URBANIZATION VERSUS SANITATION: EXPLORING THE EFFECTIVENESS OF SOCIAL INDICATORS ON REDUCING THE INFANT MORTALITY RATE IN DEVELOPING COUNTRIES

by

LESLIE M. ANDRINGA

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Abstract

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Leslie M. Andringa

The University of Texas at Arlington, 2015

Supervising Professor: Vijanyan K. Pillai

Despite numerous health gains around the globe, reducing infant mortality continues to be a central Millennium Development Goal. Low- and middle-income countries continue to transition epidemiologically, prompting international investments and a transferring of ideas, technology, and influences into developing nations' systems. In this systematic way, along with capital and social aid, the translation of knowledge and values are passed. As globalization persists in an ever-changing world, and urbanization efforts receive more assistance funding than sanitation improvements, this paper aims to explore which is the most effective approach for reducing the infant mortality rate (IMR) in developing countries. Indicators from a sample of 139 developing countries were assessed with data for all variables from the *2012 World Data Bank*. An adjusted R-square model was used in a pairwise deletion multiple regression. Findings indicate that improved sanitation ($R^2 = 0.001$, $p = < 0.05$) and GNI ($R^2 = 0.000$, $p < 0.05$) are significant in reducing the IMR, while the total fertility rate ($R^2 = 0.000$, $p < 0.05$) and health expenditure ($R^2 = 0.830$, $p < 0.05$) actually increase the IMR, and surprisingly no dramatic relationship is observed between IMR and percentage of urban population ($R^2 =$

0.444, $p < 0.05$). These results suggest that sanitation initiatives, policies regarding reducing fertility, and economic interests should actually be the priorities concerning IMR reduction instead of urbanization and education. Although IMR is decreasing worldwide, addressing the correct indicators in developing countries receiving aid and influence is imperative to effectively eliminate avoidable infant mortality.

Keywords: Infant mortality rate, urbanization, developing nations, sanitation, GNP, total fertility rate, female labor force, health expenditure, water

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Chapter 1

Introduction

Despite numerous health gains around the globe, reducing child and infant mortality continues to challenge nations, as evident by the goals set forth by the Millennium Development Goals (MDGs), which were designed to purposefully focus awareness on health and social justice issues while collaboratively measuring global progress on these goals (Botting et al., 2010; Brinda, Rajkumar, &Enemark, 2015; Cheng, Schuster-Wallace, Watt, Newbold & Mente, 2012; Guillot, Gerland, Pelletier, & Saabneh, 2012; Jorgenson, Rice, Clark, 2012; Sartorius, B. & Sartorius, K., 2014; Schell, Reilly, Rosling, Peterson & Ekström, 2007; Wang, 2013). Established in 2000 following the Millennium Summit of the United Nations, all 189 countries committed to the eight MDGs proposed, including goal 4: to reduce child mortality, or more specifically, target 4A: to reduce the under-five (year old) child mortality rate by two-thirds between 1990 and 2015, which also includes the indicator 4-2 of infant mortality rate (United Nations, 2015). Although valuable global action advances have accelerated the progress towards achieving the MDGs, many developing countries still remain in need of further initiatives (Botting et al., 2010; Cheng et al., 2012; Guillot et al., 2012; Sartorius, B. & Sartorius, K., 2014; Schell et al., 2007; Wang, 2013).

Indeed, low- and middle-income countries continue to transition epidemiologically, prompting international investments and a transferring of ideas, technology, and influences into developing nations' systems (Botting et al., 2010; Dao, 2013; Jorgenson et al., 2012; Guillot et al., 2012; Lipton, 1977, 2005; Omran, 2005; Wang, 2013; Williams, Embleton, Bythell, Ward Platt & Berrington, 2013;). As developing countries continue to struggle with making desirable gains on a number of determinants of population health, aiding countries offer assistance that comes with contingencies and

