Information about a population's mortality status is a useful indicator of its level of development. For example, life expectancy at birth – along with education and Gross National Income (GNI) indicators -- is used in the computation of the Human Development Index (HDI). In the Philippines, life expectancy at birth in 2010 was about 67 years old for males and 73 years for females, an addition of 9 and 14 years, respectively, compared to figures half a century before. Along with the increase in expectation of life at birth is the increase in the sex differential in life expectancy at birth from 1.5 years in 1960 to 6 years in 2010.

This paper aims to contribute to the understanding of Philippine mortality and add to the growing literature on population dynamics, particularly on mortality trends and changes in the life expectancy over time by sex. Using Arriaga's decomposition method, the paper seeks to answer the questions*: "What is the contribution of the mortality change at each age group to the total change in temporary life expectancy between birth and age 65 from 1960 to 2010? Is the pattern of age-group contribution the same for both males and females over the years?"*

By tracking the specific sectors that stood to gain in the past increases in life expectancy, the findings will be useful in planning future health and health-related programs in the country. In particular, by accurately identifying specific population segments by age and sex that have gained the most, it can better understand possible factors that help explain such improvements. Pinpointing sectors with the least years of life gained can help provide focus for future intervention. At the same time, an assessment between sexes will help ensure comparable gains for both males and females that will ensure the achievement of Sustainable Development Goals (SDGs)' health-related goal of attaining good health and well-being for all. In so doing, we can expect to further improve overall life expectancy in the country.

METHODS

The paper employed the *decomposition method*, a technique that takes apart the components that make up demographic measures. It applied concepts and measures proposed by Arriaga (1982, 1984), mainly the notion of *temporary life expectancy* (TLE, with notation $_{i}e_{x}$) and indices that can be derived from it. TLE is defined as "average number of years that a group of persons at exact age will live from age x to x+i years" (Arriaga, 1984, p. 84). For example, if $_{25}e_{20}$ = 15, i.e., the TLE between ages 20 to 45 is 15, then this means that those who reached their 20th birthday can expect to live 15 more years out of a possible 25 years.

A measure derived from TLE is the *index of annual relative change* (ARC): the "absolute change [in the number of years to be lived between two ages] in relation to the maximum possible change in the number of years to be lived" (Arriaga, 1982, p. 560), annualized to facilitate comparison when the life tables are generated at different intervals. While TLE shows an absolute number of years lived within the interval, ARC shows "the *pace* of the relative gains in longevity over time" (Olshansky & Ault, 1986, p. 366).

Arriaga's method estimates the contribution of the mortality changes in each age group to the total change in life expectancy (and, in this paper, in TLE). He classifies group effects of morality change by age categories on life expectancies into *direct*, *indirect*, and *interaction*:

> The *direct effect* on life expectancy is due to the change in life years within a particular age group as a consequence of the mortality change in that age group… The *indirect effect* consists of the number of life years added to a given life expectancy because the mortality change within (and only within) a specific age group will produce a change in the number of survivors at the end of the age interval… Both previous effects take into account only the mortality change at each age group, independent of the change in other ages. Since mortality changes simultaneously in all ages, a small part of the life expectancy change is due to the fact that the difference in the number of survivors at the end of the age interval (those

> responsible for the indirect effect) will not experience an unchanged mortality. The difference in mortality levels (unchanged and actual) applied to the difference in survivors (at the end of the group age interval) produces the *interaction effect*. (Arriaga, 1984, pp. 87–88)

The sum of the three effects is, therefore, the contribution of each age group to the total change in e_x or ${}_ie_x$.

OTHER APPROACHES TO DECOMPOSITION

Several authors have already compared decomposition methods in demography and have identified what they deem as merits and shortcomings of each. For mortality in particular, apart from Arriaga's, often reviewed are the works of Pollard (1982, 1988), Vaupel (1986), and a report published by the United Nations (1982).

