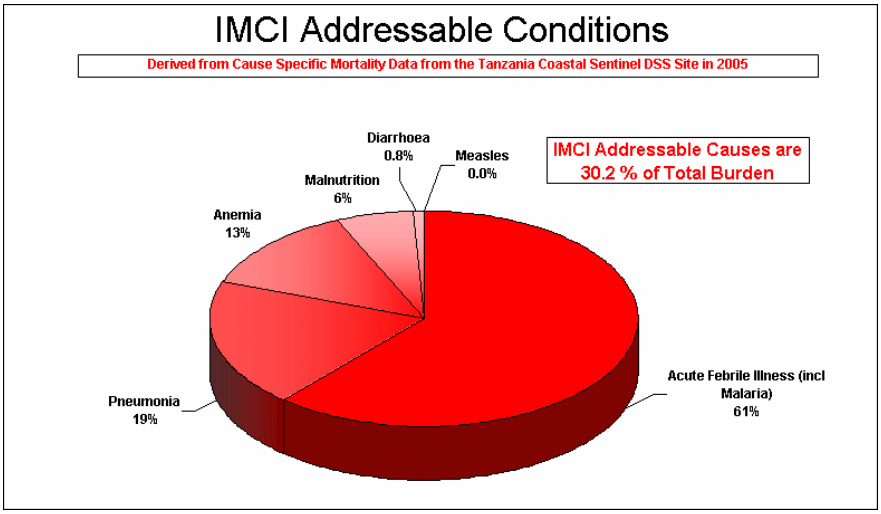


Figure 10. Integrated Management of Childhood Illness (IMCI) Addressable Conditions
Children under the age of five carry the highest per capita share of the total burden. The above graph shows that if **Integrated Management of Childhood Illness (IMCI)**, an integrated, cost-effective essential health strategy targeted to under-fives, was the only intervention offered, it would address almost one third of the total population burden of disease. No other single intervention addresses such a large portion of the remaining burden of disease, thus this package merits intensive support to reach high levels of coverage. Strengtening this package with more intervetions for neonatal mortality in the first month of life (IMNCI) would increase its importance even further. The total share of the burden addressable by IMCI has decreased from 41.3% in 1999 to 30% in 2005, possibly as a response to the wide access to IMCI that was achieved since 1999 in Rufiji District. Similar gains might be expected in other districts achieving similar coverage through use of Council Health Basket Funding as done in Rufiji. The above graph illustrates the relative contribution of the individual component conditions addressed by IMCI. Acute febrile illness including malaria constitutes about 61% of the under-five burden and emphasizes the importance of providing efficacious preventive and curative interventions for malaria. The transition from chloroquine to SP and now ACT improves the effectiveness of IMCI.

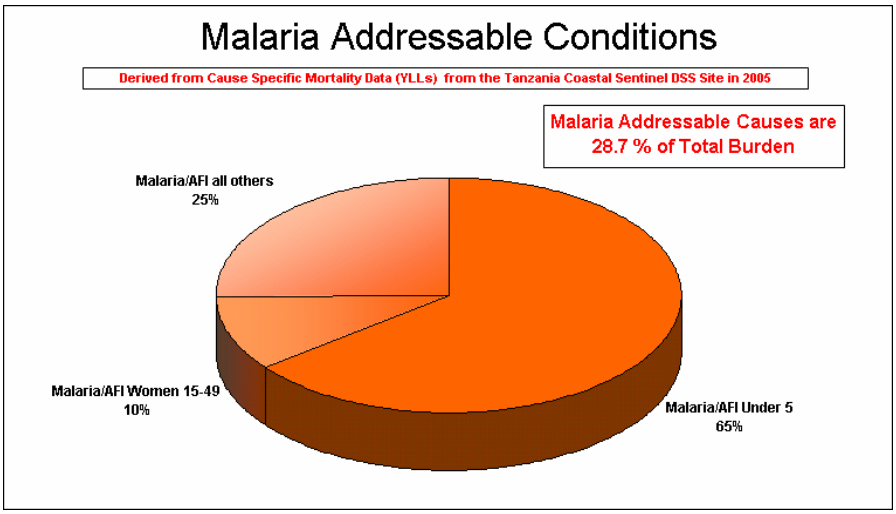


Figure 11. Malaria and Acute Febrile Illness Addressable Conditions
29% of the total burden of disease of the population is driven by acute febrile illness, predominantly malaria (down from 37% in 1999). Of this, about 65% is suffered by children under-five (also counted in IMCI). The other important risk group is pregnant women. Women 15-49 are 21% of the population and carry about 10% of the malaria burden. This risk increases during pregnancy. This illustrates the importance of prompt and effective **Malaria Case Management with ACT** according to the new National Guidelines, and preventive interventions such as **Insecticide Treated Nets (ITNs)**, especially for mothers and young children via the Tanzania National Voucher Scheme, and **Intermittent Preventive Treatment (IPT)** with SP at antenatal care during pregnancy.

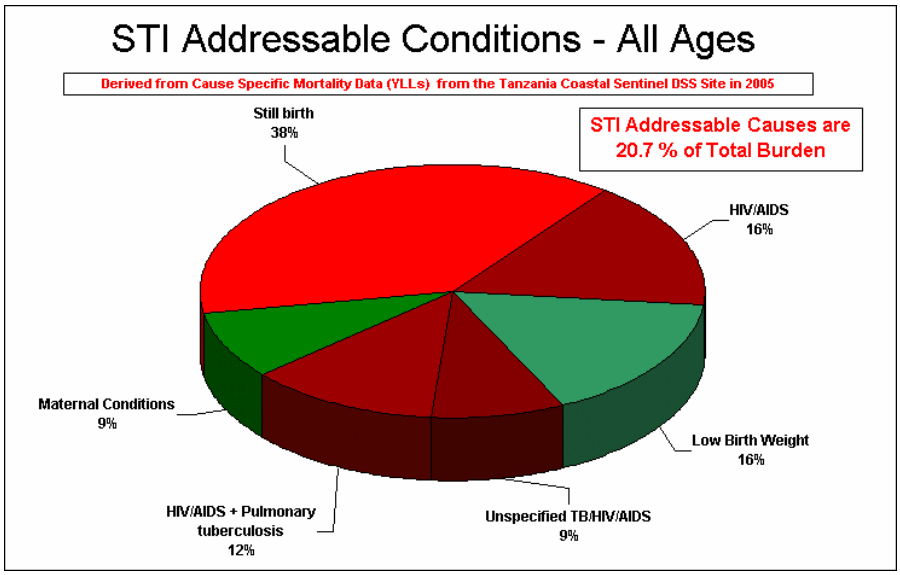


Figure 12. Sexually Transmitted Infection (STI) Addressable Conditions
Sexually Transmitted Infections (STIs), including HIV/AIDS, constitute about 21% of the total disease burden in 2005 (up from 14% in 1999). They are the third largest addressable component of the burden of disease. HIV/AIDS is a major component of the mortality due to STIs, either directly or indirectly through increasing the risk of TB. Other major contributors are stillbirths (mainly associated with syphilis), low birth weight, and maternal conditions (possibly associated with chlamydia and gonorrhoea). STIs can be partially addressed by carefully selected **Reproductive Health** and **Integrated Management of Adolescent and Adult Illness (IMAI)** interventions such as **Antiretroviral Therapy (ART), Prevention of Mother-to-Child Transmission of HIV (PMTCT), Voluntary Testing and Counseling (VCT), Condom Promotion, STD Syndromic Management, RPR Screening in Pregnancy, Family Planning, Strengthening Blood Transfusion Safety, School Health and Youth Interventions, Safe Motherhood Initiatives,** etc.