conditions (Pamuk, Fuchs, & Lutz, 2011; Williams et al., 2013). This offer of assistance, along with capital and social aid, permit the diffusion of both knowledge and values necessary for improving population health (Dao, 2013; Omran, 2005; Wang, 2013). While distal, intermediate, and proximate determinants influence population health, the outside impact of modern ideas, technology, and values also cause societal transformations, changing the basic structures, norms, and systems within those countries (Caldwell, 2001; Omran, 2005; Radu et al., 2010; Schell et al., 2007; Williams et al., 2013). As globalization persists in an ever-changing world, and urbanization efforts are far more supported than sanitation improvements (Cheng et al., 2012; Schell et al., 2007), this paper aims to explore which is the most effective approach for reducing the infant mortality rate (IMR) in developing countries.

Chapter 2

Literature Review

Extrapolating from social epidemiology as a basis for a meta-theoretical framework (Caldwell, 2001; Jorgensen et al., 2012; Lipton, 1977, 2005; Omran, 2005), persistently high infant mortality rates in developing countries are not merely the result of individual risk factors as some might suggest, but rather are the cumulative effect of unequal direct and indirect social constructs centuries in the making (Cheng et al., 2012; Jorgenson et al., 2014; Pamuk et al., 2011; Sartorius, B. & Sartorius, K., 2014; Schell et al., 2007; Williams et al., 2013). As systems and epidemiological theory contend, both the "biophysical and built environments have cognitive, behavioral and physiological impacts discernable at the individual and population levels" (Jorgenson et al., 2012, p. 3498), in which inequalities are routinely enacted and felt. Indeed, researchers have "examined the interaction between children and their environments…highlighting the effects of socially toxic environments" and determined that there is a strong correlation between harmful childhood atmospheres (such as abuse or neglect, dysfunctional households, exposure to maternal violence, etc.) termed Adverse Childhood Experiences (ACEs) and later health consequences (Rosenbaum & Blum, 2015, p. 16–17). In fact, many adult diseases likely have origins in infancy or pregnancy, with individuals experiencing ACEs approximately "two to four times" at risk for subsequent problems than those "who did not have such adverse experiences" that persist into adulthood (Rosenbaum & Blum, 2015, p. 16–17).

Despite being a relatively known high risk factor for infant and child mortality, unsafe and unhealthy environments persist at a global-regional level, especially among developing countries. In efforts to reduce disease, malnutrition, overcrowding and lack of access to institutions and health care, international investments continue to cater to

urbanization energies, believing that sanitation needs have essentially tapered off and accordingly focusing on increasing globalization efforts, putting a premium on education, technology, trade openness and economic development (Botting et al., 2010; Dao, 2013; Jorgenson et al., 2014; Pamuk et al., 2011; Wang, 2013). With these advances, researchers and world leaders hope to see modernization and societal changes begin to have larger effects on the developing countries, changing not only individual thinking patterns, but basic cultural structures within the nations' systems as a whole (values, norms, family structures, policies, etc.).

This study explores the effectiveness of urbanization on the infant mortality rate (IMR), the effectiveness of improved sanitation on IMR, and whether the effect of urbanization is greater than the level of sanitation on reducing IMR in developing countries and the implications of those results for international and national policies.

Chapter 3

Method & Data

3.1 Measurements

Country-level data were collected for 139 countries from several different sources as compiled and represented on the World Bank website (Appendix A). At the time of this study, 2012 was the most complete dataset available for all indicators. Missing 2012 data were imputed using 2011 values in an attempt to reduce the number of missing cases. (Table 3-1). Using countries designated as low- to middle-income as units of observation, estimates of infant mortality rate (IMR: the number of infant deaths before age one per 1,000 live births) was chosen as the key dependent variable and percentage of total population living in urban areas (urbanization/urban) and percentage of total population with improved sanitation (sanitation) were the two main independent variables in the analyses.