Canudas Romo (2003) traced the origin of these methods to standardization techniques and consolidated the latest formulations available not only for mortality, but also for fertility and population growth. His was a technical analysis of the methodologies developed to explain the change in demographic variables (i.e., life expectancy, total fertility rate, and crude growth rate) over time, with some applications, and a comparison with one formulated by him and Vaupel (2003) which they call "direct vs. compositional decomposition". He shows that Pollard's and Arriaga's methods yield similar results; the Vaupel-Canudas Romo method, while producing the same total contribution by age group, produces different figures for direct and indirect effects.

Similarly, de Castro (2001) finds that Pollard's continuous approach and Arriaga's discrete approach produce the same results. In addition, she suggests that the choice of which among the three methods (referring to Arriaga's, Pollard's, or Vaupel's, as she believes the UN method is limited in its interpretative ability) to use should depend on the situation. While Vaupel's seems to be most powerful when interpreting results, Arriaga's and Pollard's are more flexible since they can be applied when mortality changes are significant (Vaupel's underestimates younger ages) and when the direction of mortality change is not the same across age groups[1].

APPLICATIONS OF ARRIAGA'S METHOD

Arriaga's methods have been previously used in the Philippine context. One such study (Pagtolun-an, 1986) used his indices of urbanization as well as his method of fertility estimation to derive age-specific fertility rates to propose a method for computing mortality estimates by urban and rural residence, when registered deaths are not tabulated by type of residence. These methods, combined with Brass' growth balance technique, allowed the author to generate 1975 Philippine life tables by urban and rural regions.

Arriaga's decomposition method and the concept of TLE (or "partial life expectancy" as used by some) have been widely utilized and adapted. Olshansky and Ault (1986) used the decomposition of TLEs to illustrate the fourth stage of the Epidemiologic Transition. Their study revealed a shift in in the contribution to the total change in TLE from birth to age 85 in the United States from the younger age groups in the 1900s to the older age groups by 2020. This shift is indicative of the change in the age group at which degenerative diseases kill, therefore delaying the compression of morbidity and increasing life expectancy.

Auger et al. (2014) also preferred Arriaga's among other decomposition methods for its ease of application using traditional life table data. Using Arriaga's method, their study showed that while the difference in life expectancy between Quebec and the rest of Canada is negligible, decomposition by age and by cause of death revealed large differences.

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[1] While Arriaga's and Pollard's methods allow for both positive and negative contributions (e.g., one age group contributes x% to the gains in life expectancy, another age group can contribute an x% reduction in life expectancy), Vaupel's method assumes proportional mortality change across all ages (de Castro, 2001, p. 200).

Another application of his method is a breakdown of age- and cause-specific contributions to life expectancy at age 25 across educational levels among South Korean males and females (Jung-Choi, Khang, Cho, & Yun, 2014) revealed different levels across age groups and causes of deaths and highlighted the need for specific priority areas for health policy and intervention.

Arriaga's measures have the advantage of avoiding the addition of assumptions brought about by unreliable statistics in older ages (since he suggests using TLEs with the old age limit being the age at which data is still reliable) as well as of taking the effect of the limit of the human life span on the changes in life expectancies into consideration (Arriaga, 1984, p. 84). It is on the grounds of data reliability that the upper limit in the computation of TLE for this paper was set at age 65 which has been found to be a reasonable age where mortality data is deemed more or less stable.

DATA

Arriaga's method requires life table data as input, in particular, survivorship (l_x) and person-years lived (T_x). As such, this paper used complete life tables by decade from 1960 to 1990 (Cabigon, 2001) and abridged life tables for 2000 (Cabigon, 2009) and 2010 (Philippine Statistics Authority, n.d.). The 1960 life tables are the earliest published life tables while the 2010 set are the most recent ones available. The life tables for 2000 and 2010 were unabridged using the UNABR procedure in MORTPAK (United Nations Population Division, 2013), which requires q_x values of age groups 0-1 through 80-85 and produces a smoothed set of values for m_x, q_x, l_x, and e_x. The values for the functions d_x, L_x, and T_x were computed following the calculations described by Cabigon (2001, pp. 163–164).