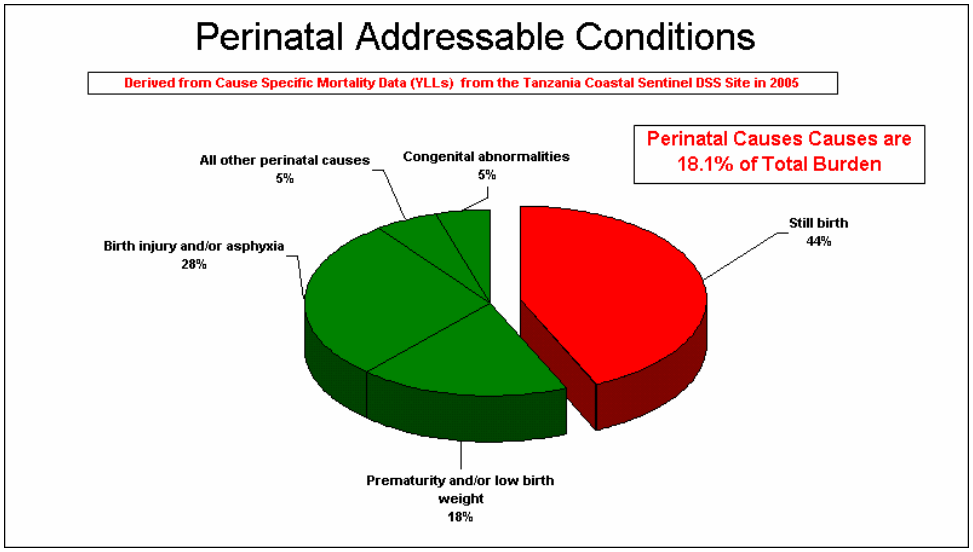


Figure 13. Perinatal Addressable Conditions

The above graph shows perinatal mortality. Stillbirths are the largest share, followed by birth injury or asphyxia, prematurity or low birth weight, and congenital abnormalities. Stillbirths can be partially addressed by **RPR Screening for Syphilis** during pregnancy. Neonatal tetanus was not observed, suggesting that **EPI** is performing well. Birth injury, asphyxia, and still birth demands more attention on **quality obstetrical care**. Low birth weight demands further attention on both **maternal nutrition** and on malaria prevention in pregnancy (**IPTp**). This graph illustrates the growing importance for dealing with neonatal mortality now that IMCI has made such good progress in reducing post-neonatal under-five mortality.

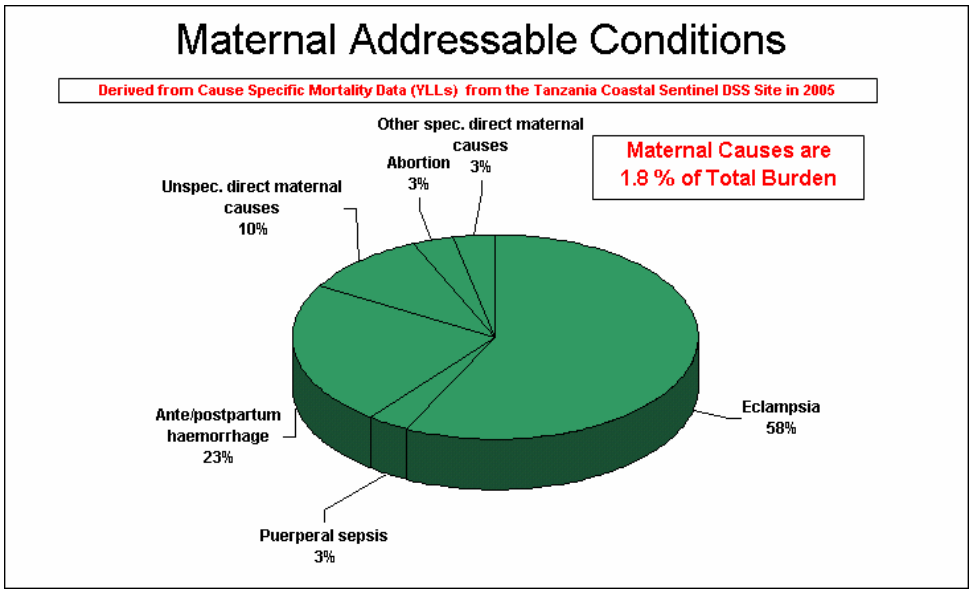


Figure 14. Maternal Addressable Conditions

Although the relative burden due to maternal morbidity and mortality appears comparatively low, it must be appreciated that this is concentrated in the 20% of the population who are female between the ages of 15 and 45. Furthermore, if morbidity is added, this burden almost doubles (see figure 27). Maternal morbidity and mortality therefore deserve higher priority than this burden share suggests and it is an imperative to address. The above graph shows the causes for the more than 1.8% of total burden due to maternal mortality. These are usually eclampsia, haemorrhage, sepsis, and obstructed labour. Malaria, anemia and HIV/AIDS are also important indirect causes of this burden. These causes can be addressed by a priority package for **Emergency Obstetric Care (EmOC) and Skilled Birth Attendance** including essential obstetric drugs (e.g. oxytocins), equipment (e.g. resuscitation), supplies (e.g. oxygen and blood), post-abortion care, access, referral, quality assurance and training. Other key packages are: **Family Planning** (spacing, men as partners, youth friendly services, treatment of unwanted pregnancies); and **Antenatal Care and Birth Preparedness** (ITNs, IPTp, nutrition, maternal anemia, STD syndromic management, and post delivery care).

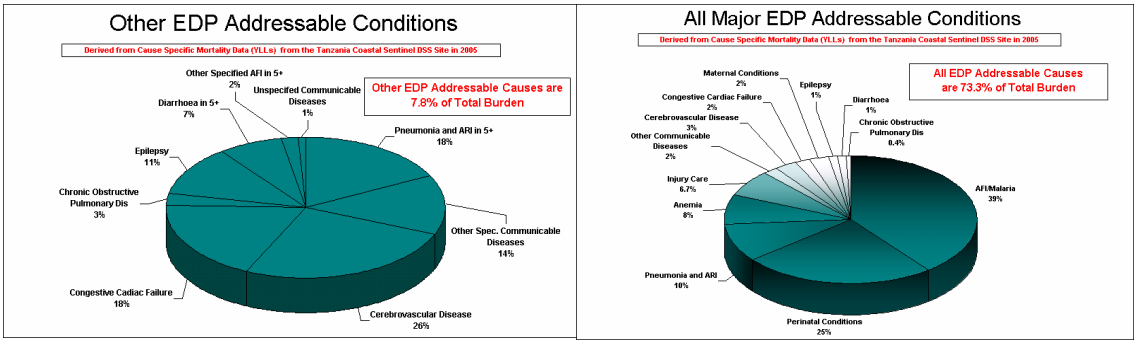


Figure 15. Essential Drug Program (EDP Lists for Kit or Indent) Addressable Conditions
Here we show two graphs for essential drug lists to emphasize the profound importance of maintaining adequate supplies. The EDP list for Tanzania has been well designed for the existing burden of disease and addresses 73% of the total burden (top graph). Most essential drugs are delivered through essential health interventions already listed in this document, but some have no specific package. This remainder of the EDP kit contains drugs and materials useful for additional care aimed at morbidity reduction and mortality. These additional causes amount to about 8% of the total burden of disease (bottom graph) and include diarrhoea, pneumonia and ARI in people five years and older as well as a number of **neglected communicable and non-communicable diseases** such has **helminthic infections, epilepsy, hypertension and cardiovascular conditions.** These considerations are important to bear in mind for those districts converting to the Indent System for essential drugs.

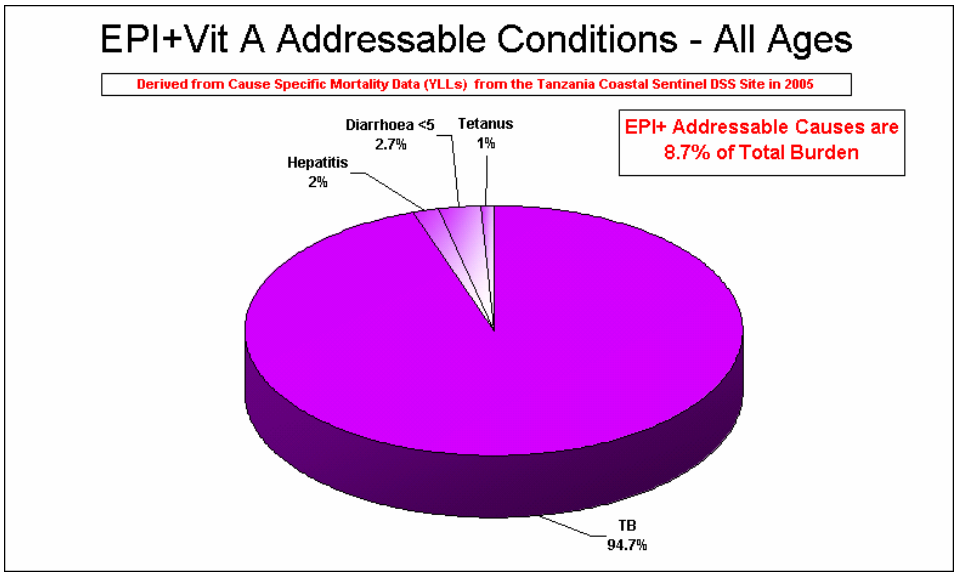


Figure 16. Expanded Program on Immunization Plus (EPI+) Addressable Conditions
The above graph illustrates the success of **EPI+** as an essential health intervention. The current high coverage of **EPI+** has reduced a previously high burden to only 9% of the total burden. Remaining causes are tetanus and hepatitis; however TB is rising due to HIV. This illustrates the importance of maintaining **EPI+** at high coverage and supporting additional interventions for measles (e.g. **IMCI**), Tetanus (e.g. **SMI**), TB (e.g. **TB DOTS**) and **EPI+ with Vitamin A Supplementation** for diarrhoea and measles mortality reduction in under-fives.