Infant and child deaths are associated with a range of hierarchical determinants, dependent on the progress of the epidemiological pattern within the developing nation (Guillot et al., 2012; Radu, Molnar, Mîrza, & Ţigan, 2010; Rosenbaum & Blum, 2015; Schell et al., 2007; Wang, 2013; Williams et al., 2013). For the purpose of this study, other covariates included in the analyses are: GNI per capita (GNI: formerly the GNP is the gross national income converted into U.S. dollars using the World Bank Atlas method, divided by the midyear population), total fertility rate (TFR: the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with current age-specific fertility rates), percentage of female labor force participation (%FLP: the proportion of the population ages 15 and older that is economically active), health expenditure (the sum of public and private health

expenditures, including preventative and curative services), and percentage of population with access to improved water sources (water access: percentage of population using an improved drinking water source includes piped water on premises and other improved sources).

3.2 Data

Indicators from an initial sample of 139 developing countries were assessed with data for all variables from the *2011* and *2012 World Data Bank*. Utilizing IBM SPSS Statistics software, an adjusted R-square model was used in a pairwise deletion multiple regression. (In this regard, American Samoa and Kosovo were both dropped during the analyses due to pairwise deletion, as they were missing both independent and dependent variable values, leaving the final sample at 137 countries.)

Table 3-1 No. of data points per variable imputed with 2011 data for 2012 missing values

Variable name	# imputed	# still missing values
IMR	0	2*
Urban	1	0
Sanitation	3	8
GNI	2	8
TFR	1	5
%FLP	1	10
Health expenditure	1	5
Water access	3	4

*dropped from analyses due to pairwise deletion

Indicators were initially studied using descriptive statistics as represented by Table 3-2. The dependent variable IMR values ranged from 4 (in Belarus) to 110 (in Sierra Leone) per 1,000 births, with a median score of 27 (in Morocco & Guatemala) per 1,000 births. The mean rate of infant mortality of 139 countries was 34 per 1,000 live births (SD = 24), with countries most often having an infant mortality rate of 13 per 1,000 births (Brazil, Georgia, Libya, Mauritius, Mexico, St. Lucia, and Venezuela). Additionally, the independent variable urbanization values ranged from 11% (in Burundi) to 91%

(Argentina) per population, with a median score of 49% (Liberia and St. Vincent & the Grenadines) per population. For the 139 developing countries studied, the mean of urbanization was 49% per population (SD = 20.02), with low- to middle-income countries most often having a percentage of 63% urbanization per population (Armenia, Cabo Verde, Ecuador, Montenegro, Sao Tome & Principe, and South Africa). Finally, the independent variable percentage of population with improved sanitation values ranged from 9% improved sanitation (in Niger and South Sudan) to 100% (in Bulgaria, Hungary, Palau, and Uzbekistan) per population, with a median score of 65% (in Lao and St. Lucia) per population. The mean rate of improved sanitation of 139 countries was 62% per population (SD = 29.67), with developing countries most often having a 91% rate of improved sanitation per population (Albania, Armenia, Belize, Macedonia, Mauritius, Tonga, and Turkey).

Table 3-2 Descriptive Statistics

	IMR	Urban	Sanit.	GNI	TFR	% FLP	Health exp.	Water access
Median	27	49	65	3,100	2.9	53	6.1	83
Mean	34	49	62	3,816	3.3	53	6.5	77
Mode	13	63	91	880	2.4	56	6.4	99
Min	4	11	9	240	1.3	13	1.8	29
Max	110	91	100	12,830	7.6	88	15.6	100
Std. dev.	23.95	20.02	29.67	3,151.47	1.46	18.23	2.67	20.27

3.3 Findings

The adjusted model fit is good, as illustrated by Table 3-3; with 54% variance, IMR is explained by variables encoded in this model. This means the model is intuitively reasonable and, thus, the outcomes are relatively easy to convey to others (Nau, 2015).