The analysis examines the country's mortality experience in the past 50 years divided into two distinct periods: pre-ICPD (1960-1990) and post-ICPD (1990-2010). The International Conference on Population and Development (ICPD) was a landmark event held in Cairo, Egypt in 1994 that saw a shift in focus for goal-setting related to population. The main output of the Conference is a Programme of Action (PoA) – put together through a consensus by 179 governments – which is still being used today as a set of guiding principles when new frameworks are needed to address demographic changes. The PoA calls for states to go beyond seeing people merely as a product of demographic indicators and using these statistics to measure development. It recommended that demographic indicators be placed within the context of human rights and concern for the environment. Much emphasis was placed on woman empowerment and reproductive health as human right (United Nations Population Fund, 2014). In accordance with the ICPD, the Philippine Population Management Program (PPMP) Directional Plan 1998-2003 re-oriented the country's population policy towards slowing down population growth that underscores a woman's achievement of fertility preferences from one with direct aims for fertility-reduction (Orbeta, Matro, & del Prado, 2002). The Philippine Reproductive Health Program was created in 1998 which had 10 key elements: "(1) family planning; (2) maternal and child health care and nutrition; (3) prevention and management of abortion complications; (4) prevention and treatment of STIs, including RTIs and HIV/AIDS; (5) an Information, Education, and Communication (IEC) component in counseling on sexuality and sexual health; (6) diagnosis and treatment of breast and reproductive tract cancers and other gynecologic conditions; (7) men's reproductive health; (8) adolescent reproductive health; (9) prevention and management of violence against women; and (10) prevention and treatment of infertility." (Asian-Pacific Resource and Research Centre for Women, 2005) Given the significant shift in the health framework resulting from the ICPD, this period was used as a marker to signal a turning point in population policy. It is thus interesting to compare the mortality picture prior to and after the ICPD declaration.

Because life tables are constructed based on population counts from the census and registered deaths, the limitations posed by the quality of data are carried over to this analysis. A recent study by Grande (2015) evaluated the national level of completeness of death registration at 72.9%, with some sub-national estimates at the extremes: a very low 8.3% in the Autonomous Region in Muslim Mindanao (ARMM) and an excessive 105.4% in the National Capital Region (NCR). Further, an assessment of mortality data among World Health Organization (WHO) Member States included the Philippines in the group that has intermediate quality when cause of death information is also considered (Mathers, Fat, Inoue, Rao, & Lopez, 2005); in the same group are 54 other countries including Brunei, Malaysia, and Republic of Korea[2]. While mortality rates applied in the creation of the life tables have already been corrected for under-registration, it is important to keep the country's quality of mortality data in mind as one of this study's controls.

RESULTS

LIFE EXPECTANCY

Results presented in Table 1 show that a Filipino baby girl born in 1960 can expect to live 59 years on the average while her male counterpart can expect to live a year and a half less.

By 2010, these figures registered 72.8 years and 66.8 years, respectively, signifying not only an absolute increase in life expectancy at birth but a widening in the gender gap to six years. In 1960, the gender difference in remaining life is negligible for all ages beyond infancy indicating the more or less comparable mortality picture between the sexes for the said age groups. A perceptible increase in the gender gap of the remaining life was noted thereafter such that by 2010, younger females (15 years and younger) were outliving their males counterpart by 6 years on the average. The gender gap is about five years for those in their 50s and around three years for those 65 years old indicating a declining gender gap with advancing age.

[2] Countries were considered to have medium-quality death registration data when "completeness is 70-90% OR ill-defined codes appear on 10-20% of registrations OR non-ICD codes used although completeness is >90% and ill-defined codes appear on <10% of registrations".