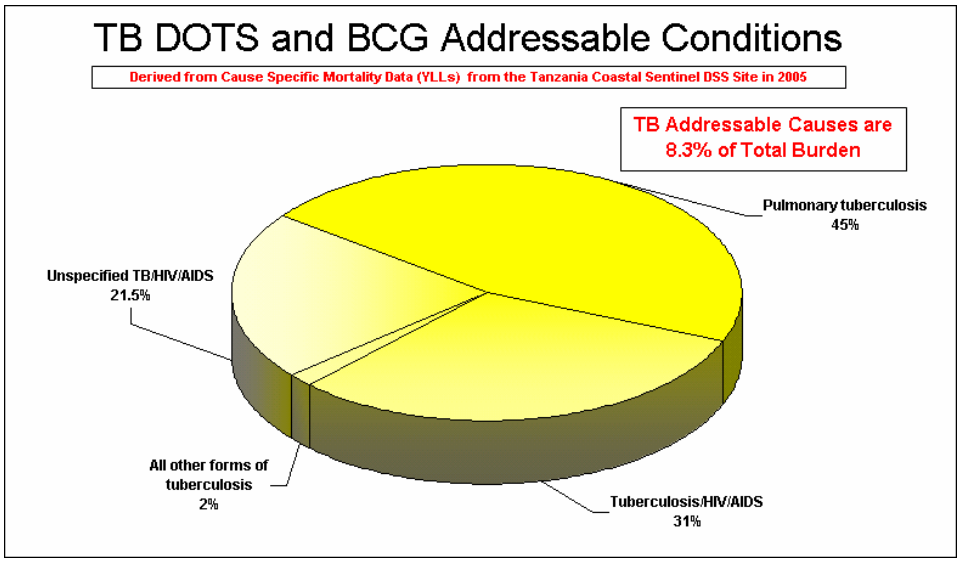


Figure 17. TB Directly Observed Treatment – Short Course (TB DOTS) addressable conditions
TB accounts for about 8% of the burden of disease in 2005, up from 5% in 1999. HIV is believed to increase the risk of TB mortality. This illustrates the importance of increasing the coverage and integration of **TB DOTS** and **STD Syndromic Management** as well as maintaining high **BCG** immunization coverage in newborns.

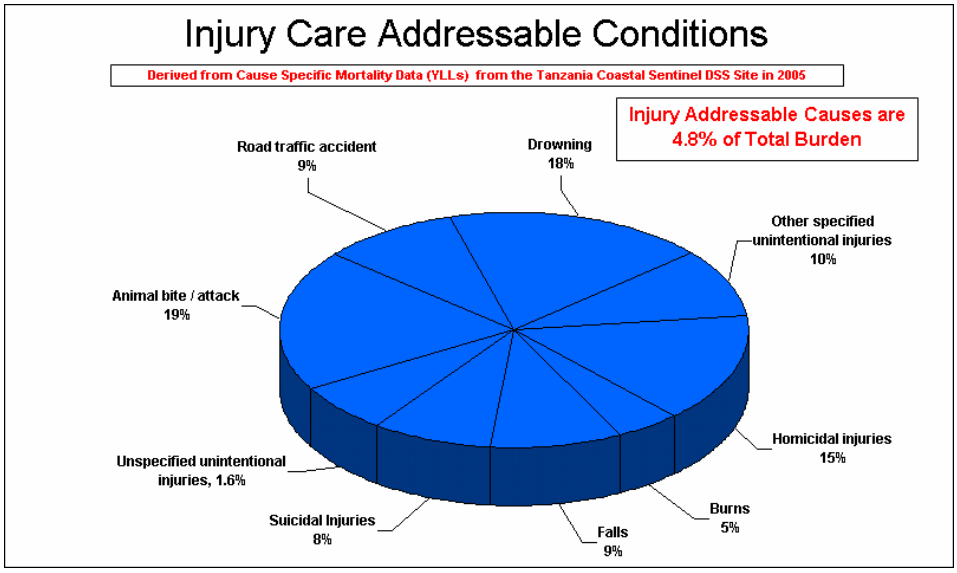


Figure 18. Injury Care Addressable Conditions
The above graph illustrates the relatively low (5%) but important burden of disease that can be addressed through life-saving interventions for injuries through adequate risk avoidance and injury care. This shows the importance of maintaining a regular supply of **Essential Drug Kits** and other supplies that include materials for **Injury Care**. It also suggests the need for appropriate **Inter-sectoral Interventions**, e.g. to address the rising risk of road traffic accidents. The pattern of injuries will vary greatly between districts depending on the nature of roads, which affects road traffic accidents, and the proximity to wild life, which determines risk of animal attacks. Drowning is a common cause of fatal injury in the Coastal Sentinel. **School** Health Programs should consider rescue, first aid, and swimming instruction at primary school level. There were several fatal animal attacks in the DSS area this year. Previous years also saw snakebite mortality. Adequate stocks of anti-venom should be kept available at dispensaries. In districts where suicide or homicide are occurring, health planners may need to consider mental health interventions.

Part 3: Other DSS Data Useful for Planning Purposes

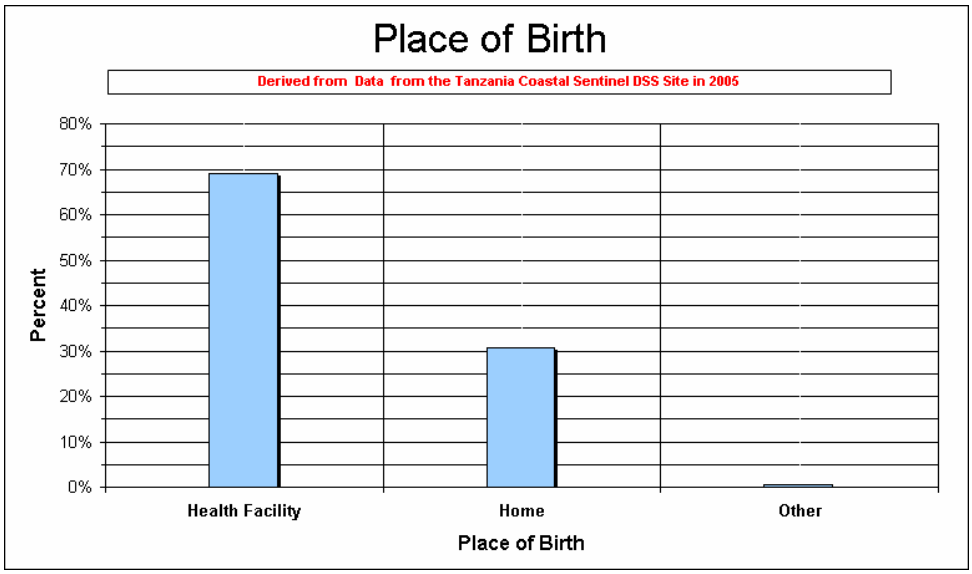


Figure 19. Place of Birth
The above figure illustrates that almost 70% of births now occur in health facilities and about 30% at home. This rate of births in health facilities is higher than the national average of 47% for Tanzania recorded in the Tanzania DHS 2004.

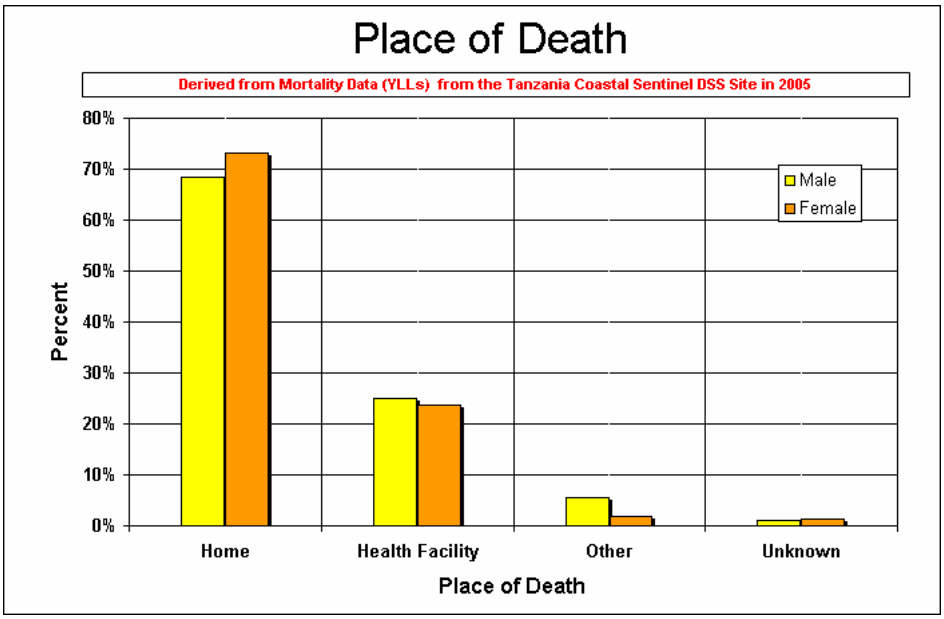


Figure 20. Place of Death
The above graph shows that about 70% of all deaths occur at home. This emphasizes the need to consider household-based data when assessing the burden of disease in the population, and not only HMIS health facility data. This rate has held constant over the past six years of monitoring.