Table 3-3 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.748[a]	0.560	0.536	16.631

a. Predictors: (Constant), water access, %FLP, hlthexp, urban, GNI, sanitation

Findings indicate that statistically significant relationships are observed, with improved sanitation (R^2 = 0.001, p = < 0.05) and GNI per capita (R^2 = 0.000, p < 0.05) significantly correlated in reducing the IMR, while the total fertility rate (R^2 = .000, p < .05) and health expenditure (R^2 = 0.830, p < .05) actually increase the IMR. Surprisingly, no significant relationship can be supported between IMR and percentage of urban population (R^2 = 0.444, p < 0.05). Although both participation of females in the labor force (R^2 = 0.033) and improved water access (R^2 = -0.117) decrease IMR, it cannot be concluded that significant correlation exists based on the empirical support of this study.

Table 3-4 Association between IMR and independent variables

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	54.261	7.402		7.331	0.000
	Urban	-0.070	0.091	-0.058	-0.768	0.444
	Sanitation	-0.204	0.059	-0.279	-3.433	0.001
	GNI	-0.002	0.001	-0.289	-3.986	0.000
	TFR	2.777	0.668	0.309	4.161	0.000
	%FLP	-0.033	0.070	-0.032	-0.468	0.640
	Hlthexp	0.830	0.379	0.133	2.192	0.030
	water access	-0.117	0.072	-0.127	-1.628	0.106

a. Dependent Variable: IMR

Chapter 4

Discussion

4.1 Analyses of the Results

Upon analyses of the results, sanitation substantially reduces infant mortality rates (IMR) and is more strongly correlated as an effective measure than urbanization. Therefore considerations for international investments and influence should prioritize overcoming cultural bias in developing countries regarding sanitation methods and hygiene techniques, especially those pertaining to health and child care. Urbanization failed to contribute to a significant reduction in IMR. This is perhaps due to the rise of urban slums, an essentially unnoticed trend by researchers, which reflects the "deteriorating living conditions of many urban settlements" often referred to as the "urban penalty" (Jorgenson et al., 2015, p. 3496).

Additionally, the most statistically attributable factor overall was the total fertility rate (Table 3-4). Consequently, policies, programs, and community awareness regarding population control and reducing fertility and gender inequality should be of utmost concern (Schell et al., 2007). However, due to culturally ingrained stereotypes, religions, patriarchal societal and media-endorsed systems, curative versus preventative health systems, and other man-made barriers, increasing feminism and creating a new mindset will be difficult in countries rife with traditional social practices and consequences (Brinda et al., 2015; Wang, 2013). Nonetheless, targeting negative social constructs that reinforce and sanctify long-held gender inequality beliefs such as son preference, dowries, daughter aversion, and the Mathew effect, which have all been shown to contribute to high female perinatal as well as infant mortality rates along with adverse psychosocial effects for those that survive, is an imperative step to reducing infant mortality (Brinda et al., 2015). This must be done in both urban and rural areas,

highlighting cultural, community and client-based goals with shared motives of the engaged communities, especially those pertaining to the survival and well-being of infants and children.

Finally, policies aimed at strengthening developing nations' economies to the point of independence from international aid are imperative to IMR reduction. Moreover, a country that grows in such a way that it supports economic equality has been shown to further support reducing the IMR (Brinda et al., 2015; Pamuk et al., 2011; Rosenbaum & Blum, 2015; Wang, 2013). Allowing women leverage over household finances provides them the opportunity to guide not only their own economic decisions, but also those regarding their children's nutrition, education, health care, and other long-reaching outcomes (Brinda et al., 2015). In fact, the necessity for out-of-pocket health expenditures "connects to economic inequality, gender inequality, and the inequities in the delivery of health care to poor women" in developing countries (Brinda et al., 2015, p. 5; Jorgenson et al., 2012; Rosenbaum & Blum, 2015; Wang, 2013), accounting for the rise in the IMR correlated with the increase in health expenditures demonstrated in this analyses. For that reason, a healthy economy that can minimize personal health expenditures and improve health services to include preventative care (versus curative medical interventions alone) will further safeguard the survival of infants and children.

Thus, taken together, it is evident that in direct and indirect ways the social constructs in which the infant lives and grows are prominent factors for the child's overall health and well-being. Employing policies that reduce fertility, promote economic growth, and improve sanitation efforts are needed to reduce the infant mortality rate effectively. In this manner, avoidable infant deaths can be averted.