Table 1. Life Expectancy at Selected Exact Ages by Sex: Philippines, 1960-2010

Age	1960	1990	2010
		MALES	
0	57.5	62.1	66.8
5	64.8	64.5	63.9
15	56.4	55.7	54.4
50	26.2	27.6	23.5
65	15.8	18.4	13.1
		FEMALES	
0	59.0	67.9	72.8
5	64.8	69.0	69.9
15	56.4	59.8	60.3
50	26.2	28.1	28.1
65	15.8	16.3	16.1
		DIFFERENCE BY SEX	
0	1.5	5.8	6.0
5	0.0	4.5	6.0
15	0.0	4.2	5.9
50	0.0	0.5	4.5
65	0.0	(2.1)	3.0

Source of life table estimates: Cabigon (2001, 2009) and PSA (n.d.); table structure modified upon the work of Olshansky & Ault (1986, p. 363); negative values in parenthesis

TEMPORARY LIFE EXPECTANCY

As explained earlier, a TLE between two ages is the average number of years a group of people alive at the beginning of that interval can expect to live within that interval. Table 2 demonstrates that the TLE between birth to age 65 for males born in 1960 is 48.69 years as compared to about 50 years for their female counterparts. This means that for this particular year, the males lived 16 years short to attaining the 65 maximum years on the average. The comparative figure for the females is 15 years. This translates to males having achieved 74.9% of expected years within the interval as compared to 76.9% for their female counterparts.

Table 2. Temporary Life Expectancies at Selected Exact Age Intervals by Sex: Philippines, 1960-2010

Age Group	Temporary Life Expectancy			Percent of interval size			*i*
	1960	1990	2010	1960	1990	2010	
				MALES			
Birth to age 65	48.69	51.79	58.27	74.9	79.7	89.6	65
Birth to age 1	0.90	0.95	0.98	89.9	94.9	98.1	1
Ages 1-5	3.83	3.87	3.98	95.8	96.7	99.5	4
Birth to age 5	4.27	4.58	4.87	85.5	91.6	97.4	5
Ages 5-15	9.83	8.90	8.96	98.3	89.0	89.6	10
Ages 15-50	33.42	32.76	33.59	95.5	93.6	96.0	35
Ages 50-65	13.69	13.42	13.50	91.3	89.4	90.0	15
				FEMALES			
Birth to age 65	49.99	56.24	60.28	76.9	86.5	92.7	65
Birth to age 1	0.92	0.95	0.98	91.9	95.4	98.3	1
Ages 1-5	3.83	3.92	3.98	95.8	98.1	99.5	4
Birth to age 5	4.38	4.67	4.88	87.7	93.3	97.6	5
Ages 5-15	8.86	8.93	8.97	88.6	89.3	89.7	10
Ages 15-50	33.42	33.98	34.17	95.5	97.1	97.6	35
Ages 50-65	13.69	14.09	14.16	91.2	93.9	94.4	15

i = interval, width of the age group

The TLE between births to age 65 has steadily increased from over the years such that half a century later, it posted an absolute gain of 9.58 years for the males and 10.29 years for the females. The increases represent an 89.6% increase for the males and 92.7% for females. By 2010, males and females TLE were 6.73 and 4.72 short of attaining the maximum number of years possible.

The data also shows that TLEs across the age structure have almost reached the maximum number of years to be lived within their respective intervals. In 1960, the male TLE from birth to age 1 is 0.90 or almost 90% of the maximum of one year to be lived within the age group. The number for females is slightly higher: 0.92 years, or 91.9% of the interval. This increased consistently and after 50 years, these numbers are up to 98.1% and 98.3% for males and females, respectively.

It is noticeable that in 1960, the TLE between birth to age 5 (${}_{5}e_{0}$) is furthest from the maximum for either sex (4.27 for males and 4.38 for females, out of a maximum of 5 years). Then, in the 50 years that followed, this age group showed the greatest improvement in percent growth towards achieving the maximum number of years to be lived in the interval. By 2010, the ${}_{5}e_{0}$ is 4.87 for males and 4.88 for females – about 97% of the size of the interval.