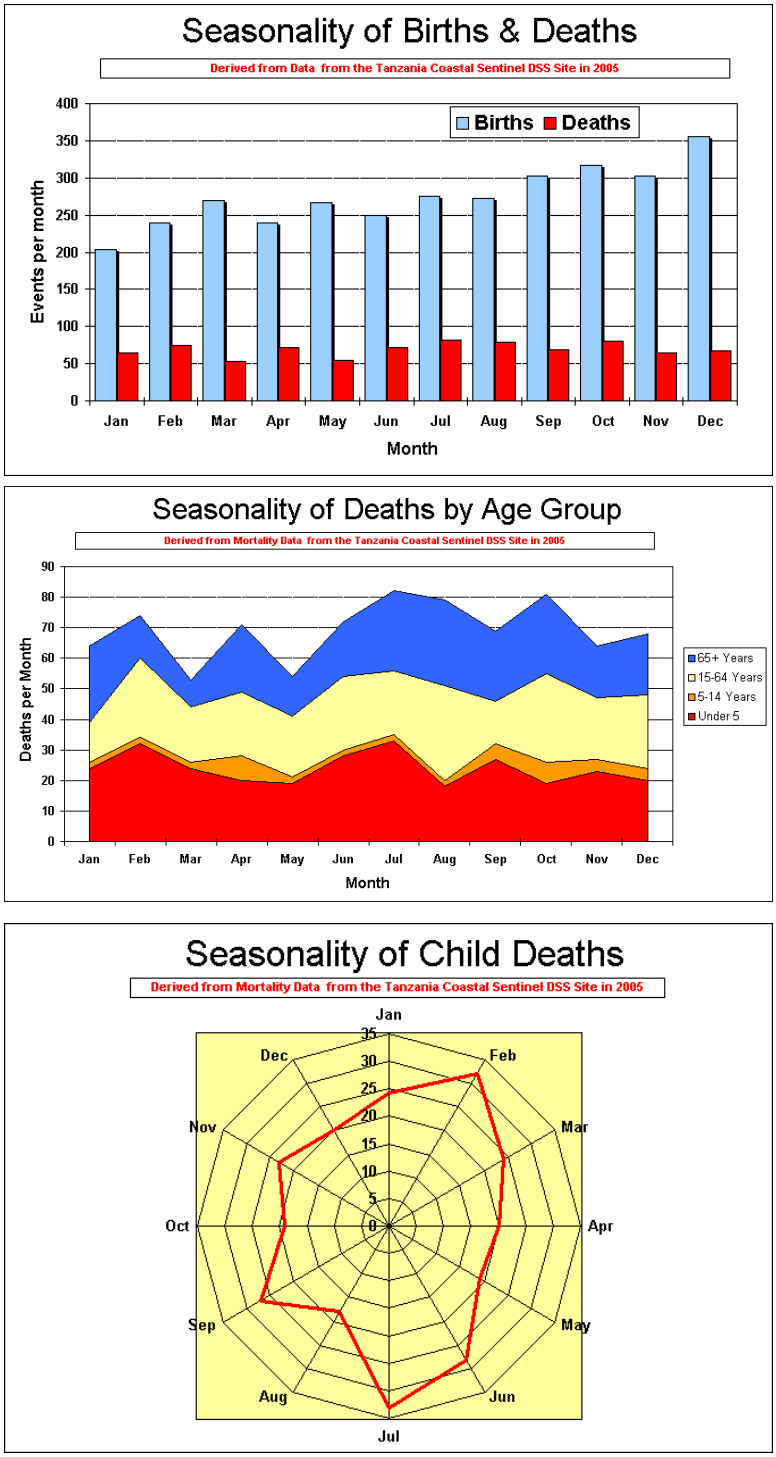


Figure 21. Seasonality of Births and Deaths

The top figure above shows monthly births and deaths in 2005 where the DSS area recorded an average of 274 births and 69 deaths per month. The second shows monthly deaths in children under 5 years; school aged children 5-14 years; adults 15-64 years; and the elderly 65 years of age and older. The third figure shows mortality in children under five which builds to peaks coinciding with the ends of the short rains (February) and long rains (July). This general pattern is consistent with malaria as the single largest disease component contributing to the burden of disease in children, which also peaks during the rains. Mortality in other ages is relatively constant over the year.

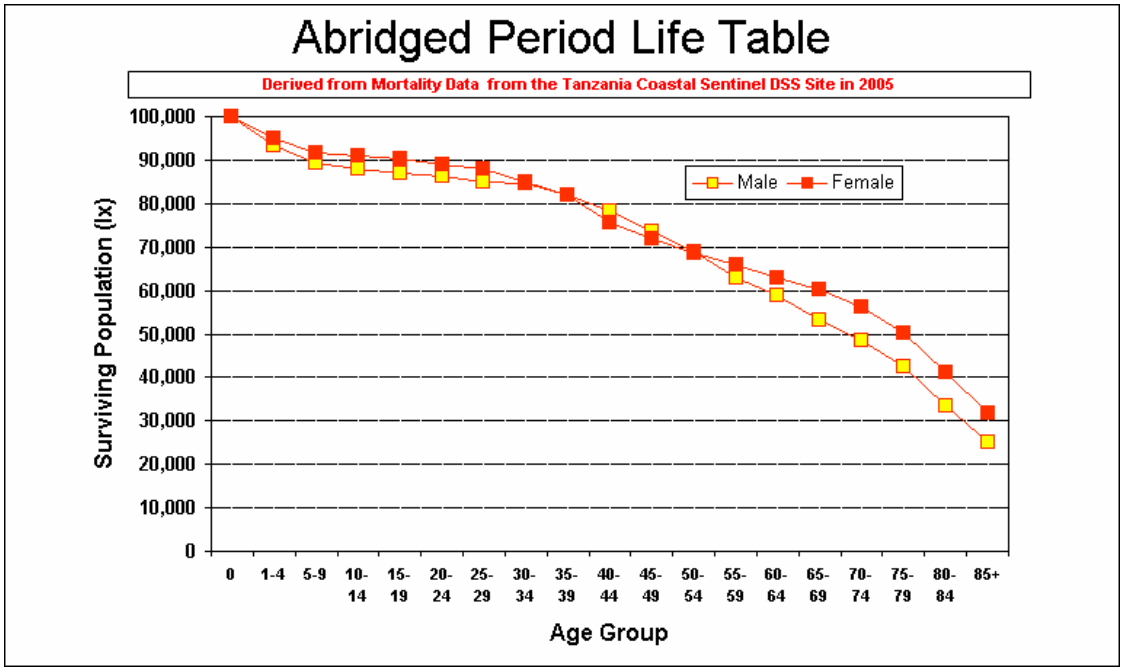


Figure 22. Abridged Life Table Survival Curve for Males and Females in 2005.
The above figure shows the survival of a hypothetical cohort of 100,000 males and 100,000 females, if born in 2005 and exposed to current risks of mortality in the sentinel area. Females have a biological survival advantage over males except for the period aged 30-49 when the risk of maternal mortality over-rides the advantage.