4.2 Limitations of the Study

This study has certain limitations including but not restricted to causal associations (which can only be speculated), missing data values, and the challenges within the conceptualization and operational standards of indicators (Botting et al., 2010; Brinda et al., 2015; Guillot et al., 2012; Wang, 2013; Sartorius, B. & Sartorius, K., 2014). Survey data from 2012 was chosen for this study as it was the most recent and most complete data available, with 2011 values imputed when possible for missing values, but several variables were still missing values (as illustrated by Table 3-1). As the data for this study was compiled by internationally recognized organizations, the quality of global data depends on how well individual national systems perform and studies suggest that underestimation of IMR occurs in areas with known higher IMR risk and poorer data quality (Sartorius, B. & Sartorius, K., 2014). Thus, having corrected, updated and complete data that also takes into account spatial inference to "identify significant clustering of IMR and associated determinants" would better inform researchers, interventions, and policy initiatives (Sartorius, B. & Sartorius, K, 2014, p. 11).

Additionally, conceptual ambiguity may occur when relating to the social indicators (Botting et al., 2010; Brinda et al., 2015; Guillot et al., 2012; Pamuk et al., 2011; Wang, 2013). For example, the popularly used indicator of percentage of female participation in the labor force may not be contextually applied the same in each country (Wang, 2013). While an increase in this indicator may correlate to an increase in urbanization and gender equality in one developing country, in another it could reduce opportunities for women lacking higher education and maintain patriarchal ideology (Brinda et al., 2015; Wang, 2013). Furthermore, the IMR indicator includes model age patterns below age one and at age one, which may reflect different epidemiological patterns not addressed in current model life tables (Guillot et al., 2012). Therefore,

caution must be used when attempting to conceptualize variables in cross-country research and evaluating their relationships within social model constructs, allowing for correlations but never complete causality.

4.3 Future Research

A plethora of future research topics became apparent through the course of this study. For example, considerable research and evaluation is needed in order to understand how to effectively implement the international and domestic policies impacting infant mortality mentioned in this study, specifically those relating to population control/reducing fertility, enabling gender inequality, promoting economic sustainability and economic equality, and increasing improved sanitation efforts worldwide despite ingrained cultural traditions. In this regard, studies pertaining to environmental determinants (correlating to ACEs, a deeper understanding of the intricacies and impacts of urban slums, etc.); agricultural determinates that indicate migration of population to urban areas, access to health care and other institutions, and/or relating to the health of the livestock and population (antibiotic use in livestock has been linked to antibiotic resistance and disease in humans [Doucleff, 2015]); indicators of what constitutes and sustains a healthy workforce; and comparative analyses of countries that have experienced similar issues and the methods and interventions that have been effective in producing positive social change, are in order. For example, while the tragedy of the 1994 Rwanda genocide is relatively well-known, the country's path towards unity, reconciliation, and gender equality has largely been debated. Although a few scholars have argued that the gains have been significant through the initiatives and efforts of government and non-government organizations (Pells, 2009; Skafte & Silberschmidt, 2014), other researchers contest this claim (Clark, 2010; Gerver, 2013; Hitchcott, 2013; Waldorf, 2009). Therefore a deeper look into countries like Rwanda and the policies,

interventions, and initiatives that have promoted success could provide invaluable guidance for future programs, developments, and efforts. Finally, continued evaluations into the unmet goals and thus still necessary interventions to achieve the Millennium Development Goals are required in order to truly reduce the infant mortality rate and bring about global social justice.

Chapter 5

Conclusion

This study indicates interesting and statistically significant relationships between the percentage of populations with improved sanitation and the total GNI per capita in reducing the infant mortality rate. Additional findings demonstrate that as the total fertility rate of a nation and the overall health expenditure increase so does the infant mortality rate. With this knowledge, foreign and domestic policies and aid should focus on reducing fertility rates, increasing economic growth, and improving sanitation and hygiene efforts. This will more effectively progress developing countries towards achievement of the Millennium Development Goals and reduce avoidable infant deaths.