There is a visible decline in male TLE of age groups 5 years and older, more noticeably so for those ages 5-15 (${}_{10}e_{5}$) and ages 15-50 (${}_{35}e_{15}$), between 1990 and 1960. There was no such decline for females, but the reduction in ${}_{35}e_{15}$ widened the gender gap for this age group. Larger gains in male TLE between 1990 and 2010 for these age groups relative to females served to narrow the gender difference, although female achievement towards the maximum is consistently higher for the TLE from birth to 65 and across age categories within this interval. By 2010, those with the most to gain are males and females within the age 5-15 cohort. This analysis of absolute change in TLE presents the quantum of mortality change. The question of how much mortality has changed over the years has been answered here. However, how fast did this change occur? Arriaga suggests using ARCs in measuring the tempo of change in mortality.

INDEX OF ANNUAL RELATIVE CHANGE

Measurement of the mortality change between two specific ages over time, Arriaga suggests, should be measured relative to the possible maximum change between them. As TLEs are meant to complement existing mortality indicators, Table 3 presents both life expectancy at birth and TLE from birth to age 65 (${}_{65}e_{0}$).

Table 3. Levels and Changes of Life Expectancies at Birth and Temporary Life Expectancies from Birth to Age 65 by Sex for Selected Years: Philippines, 1960-2010

Year	Life Expectancy at Birth			Temporary Life Expectancy from Birth to Age 65		
	Level	Annual Average		Level	Annual Average Years Added	Index of Annual Relative Change
		Years Added	Percent Change			
	MALES					
1960	57.48			48.69		
		0.154	0.27		0.103	0.70
1990	62.09			51.79		
		0.235	0.38		0.324	3.31
2010	66.78			58.27		
	FEMALES					
1960	59.01			49.99		
		0.296	0.50		0.208	1.78
1990	67.89			56.24		
		0.245	0.36		0.202	3.04
2010	72.78			60.28		

Source: Table structure modified upon the work of Arriaga (1984, p. 85)

The table places side by side the commonly used mortality indicator life expectancy at birth and temporary life expectancy from birth to age 65. For both measures and between sexes, there is a consistent increase over the years. In By 2010, these figures registered 72.8 years and 66.8 years, respectively, signifying not only an absolute increase in life expectancy at birth but a widening in the gender gap to six years. In 1960, the gender difference in remaining life is negligible for all ages beyond infancy indicating the more or less comparable mortality picture between the sexes for the said age groups. A perceptible increase in the gender gap of the remaining life was noted thereafter such that by 2010, younger females (15 years and younger) were outliving their males counterpart by 6 years on the average. The gender gap is about five years for those in their 50s and around three years for those 65 years old indicating a declining gender gap with advancing age.

Table 1, the gender gap seen in is more prominent when looking at life expectancy at birth rather than TLEs. For males, the average annual number of years added to the life expectancy is greater in the post-ICPD period than pre-ICPD; the same observation can be applied to females.

It is in the pace of mortality decline where there are some differences. For males, regardless of which mortality measure is used, improvements in mortality were at a faster pace post-ICPD than the years prior: their life expectancy at birth grew 0.38% every year between 1990 and 2010 and their birth to age 65 TLE grew by 3.31% every year when measured using ARC -- which may be interpreted as the “percent change in mortality rates” (Arriaga, 1984, p. 85).

For the females, based on life expectancy at birth, gains in added years of life was faster between 1960 and 1990 (0.50% annual average as compared to 0.36% between 1990 and 2010). Meanwhile, if TLEs are to be used, the speed at which mortality is declining is faster in the period between 1990 and 2010 (3.04% growth annually).