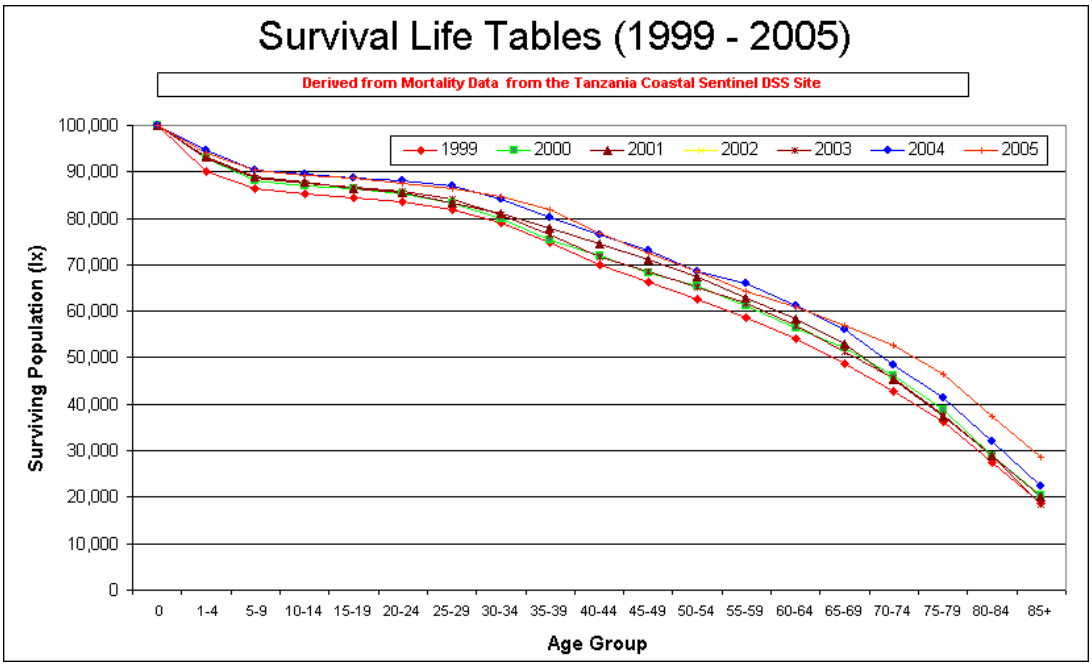


Figure 23. Abridged Life Table Survival Curves between 1999 and 2005.
This figure shows the abridged total population life table (males and females combined) for each of the past seven years, showing a steady improvement in survival across all ages.

Part 4. Projecting DSS Sentinel Data to Other Districts

The information provided in Parts 2 and 3 can be used by Districts with socio-economic, epidemiologic, and health service profiles similar to Rufiji District. In Part 4, Rufiji District DSS rates are applied to the expected populations of Rufiji and other similar districts to derive district specific estimates in Coast, Lindi, Mtwara, and Tanga Regions. This section summarizes some key indicators generated by demographic surveillance that can be used for estimating local populations at risk of particular disease burdens, or in need of particular interventions.

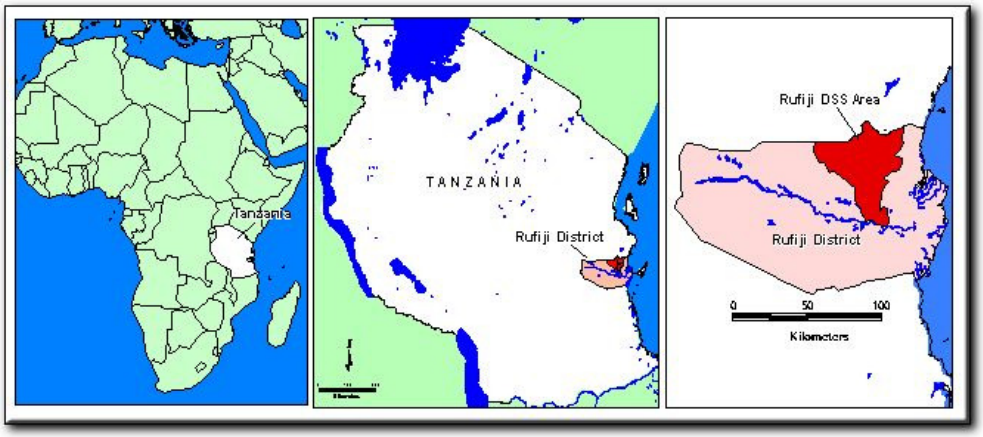


Figure 24. Map of Location of the Rufiji DSS Sentinel Area.
The above map indicates the location of the area in which the Rufiji DSS operates. The entire population of over 79,000 people in about 17,000 households in this area is monitored continuously for births, deaths, in-migrations and out-migrations, with verbal autopsies on all deaths. This area is at the mid-point of the coastal border of Tanzania and is selected to be representative of rural coastal districts of the country. See also the figure, below.

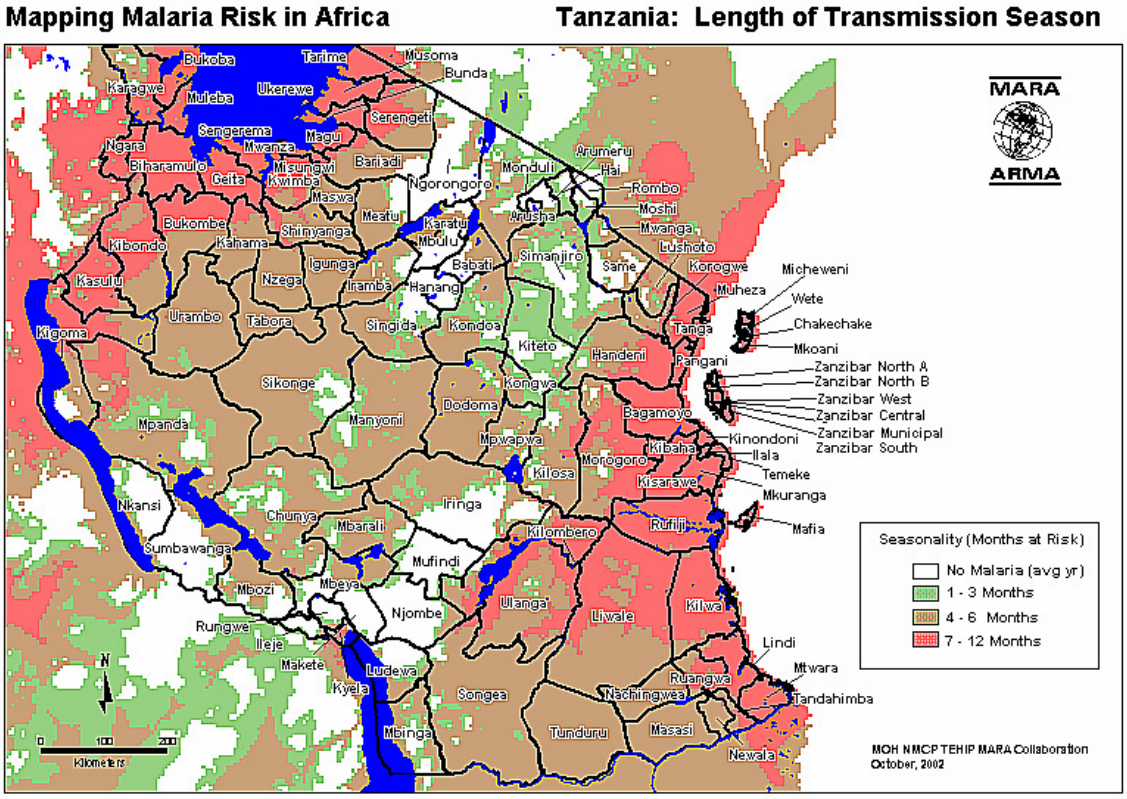


Figure 25. Map of Malaria Transmission Risk in Tanzania
The above is a map of Tanzania showing the great similarity of Tanzanian rural coastal districts with respect to risk of malaria transmission. Malaria is the single largest component of the burden of disease in Tanzania and the Rufiji DSS sentinel data. This adds weight to the relevance of sharing Rufiji DSS data with other coastal districts.