Appendix A

Data list of developing countries' variables' values for 2012 (shaded cells are missing or imputed 2011 values)

Country Name	Code	IMR	urban	sanitation	GNI	TFR	%FLP	Health expenditure	Water access
Afghanistan	1	72	25	29	690	5.1	16	8.6	56
Albania	2	14	54	91	4,530	1.8	45	6	94
Algeria	3	22	69	95	5,010	2.8	15	5.2	80
American Samoa	4	n/d	87	63	n/d	n/d	n/d	n/d	100
Angola	6	104	42	60	4,520	6	63	3.5	34
Argentina	8	12	91	97	n/d	2.2	47	8.5	95
Armenia	9	15	63	91	3,700	1.7	54	4.5	100
Azerbaijan	13	31	54	82	6,290	2	63	5.4	71
Bangladesh	16	35	32	57	950	2.2	57	3.6	84
Belarus	18	4	75	94	6,400	1.6	50	5	99
Belize	20	15	44	91	4,420	2.7	49	5.8	100
Benin	21	58	43	14	750	4.9	68	4.5	69
Bhutan	23	31	36	47	2,320	2.3	66	3.8	97
Bolivia	24	32	67	46	2,220	3.3	64	5.8	72
Bosnia and Herzegovina	25	6	39	95	4,600	1.3	34	9.9	100
Botswana	26	37	57	64	7,710	2.7	72	5.3	93
Brazil	27	13	85	81	11,640	1.8	60	9.3	85
Bulgaria	29	11	73	100	7,070	1.5	48	7.4	99
Burkina Faso	30	66	27	19	670	5.7	77	6.2	76
Burundi	31	57	11	48	240	6.1	83	8.1	73
Cabo Verde	32	22	63	65	3,530	2.3	51	3.9	86
Cambodia	33	34	20	37	880	2.9	79	5.4	66
Cameroon	34	62	53	45	1,220	4.9	64	5.1	52

Central African Republic	37	98	39	22	490	4.5	73	3.8	54
Chad	38	90	22	12	1,000	6.4	64	2.8	45
China	40	12	52	65	5,730	1.7	64	5.4	85
Colombia	41	15	76	80	7,020	2.3	56	6.8	74
Comoros	42	59	28	n/d	820	4.8	35	4.5	97
Congo, Dem. Rep.	43	88	41	31	400	6	71	5.6	29
Congo, Rep.	44	37	64	15	2,480	5	68	3.2	39
Costa Rica	45	9	74	94	8,850	1.8	46	10.1	91
Cote d'Ivoire	46	73	52	22	1,340	4.9	52	7.1	68
Cuba	48	5	77	93	5,890	1.5	43	8.6	87
Djibouti	53	59	77	61	n/d	3.5	36	8.8	66
Dominica	54	11	69	n/d	6,820	n/d	n/d	5.9	n/d
Dominican Republic	55	24	76	82	5,570	2.5	51	5.4	77
Ecuador	56	20	63	83	5,360	2.6	54	6.4	75
Egypt, Arab Rep.	57	19	43	96	2,980	2.8	24	5	99
El Salvador	58	14	65	71	3,600	2.2	48	6.7	81
Eritrea	60	37	21	n/d	450	4.8	80	2.6	n/d
Ethiopia	62	46	18	24	420	4.6	78	3.8	42
Fiji	64	20	53	87	4,020	2.6	38	4	92
Gabon	68	40	86	41	10,020	4.1	56	3.5	63
Gambia, The	69	50	58	60	520	5.8	72	5	84
Georgia	70	13	53	93	3,290	1.8	56	9.2	97
Ghana	72	53	52	14	1,580	3.9	67	5.2	81
Grenada	75	11	36	98	7,160	2.2	47	6.4	95
Guatemala	77	27	50	80	3,130	3.8	49	6.7	89