CONTRIBUTION TO CHANGES IN MORTALITY

Table 4 demonstrates the decomposition of the changes in temporary life expectancies between two periods by age and exhibits "*shifts* in the relative importance of different age groups to… gains in TLEs” (Olshansky & Ault, 1986, p. 371) between 1960 and 2010.

The table shows, for each period, the percent contribution of the changes in each age group – direct, indirect, and interaction effects combined – to the total change in ${}_{65}e_0$. For example, males born in 1990 lived 3.10 years longer between birth and age 65 than those born in 1960. This increase can be largely (104.5%) attributed to the decrease in mortality among male infants. In the same period, adult males (ages 15 to 65) experienced an increase in adult mortality, explaining its negative effect on the change in TLE. Instead of pulling TLE up (i.e., adding to the number of years of expected life up to age 65), the rise in mortality for this age group at this time point hindered its growth. This seeming dip in adult mortality continued on for those ages 49 to 65 up to 2010, thereby inhibiting a more rapid increase in ${}_{65}e_0$.

For females, the clear contributors to growth in TLE are the younger age groups (birth to age 5). Secondarily, improvements of health among women in their reproductive ages (15-49) also contributed to the positive change in TLE. This is consistent for both time periods.

Table 4. Contribution of the Mortality Changes in Selected Exact Age Groups to the Total Change in Temporary Life Expectancy from Birth to Age 65: Philippines, 1960-2010

Ages	1960-1990	1960-2010
	MALES	
TLE increase in years	**3.10**	**9.58**
Birth to age 1	104.5	60.2
Ages 1-5	27.2	31.4
Ages 5-14	7.6	7.6
Ages 15-49	(33.1)	2.2
Ages 49-65	(6.1)	(1.4)
All Ages	100.0	100.0
	FEMALES	
TLE increase in years	**6.25**	**10.29**
Birth to age 1	39.9	45.3
Ages 1-5	30.8	31.0
Ages 5-14	9.0	8.2
Ages 15-49	15.2	12.0
Ages 49-65	5.0	3.6
All Ages	100.0	100.0

Source: Figures may not add up to totals due to rounding; table structure modified upon the work of Olshansky & Ault (1986, p. 372)

DISCUSSION AND CONCLUSION

Worldwide estimates (United Nations Department of Economic and Social Affairs Population Division, 2017) approximate the Philippine level of life expectancy at birth for 2010-2015 as intermediate compared to its neighbors. At about 69 years (both sexes combined), the country's levels has yet to reach the same levels as Thailand's (75 years) whose people in 1960-1965 had a life expectancy at birth 3 years shorter than the average Filipino then.

With life expectancy at birth in 2010 at almost 67 years for males and about 73 for females, it is quite expected that TLEs from birth to age 65 would have very little room for further improvement as mortality levels particularly among infants and children below 5 years old have achieved a very high survival rate. Gains in longevity for both sexes in the Philippines since 1960 is largely attributable to the significant improvements in infant and child survival as shown in the maximum gains coming from these age groups.

This increase in years lived between birth to age 5 is congruent with the observed decline in infant and under-five mortality rates as shown by the results of the series of National Demographic and Health Surveys (NDHS). Findings show that infant mortality rates (IMR) declined from 34 deaths per 1,000 live births in the five years preceding the 1993 survey to 21 in the latest 2017 NDHS (Philippine Statistics Authority and ICF, 2018). During the same period, under five mortality declined from 54 deaths per 1,000 live births to 27 deaths per 1,000 live births. Such substantial gains in infant and child survival are evident in the achievement of the country's IMR and under five mortality MDG targets (National Economic and Development Authority & United Nations Development Programme, 2014; Philippine Statistics Authority, 2015). The momentum in infant and child health is expected to continue with the Philippines poised to achieve its set SDG 3 target of reducing "under-5 mortality to at least as low as 25 per 1,000 live births" (Philippine Statistics Authority, 2018).