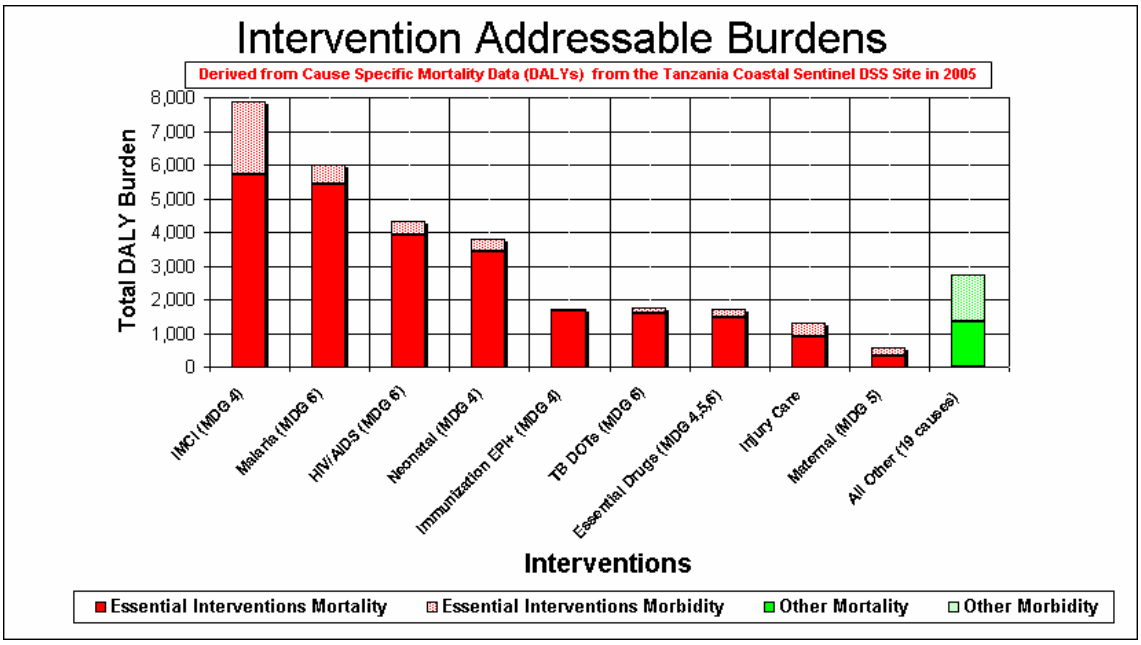


Figure 26. The Effect of Including Disability.
This graph shows the effect of including disability as well as mortality in determining the relative shares of the burden of disease addressed by each intervention. Mortality is relatively easy to measure objectively and has been used as the basis of the information throughout this document. Morbidity is much more difficult and costly to measure. In this graph we have modeled the expected morbidity for each cause of mortality to derive an estimate of the Disability Adjusted Life Years (DALYs)(see End Note). The ratios used in the model are from the WHO Burden of Disease analysis for 2002 for AFRO E countries (those with high child and very high adult mortality). In comparing the pattern in this graph to that in Figure 7 which uses only mortality data, there is no real difference in the relative ranking in disease burdens addressed by each intervention. Hence we can, for the moment and for these purposes, continue to use years of life lost due to mortality (YLLs) in place of the full DALY. It should be noted that any large, non-fatal burdens of disease that are not associated with mortality will be missed by this approach (e.g. mental health, depression, cataracts, etc).

Table 1. Trends in Vital Statistics in the Rufiji DSS Sentinel Area.
The table below compares a selection of demographic measures obtained in the Rufiji DSS Coastal Sentinel area to those obtained in previous years in Rufiji and in the 2004 National DHS survey for rural mainland Tanzania. Note, the 2004 DHS gives period estimates for the period 1999-2004).

Trends in Selected Rates and Statistics from the Tanzania NSS Coastal Sentinel DSS Area

Indicator	Units	National Tanzania DHS	Coastal DSS						
		1999-2004	1999	2000	2001	2002	2003	2004	2005
Crude Birth Rate	Births per 1,000 population	42.4	42.3	41.6	41.3	39.9	39.2	36.3	41.3
Crude Death Rate	Deaths per 1,000 population	14*	15.4	13.3	12.8	13.1	10.5	11.6	10.4
Crude Rate of Annual Increase	Change per 100 population excluding migration	2.9%*	2.7%	2.8%	2.9%	2.7%	2.9%	2.5%	3.1%
Still Birth Rate	Still births per 1000 live births	n/a	15.2	14.9	13.4	14.1	14.5	14.8	13.7
Infant Mortality	Probability of dying before 1st birthday / 1,000 (1q0)	68	107.8	75.6	69.0	69.3	46.3	54.5	59.1
Under Five Mortality	Probability of dying between birth and 5th birthday / 1,000	112	135.5	118.5	110.1	114.3	75.4	95.9	96.6
Adult Mortality	Probability of dying between age 15 and age 60 / 1000 (4	n/a	312.6	297.4	282.3	289.6	257.4	263.5	280.3
Maternal Mortality Ratio	Maternal deaths per 1000 live births	5.8	5.2	5.7	2.5	5.1	3.5	2.1	5.2
Life Expectancy	Life expectancy at birth in years	51*	55.8	58.0	58.1	58.1	62.1	60.4	61.8
Total Fertility Rate	Children per woman 15-49 years old (avg)	5.7	6.2	6.2	6.1	5.8	5.8	5.6	6.3
Dependency Ratio	People <15 years or >64 years per 100 people 15 to 64	105	112	111	109	110	111	113	113
Average Household Size	People per household	4.8	4.8	4.9	4.2	4.7	4.7	4.7	4.7

Sources: Coastal DSS from Rufiji Demographic Surveillance System data for 1999 to 2005 (Part of the National Sentinel Surveillance System)
National Tanzania DHS is from National Bureau of Statistics (NBS)[Tanzania] and ORC Macro 2005. Tanzania Demographic and Health Survey, 2004-05. Dar es Salaam, for the period 1999-2004
*National level values from National Bureau of Statistics (NBS)[Tanzania] 2002 National Census

Table 2. Trends in Mortality in the Rufiji DSS Sentinel Area.

There are many ways to express mortality indicators. Here we show a variety of measures. They are internally consistent with the fact that infant, under-five and adult mortality has declined in the Rufiji DSS area by about 43%, 34%, and 10% respectively since 1999. This indicates movement in a good direction despite the increasing prominence of HIV/AIDS and TB mortality in the District. The large drop in 2003 may have been assisted by the extremely low rainfall that year and as expected, rebounded slightly in 2004-5 possibly due to the unusually high rainfall.

Infant Mortality in Rufiji District (excluding still births)

Type of Measure	Definition / Units	(1998)	1999	2000	2001	2002	2003	2004	2005	%Change
Probability	of infant death by age 1 (1q0) per 1000 children at birth	113.4	97.8	72.0	69.0	69.3	46.3	54.5	59.1	39.6%
Ratio	of infant deaths per 1000 live births	n/a	100.1	66.5	66.5	68.1	46.6	56.8	53.4	46.6%
Rate	of infant deaths per 1000 infant person years	n/a	107.8	75.6	72.2	72.7	47.7	56.9	61.5	43.0%
Source: Coastal (Rufiji) DSS except for 1998 from the TRCHS (DHS) of 1999.							Average decrease since 1999			43.1%

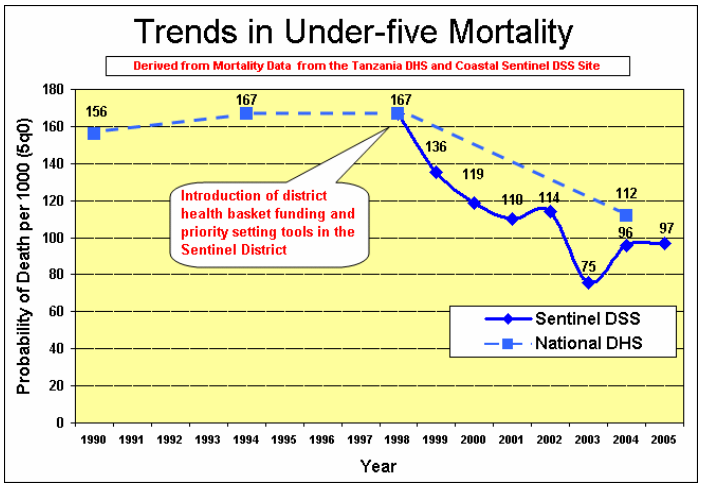
Under Five Mortality in Rufiji District (excluding still births)

Type of Measure	Definition / Units	(1998)	1999	2000	2001	2002	2003	2004	2005	%Change
Probability	of death by age five (5q0) per 1000 children at birth	166.8	135.5	118.5	110.1	114.3	75.4	95.9	96.6	28.7%
Ratio	of under five deaths per 1000 live births	n/a	131.5	102.6	102.6	108.3	74.0	98.0	87.2	33.7%
Rate	of under five deaths per 1000 under five person years	n/a	34.0	25.1	25.1	26.1	16.5	21.0	21.0	38.2%
Source: Coastal (Rufiji) DSS except for 1998 from the TRCHS (DHS) of 1999.							Average decrease since 1999			33.5%