Guinea	78	67	36	19	440	5	66	6.3	65
Guinea-Bissau	79	80	47	20	590	5	68	5.9	56
Guyana	80	31	28	84	3,440	2.6	42	6.6	98
Haiti	81	56	55	24	760	3.2	61	6.4	48
Honduras	82	20	53	80	2,140	3.1	43	8.6	82
Hungary	84	5	70	100	12,830	1.3	45	7.8	100
India	86	43	32	36	1,550	2.5	27	4	91
Indonesia	87	25	51	59	3,420	2.4	51	3	76
Iran, Islamic Rep.	88	15	72	89	6,570	1.9	16	6.7	92
Iraq	89	29	69	85	6,070	4.1	15	3.6	69
Jamaica	94	15	54	80	5,190	2.3	56	5.9	89
Jordan	96	17	83	98	4,660	3.3	15	9.8	91
Kazakhstan	97	16	53	98	9,780	2.6	68	4.2	86
Kenya	98	49	24	30	1,080	4.5	62	4.7	55
Kiribati	99	46	44	40	2,520	3	n/d	10.7	51
Korea, Dem. Rep.	100	23	60	82	n/d	2	72	6.5	97
Kosovo	102	n/d	n/d	n/d	3,770	2.2	n/d	n/d	n/d
Kyrgyz Republic	104	23	35	92	1,040	3.1	56	7.1	82
Lao PDR	105	55	35	65	1,260	3.1	76	2.9	65
Lebanon	107	8	87	n/d	9,520	1.5	23	7.6	100
Lesotho	108	74	26	30	1,480	3.1	59	11.6	77
Liberia	109	56	49	17	370	4.9	58	15.5	63
Libya	110	13	78	97	n/d	2.4	30	3.9	n/d
Macedonia, FYR	115	7	57	91	4,710	1.4	43	7.1	99
Madagascar	116	41	33	14	430	4.5	87	4.1	35

Malawi	117	46	16	10	320	5.5	85	9.2	83
Malaysia	118	7	73	96	9,820	2	44	3.9	99
Maldives	119	9	42	99	5,430	2.3	56	8.5	98
Mali	120	79	38	22	660	6.9	51	5.8	54
Marshall Islands	122	31	72	76	4,000	n/d	n/d	15.6	98
Mauritania	123	68	58	27	1,040	4.7	29	6.4	48
Mauritius	124	13	40	91	8,770	1.4	44	4.8	100
Mexico	125	13	78	85	9,720	2.2	45	6.1	91
Micronesia, Fed. Sts.	126	31	22	57	3,230	3.3	n/d	12.8	87
Moldova	127	14	45	87	2,150	1.5	37	11.7	94
Mongolia	129	27	69	56	3,080	2.4	56	6.3	61
Montenegro	130	5	63	90	6,940	1.7	43	7.6	95
Morocco	131	27	59	75	2,910	2.7	26	6.4	64
Mozambique	132	64	31	21	540	5.3	86	6.4	35
Myanmar	133	41	32	77	n/d	2	75	1.8	81
Namibia	134	36	44	32	5,600	3.1	54	8.3	87
Nepal	135	33	18	37	700	2.4	80	5.5	88
Nicaragua	139	21	58	52	1,690	2.5	47	8.2	68
Niger	140	62	18	9	390	7.6	40	7.2	42
Nigeria	141	77	45	28	2,460	6	48	6.1	49
Pakistan	145	71	37	48	1,250	3.3	24	3.1	89
Palau	146	16	85	100	10,550	n/d	n/d	9.5	86
Panama	147	16	66	73	9,030	2.5	49	7.6	87
Papua New Guinea	148	48	13	19	1,790	3.8	71	5.2	33
Paraguay	149	19	59	80	3,310	2.9	55	10.3	83