Mortality decline was quicker post-ICPD compared to three decades prior, as evidenced by ARC estimates. This can be explained mainly by the great strides achieved in the infant and child health. The older ages groups have very minimal contributions to the changes in TLE over the last two decades. This despite effort to improve on health of these population sectors. In his statement to The Hague Forum reporting on the Philippines' implementation of ICPD's PoA 5 years after its launch, then Secretary of Socioeconomic Planning Felipe Medalla (1999) outlined how the PoA's commitments were integrated into the country's Medium Term Development Plan. He mentioned the "focus on gender equity, equality and women empowerment… reflected in the Philippine Plan for Gender-Responsive Development." (Medalla, 1999, p. 3) Additionally, programs related to women's health, reproductive health, family health care packages, gender and development (GAD) activities, as well as prevention of violence against women were initiatives prioritized in response to the ICPD. Despite this, compared to the other countries in the region, Philippine maternal mortality (as well as neonatal mortality) started off with rapid declines but faltered in the recent years. Further reductions in maternal mortality will be benefitted by "improving access to services through more equitable financing schemes" (Acuin et al., 2011, p. 523). Clearly, the programs set have yet to be translated in terms of significant mortality improvements among young people, adults and older populations.

Bringing down mortality rates among adults will have to be three-pronged as both communicable and non-communicable diseases continue to be major causes of death and illnesses such as accidents and mental illnesses which are brought about by urbanization and development are also on the rise (Ortiz & Abrigo, 2017). The Philippine Health Agenda for 2016 to 2022 has been set (Department of Health, 2017), with a framework that was built around the recognition of the triple burden of disease and which guarantees universal health insurance with a network of service providers that will ensure services for both well and the sick from womb to tomb. Diseases on the administration's radar includes communicable diseases such as HIV/AIDS, tuberculosis, malaria, and cancer, non-communicable diseases such as diabetes, and heart disease, and diseases of rapid urbanization such as injuries and mental illness.

IMPLICATIONS

The tremendous life gains in the youngest population sector (from birth to age 5) in the past 50 years means that we cannot expect further gains from this sector in the future. Future advances in life expectancy will emanate from the older ages (>5 years old) who have yet to attain the full potential of their expected life years.

Indeed, looking at the absolute number of years lived within an age group, the adults have more room to improve, and between sexes, males have more years to fill-in than females.

Because of the large strides already made by the younger cohorts and the little room that the older cohorts also have to improve, the focus should now shift to the adults and those in advanced ages.

Health programs should sustain the gains in the infants and children and at the same time target the main causes of mortality among those in the older ages particularly males. Improvements in adult health and maternal health for example will contribute to increases in life expectancy to ensure people living beyond productive ages.

FUTURE DIRECTIONS

This paper has demonstrated the use of Arriaga's method in decomposing mortality declines in a specific geographic area across time. The conclusions are general to the population and offers little in the way of certainty as to which disease is hindering the decline in mortality at each age segment. This is a matter to be resolved by those interested in conducting a decomposition by cause of death, that is, finding out the contribution of each cause of death to the total change in TLE across time (for guidance, refer to: Arriaga, 1984; Jung-Choi et al., 2014). Certainly, this is hinged upon the availability of life tables for the same and improvement of death registration data by cause of death. There are other applications of the method that investigate other confounding elements of mortality and all depend on the availability of life tables by these elements or indirect approaches to generating said life tables. Interested researchers may want to pursue differentials by region, type of residence (urban/rural), or socio-economic status, and other factors that have acknowledged health inequities existing within them. Understanding mortality conditions by sub-populations will allow policymakers to plan the efficient use of limited resources and make pointed decisions to map out priorities.

Finally, the policy implications discussed above aside, it is important to note that this paper was limited to analyzing TLE up to age 65 only because of data reliability issues. The continuous assessment of the completeness and reliability of death registration data – in fact, all vital registration activities – should not be overlooked as essential parts of the research process if the collective goal is to find out the most about the country's health status so that policy makers can better respond to them.

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