Adult Mortality in Rufiji District

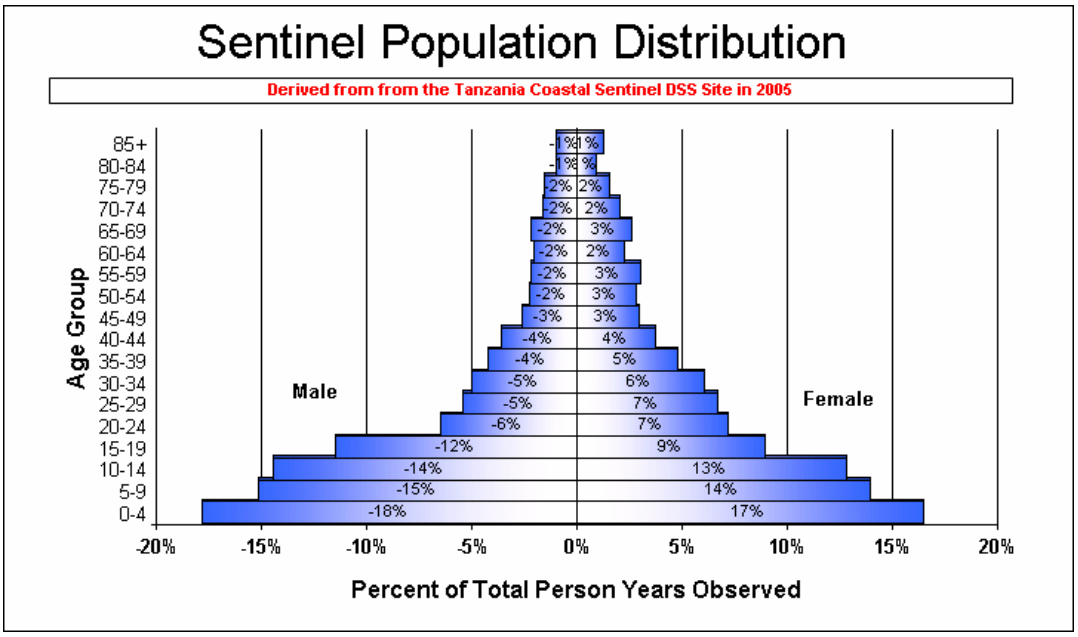
Type of Measure	Definition / Units	(1998)	1999	2000	2001	2002	2003	2004	2005	%Change
Probability	of death between age 15 and 60 (45q15) per 1000	n/a	312.6	297.4	282.3	289.6	257.4	263.5	280.3	10.3%
Source: Coastal (Rufiji) DSS								Decrease since 1999		10.3%

Figure 27. Long-term Trend in Child Mortality in the Rufiji DSS Sentinel Area.



This figure shows one example of the trend in mortality in this sentinel DSS area. The points between 1990 and 1998 are taken from the 1992, 1996 and 1999 DHS surveys for the rural coastal zone. The trend line and points from 1999 onward are from the Coastal Sentinel DSS in Rufiji District. Like much of Tanzania, mortality declines stagnated in the early 1990's. However, soon after the introduction of pilot **District Health Basket Funding** in 1997 in Rufiji (now available in all other districts), mortality began to decline again. At this rate of decline in Rufiji, the **Millennium Development Goals** for child mortality will likely be met ahead of schedule. In Rufiji, this has been achieved by using incremental basket funding for **scaling up coverage of essential health interventions and for health system strengthening**. This strengthening included access to these annual District Health Profiles for priority setting as well as the use of District Health Accounts tools for budget mapping in the planning cycle to align plans with priorities (now incorporated in Prime Ministers Office of Regional Administration and Local Government PlanRep Planning and Reporting Database for district budgets and expenditures).

The question is often raised that because mortality is changing in the sentinel area, the profile may no longer have **relevance to other districts**. In response, it should be appreciated that the profile focuses on proportional mortality and not absolute mortality. Hence the relative priority of interventions changes very slowly even though mortality can drop quickly. The ranking of the top 10 interventions in 2005 is almost exactly the same as it was in 1999 before the mortality started to drop. The proportional burden addressable by IMCI (which has contributed much to the success in the mortality reduction) has decreased from 41% to 30%, but it is still the top ranked intervention. Malaria interventions have dropped in share from 37% to 29% but still remains in second rank. The only other intervention in the top ten that has changed place is that for HIV which has steadily moved higher in addressable burden shares. Hence the priorities as determined by this approach are broadly generalizable to other rural districts in coastal Tanzania. Recent evidence from the National DHS survey indicates substantial reductions in under-five and infant mortality are also occurring at national level since 1999, but were foreshadowed by these DSS findings.



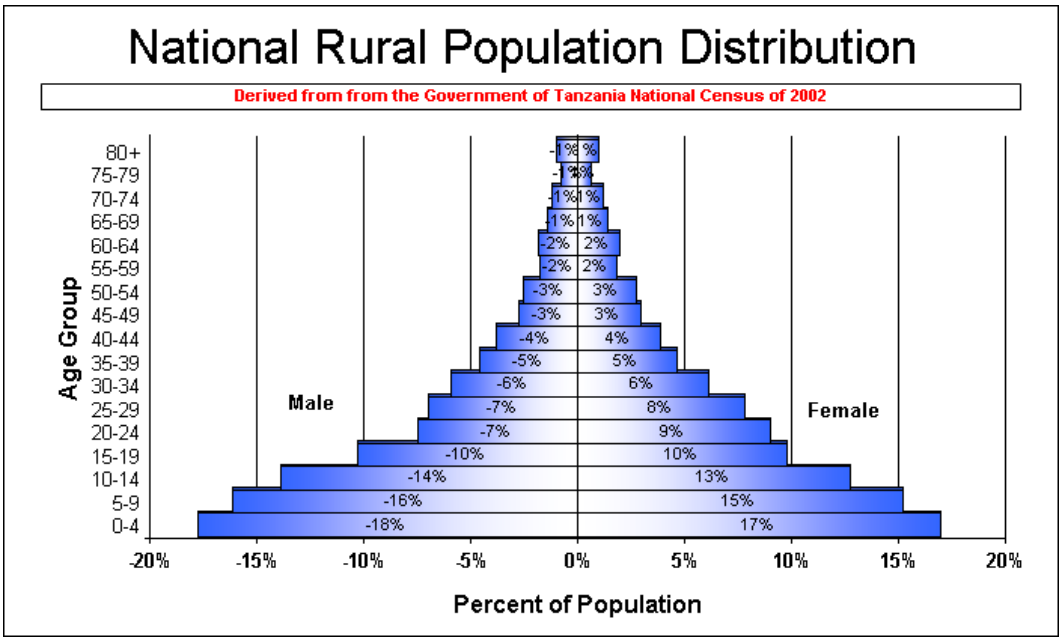


Figure 28. Population Distribution by Sex and Age by 5 year Age Groups
The above graphs display the age and sex distribution of the sentinel population during the year 2005 in the Rufiji DSS area and the national rural population from the 2002 census. These graphs reflect the combined impact of births, deaths and migration over the past 100 years on the structure of the currently living population. The wide base of the pyramid is characteristic of a population with a combination of both high fertility and high child mortality. It indicates that the majority of the population is children, and that there is a high dependency of large numbers of children and, to a much lesser extent, the elderly on a relatively small adult population. Because of their large numbers, child and young adult health problems will continue to dominate the public health priorities of this area for many years to come. It can also be seen that most of the child mortality occurs in the first years of life. It can also be seen that the **Rufiji sentinel DSS population has similar structure to the rest of rural Tanzania**. Extrapolations from this structure can be used to estimate district-wide populations in different age groups in need of specific public health services. These are provided in Table 3 below.

Table 3. Projecting the Sentinel DSS Rates to other Rural Coastal Districts.

Demographic Projections for 2007 based on the Tanzania NSS Coastal DSS Sentinel for Other Rural Coastal Districts*

Indicator	Demographic Projections to Rural Coastal Districts (North to South)										
	Muheza	Pangani	Bagamoyo	Kibaha	Kisarawe	Mkuranga	Rufiji	Mafia	Kilwa	Lindi R	Mtwara R
District Population*	312,202	48,261	259,509	148,880	107,804	211,324	226,928	46,003	184,311	231,409	222,937
Projected Population of Infants	11,208	1,733	9,316	5,345	3,870	7,587	8,147	1,652	6,617	8,308	8,003
Projected Population 0-4 years (Children)	44,957	6,274	37,369	18,312	13,799	32,121	38,873	5,888	29,674	31,009	32,549
Projected Population 5-14 years (School Aged)	84,295	12,307	65,137	35,433	25,011	56,424	63,699	12,145	52,344	53,687	53,282
Projected Population 15-64 years (Adult)	164,530	26,930	142,730	86,946	58,645	107,353	106,429	26,038	92,893	132,135	124,845
Projected Population 65+ years (Elderly)	18,108	2,703	14,273	8,188	10,349	15,427	17,927	1,932	9,400	14,810	12,262
Projected Population Female 15-49 years (Maternal)	72,431	11,631	62,542	38,113	23,609	47,548	47,473	11,179	43,497	58,778	57,741
Projected Number of Births	12,894	1,993	10,718	6,149	4,452	8,728	9,372	1,900	7,612	9,557	9,207
Projected Number of Deaths	3,247	502	2,699	1,548	1,121	2,198	2,360	478	1,917	2,407	2,319
Projected Number of Under Five Deaths	869	121	722	354	267	621	751	114	573	599	629
Projected Number of Maternal Deaths	67	10	55	32	23	45	48	10	39	49	48

* Note: District Populations are projected to 2007 from the 2002 Tanzania Census (NBS) using regional inter-censal growth rates and the 2002 age structure. Mortality projections are based on the sentinel population mortality rates.