Peru	150	14	78	73	5,680	2.4	68	5.1	72
Philippines	151	24	45	74	2,960	3.1	51	4.6	91
Romania	156	11	54	n/d	8,560	1.5	49	5.1	n/d
Rwanda	158	39	26	64	610	4.6	87	10.7	68
Samoa	159	16	20	92	3,800	4.2	23	6.8	99
Sao Tome and Principe	161	38	63	34	1,310	4.1	45	7.9	94
Senegal	163	45	43	52	1,030	5	66	5	60
Serbia	164	6	55	97	5,730	1.3	44	10.5	99
Seychelles	165	12	53	97	11,690	2.4	n/d	4.7	96
Sierra Leone	166	110	39	13	520	4.8	66	15.1	42
Solomon Islands	171	26	21	29	1,490	4.1	53	8	77
Somalia	172	92	38	24	n/d	6.7	37	n/d	9
South Africa	173	34	63	74	7,460	2.4	44	8.8	88
South Sudan	174	66	18	9	840	5	n/d	2.6	55
Sri Lanka	176	9	18	92	2,910	2.3	35	3.1	93
St. Lucia	178	13	18	65	6,920	1.9	63	8.5	93
St. Vincent and the Grenadines	180	18	49	n/d	6,340	2	56	5.2	95
Sudan	181	53	33	24	1,580	4.5	31	7.2	50
Suriname	182	21	66	80	8,920	2.3	40	5.9	88
Swaziland	183	57	21	58	3,100	3.4	44	8.5	69
Syrian Arab Republic	186	12	56	96	n/d	3	13	3.4	87
Tajikistan	187	42	27	94	880	3.8	59	5.8	64
Tanzania	188	38	29	12	570	5.3	88	7	44
Thailand	189	12	47	93	5,250	1.4	64	3.9	95

Timor-Leste	190	48	31	39	3,940	5.3	25	4.3	61
Togo	191	57	38	11	490	4.7	81	8.6	40
Tonga	192	11	23	91	4,220	3.8	54	5.4	99
Tunisia	194	14	66	90	4,170	2.2	25	7	91
Turkey	195	17	72	91	10,810	2.1	29	6.3	99
Turkmenistan	196	48	49	99	5,410	2.4	47	2	54
Tuvalu	198	25	57	83	5,650	n/d	n/d	15.4	97
Uganda	199	45	15	34	480	6	76	8	71
Ukraine	200	9	69	94	3,640	1.5	53	7.6	98
Uzbekistan	205	38	36	100	1,700	2.5	48	5.9	81
Vanuatu	206	15	25	58	3,010	3.4	62	3.6	88
Venezuela, RB	207	13	89	n/d	12,460	2.4	51	4.6	n/d
Vietnam	208	20	32	75	1,560	1.8	73	6.6	94
West Bank and Gaza	210	19	75	94	3,070	4.1	15	n/d	82
Yemen, Rep.	211	42	33	53	1,220	4.2	25	5.5	47
Zambia	212	57	40	43	1,730	5.7	73	6.5	49
Zimbabwe	213	55	33	40	820	3.6	83	n/d	69

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Biographical Information

After over a decade working with children and their families using her Bachelor of Science of Psychology from Texas A&M University, Leslie M. Andringa passionately obtained her Master of Social Work from the University of Texas at Arlington in 2015. Being twice honored with UTA's Outstanding Master's Student award for maintaining a GPA of 3.85 or higher during her academic career, she also furthered her research dealing with child abuse prevention and intervention programs, and gained insights into policy and community outreach. Her internships at two amazing non-profit agencies in the Collin and Dallas counties, along with inspiring courses that challenged students to get into the field and dare to promote and empower effective, client/community-based and empirically-supported change, encouraged immeasurable professional and personal growth.

With a firm belief that social work is best done when utilizing a strengths-based perspective and working collaboratively with clients while simultaneously pursuing policy reform and promoting empirically-informed community outreach efforts, Ms. Andringa has several short- and long-term ideas for the future. Immediate plans involve obtaining her LMSW and certification to practice equine therapy, while long-term plans continue to include advancing her advocacy, research, and outreach efforts regarding the protection of children and domestic violence, inspiring proactive action in others, and working towards ultimate social justice and change.