Part 5. Summary and Conclusions

Selecting from the National Package of Essential Health Interventions. This health profile from a typical rural coastal district in Tanzania demonstrates the importance of investing in a core group of Minimum Essential Health Interventions and encouraging service uptake, especially for the poor. For such rural districts, these include:

- **IMCI** (Integrated Management of Childhood Illnesses) and neonatal interventions for under fives;
- **Malaria Case Management** (using ACT in the new National Guidelines;
- **IPTp** (Intermittent Preventive Therapy) for malaria control in pregnancy;
- **ITNs** (Insecticide Treated Nets) for malaria prevention for all, especially children and mothers;
- **IRS** (Indoor residual spraying, where appropriate in highly seasonal transmission settings);
- **ART, PMTCT and other HIV/AIDS and STI Control** (Antiretroviral Therapy; Prevention of Mother-to-Child Transmission of HIV; Voluntary testing and Counseling; Sexually Transmitted Infection Syndromic Management; condom promotion, strengthening Blood Transfusion Services, School Health Education and Youth; Interventions for in-school and out-of-school youths, Sex Worker Interventions, etc.);
- **SMI** (Safe Motherhood Initiative including ante and postnatal care, IPT as above, delivery care, family planning, etc.)
- **EDP** (Essential Drugs Program) kits or Indent;
- **EPI Plus** (Expanded Program on Immunization with Vitamin A Supplementation);
- **TB DOTS** (Tuberculosis Directly Observed Therapy)
- **Injury Care** (Rule of Rescue, School Health Programs, etc.)

Disease elimination programs are also highly cost-effective, even though the remaining burden of disease may be too small to appear significant in a burden of disease approach. Where there are national programs for disease elimination (e.g. **lymphatic filariasis, onchocerciasis, polio, trachoma**, **iodine deficiency disorder,** etc) available in the district, these should also be considered as essential health interventions and deserve high priority, along with the interventions listed above.

It must be stressed that the burden of disease reflected in this profile is the burden remaining in the face of the current health system and interventions at their current levels of coverage. Where coverage of preventive interventions is high (such as with EPI) the remaining burden is low. Such interventions must be maintained at high coverage. Where other intervention coverages are low, such as interventions for HIV/TB, the remaining burden is still high. This illustrates the importance of using any new funding (e.g. Council Health Basket Grants) for such purposes, rather than redirecting funding from previously successful preventive interventions.

Potential Gains. Collectively, these essential interventions will address about 93% of the total burden of disease of the population. If coverage of these nine strategies can approach 80% of those at risk, substantial reductions in the burden of disease can be expected. Conversely, investing in interventions that do not address these conditions, or investing in less cost-effective interventions that target these high-burden conditions, will have only marginal impact on the overall burden of disease and will dilute and distract human and fiscal resources from more cost-effective interventions. In most cases, this will also divert resources away from the interventions that primarily benefit the poor and neediest and towards those that primarily benefit the relatively better-off members of the community. In other words, such investment decisions will usually be inequitable as well as inefficient.

Recent Trends. In Rufiji District, coverage of EPI and IMCI is high, while coverage of ITNs is moderate but increasing. Health services are improving due to judicious use of health basket funding. Mortality in children is falling. Between 1999 and 2005 there was a 34% reduction in all-cause under-five mortality and a 43% reduction in infant mortality. Coverage of interventions for adults is unknown and is probably low for ART, PMTCT, STI Syndromic Management and TB DOTS. The burden of disease from HIV and TB is increasing. This has retarded some of the health gains; nevertheless, the net effect of improved services is that adult mortality has declined 10% over the past six years. The overall burden of disease for the whole population has declined by about 29% (from 333 YLLs per 1000 person years observed in 1999 to 238 YLLs per 1000 person years observed in 2005). As a consequence, life expectancy is increasing (53.0 years in 1999; 61.8 years in 2005). It should be noted that although child mortality is declining, it is still unacceptably high and is 20 times higher than maternal mortality, even though maternal mortality is also unacceptably high. It is increasingly likely that the decline in mortality is due to health system interventions although it may also be due to the variation in mortality risks moderated by climate, food security, or other socio-economic determinants. These figures will be compared with other DSS sites, and will be followed annually over time to build up a stronger picture of trends. The above observations point to the growing importance of including estimates of intervention coverage in the HMIS data set. Such information should prove an invaluable addition to burden of disease information in guiding the investment efforts necessary to extend the reach and access of essential health interventions to those in greatest need.

Part 6: Links for Further Information

For further information on this District Health Profile, contact:
IFAKARA HEALTH RESEARCH AND DEVELOPMENT CENTRE (IHRDC)
Box 78373
Dar es Salaam, Tanzania
Tel: +255 22 277 1714
Eml: hmasanja@ihrdc.or.tz
Attn: Dr. Honorati Masanja

For further information on the use of DSS mortality data for other districts in the National Sentinel Surveillance System (NSS), contact:
HEALTH MANAGEMENT INFORMATION SYSTEM
Department of Policy and Planning
Ministry of Health and Social Welfare
Box 9083
Dar es Salaam, Tanzania
Tel: +255 22 216 0261

For further information on the Rufiji Demographic Surveillance System regarding characteristics of the population monitored, the methods used, and the basic outputs see:
Mwageni, E., Momburi, D., Juma, Z., Irema, M., and Masanja, H. et.al. (2002). **The Rufiji Demographic Surveillance System.** In*: INDEPTH Monograph Series: Population and Health in Developing Countries, Volume 1: Population, Health and Survival at INDEPTH Sites*. International Development Research Centre, Ottawa, Canada.

Or contact:
RUFIJI DEMOGRAPHIC SURVEILLANCE SYSTEM
Station Manager
Box 40
Ikwiriri, Rufiji District, Tanzania
Tel: +255 023 999 (ask for 31)
Eml: hmasanja@ihrdc.or.tz
Attn: Dr. Honorati Masanja

End Notes:

[1] Since premature mortality represents about 78% of the expected burden of disease in Tanzania as estimated by the WHO Global Burden of Disease estimates of Tanzania's Disability Adjusted Life Year (DALY), the District Health Profile uses the mortality portion of the DALY (future years of life lost due to mortality or YLLs) as a proxy measure of the distribution of the burden of disease. All graphics showing the shares of the burden of disease are based on YLLs. These YLLs use standard DALY age weighting and discounting (3%). Cause specific mortality and associated YLLs are generated through longitudinal demographic surveillance in Rufiji District using the HRS Household Registration System and the NSS/AMMP verbal autopsy classification. The graphic on the front cover shows actual YLLs, and modeled YLDs to estimate the total intervention addressable DALYs. YLDs are modeled from the WHO 2002 YLL:YLD ratio for Africa E countries with very high child and very high adult mortality. It shows that adding disability does not change the intervention priorities as determined by YLLs alone.

[2]The next annual Coastal Health Intervention Profile for the year 2007 will be available by June 2006. The Rufiji DSS is a member of the **INDEPTH Network of Demographic Surveillance Systems.** As of March 2004, management of the Rufiji DSS has been transferred by the Ministry of Health and Social Welfare from TEHIP to the Ifakara Health Research and Development Centre.

[3]The Tanzania Essential Health Interventions Project (TEHIP) and Ifakara Health Research and Development Centre (IHRDC) are funded in part by grants from the International Development Research Centre, Canada (IDRC) and work in collaboration with the Tanzania Ministry of Health and Social Welfare. TEHIP and IHRDC gratefully acknowledge the staff of the Rufiji DSS and the verbal autopsy coders for their efforts in producing the data on which this profile is based.

Visit: www.indepth-network.net for the INDEPTH Network
Visit: www.ihrdc.org for the Ifakara Health Research and Development Centre
Visit: www.idrc.ca/tehip for the Tanzania Essential Health Interventions Project
Visit: http://web.idrc.ca/en/ev-64454-201-1-DO_TOPIC.html to view a short video on the Rufiji DSS site.

[4]**Poverty Monitoring.** The Demographic Surveillance Systems in Tanzania can also report all indicators disaggregated by socio-economic status in order to determine both access to health services, and health outcomes of the poorest quintile in comparison to the rest of the population. Such results are specific to the setting in which they are collected and are therefore not included in this profile. Contact IHRDC for specific reports on health inequalities as determined by DSS.