Creating Statistically Literate Global Citizens: The Use of Integrated Census Microdata in Teaching

Ann Meier

Department of Sociology and Minnesota Population Center

University of Minnesota

Robert McCaa

Department of History and Minnesota Population Center

University of Minnesota

1. Census microdata and the IPUMS-International Project

Census microdata are the individual responses to census questionnaires recorded in computerized form as numeric or alphabetic codes. The data include demographic characteristics such as age, sex, marital status, relationship to head of household, migration, education, and occupation among other individual-level variables. They also include information on household characteristics such as urban/rural living, home ownership, and access to utilities like electricity and water supply, and number of rooms in the household. Over the past half century most of the major statistical agencies have prepared census microdata files for analysis by staff and, in many cases, by external researchers. With ever-expanding access to computers, analysis of large census microdata files is now possible for ordinary researchers, and even students, as this article will later demonstrate.

The idea of gaining access to census microdata from around the world and across time is exciting for researchers, but it is also daunting. The first challenge is gaining access to the data from the country of interest. In the past decade, a policy

revolution of sorts has taken place by statistical authorities to recognize census microdata as statistical products to be disseminated along with conventional publications. A good example is the dissemination policy of the Central Agency for Public Mobilization and Statistics (CAPMAS) of the Arab Republic of Egypt, which in 2006 began to distribute a wide variety of microdata products, such as census microdata and national employment surveys. A second challenge in using census microdata is comparability. To be able to trace trends across time in a country or to compare countries to one another on a particular dimension, files from different years and different countries must first be made compatible. Although this is improving, historically there has been very little coordination between National Statistical Agencies to facilitate comparison. Moreover, even the same statistical agency sometimes asks questions differently in different census years.

The IPUMS-International project is a global initiative in cooperation with national statistical authorities world-wide to anonymize, integrate, and disseminate samples of census microdata to researchers, policy makers, teachers, and their students. As of August 2009, IPUMS has become the largest repository of census microdata in the world with the official statistical authorities of more than 84 countries, encompassing more than four-fifths of the world's population, entrusting a total of 240 censuses to the Minnesota Population Center (Table 1).

<Table 1 here>

IPUMS-International initiatives are undertaken only in countries where authorization is provided by means of a memorandum of understanding signed with the official statistical agency. The memorandum is entirely general in nature, yet it provides

a legal framework for the project to proceed (Appendix A). Official statistical agencies in the Middle East that have not yet affiliated with the project are invited to do so by emailing the second author of this paper.

Many statistical agencies cooperate in the project for several reasons. First, there is little commitment of human resources required. Second, the project pays a standard fee to compensate for the marginal costs of preparing the microdata and documentation. Upon receipt of the official invoice, the National Science Foundation of the United States authorizes the Minnesota Population Center to pay US$5,000 per census for microdata, documentation and non-exclusive rights to dissemination. (For datasets with fewer than one million person records, the fee is decreased to US$1,000.) Finally, as more and more national statistical agencies join the IPUMS project, the fruits of evidence-based policy decisions (McCaa, Esteve, Ruggles, and Sobek, 2006) and training students to be statistically literate using these data become self-evident. This may motivate those who are not yet participating to become involved.

The IPUMS has two goals: first, to preserve census microdata and, second, to make anonymized, integrated sample extracts available to researchers and policy analysts free of charge. This article focuses on the latter goal, and offers an illustrative example of how the IPUMS effort facilitates statistical literacy and general global awareness among the next generation.

To make census microdata useful for research, they must be thoroughly documented and integrated. While the idea of integrating census data is not new, progress toward true integration has been slow. One example of positive movement towards integration is the massive achievement of the United Nations Statistical Division

in the international harmonization of census concepts from the enumeration form to the publication of final tables. While still incomplete, the effort enjoys widespread support and cooperation from statistical agencies around the globe. Beginning in 1991, the IPUMS-USA project has worked to harmonized census data for the United States for the period since 1850 (Ruggles and Sobek 1997), and IPUMS-International has capitalized on this experience (Esteve and Sobek 2003).

The IPUMS-International project adopts uniform coding schemes, nomenclatures, and classifications, based where possible on the United Nations Statistical Division's Principles and Recommendations for Population and Housing Censuses (1998) and other international standards such as UNESCO's International Standard Classification of Education (1997), and similar classifications for occupations (International Labor Office, 1990), other economic activities (United Nations Statistical Division, 1990), and population and housing measures (United Nations Economic Commission for Europe, 1999).

The basic goal of the IPUMS harmonization efforts is to simplify the use of the data while losing no meaningful information. This is challenging because to make the data simple for comparative analysis across time or place, it is necessary to create comparable codes across samples. This means that the harmonized measures must be the lowest common denominator, or the simplest measure, from all the samples that include a measure of a particular characteristic. For example, regarding information on school attendance, all samples that contain information on this measure have enough information to indicate whether the respondent is currently in school or not. However, some samples contain further information indicating, for those who are not in school,

whether they attended school in the past or never attended. To avoid the loss of important information for those samples that have more detail, the IPUMS uses a composite coding strategy that retains all original detail, and at the same time provides comparable codes across samples. The first one or two digits of each code provide information that is available across all samples (the lowest common denominator data). The next one or two digits provides additional information available in a substantial subset of the samples. The trailing digits provide detail that is only rarely available. Where information is not available for a particular sample, a zero place-holder is assigned to that digit.

The harmonization efforts allow researchers to use detailed measures on a single country or somewhat less detailed but comparable measures across countries, within a country across census years, or across countries and across census years. Thus, the IPUMS database has become a very flexible and user-friendly data source. Academic scholars and policy makers regularly use the IPUMS data to investigate pressing issues such educational attainment and labor market success of return migrants (e.g. Thomas, 2008) and the economic effects of malaria eradication (e.g. Chase, Anekwe, Barofsky, and Farshad, 2008).

In addition to informing discussions about development strategies and policy decisions, IPUMS is now used as a teaching tool as well. Using IPUMS data in teaching serves several important pedagogical goals. First, it promotes statistical literacy among students who may learn statistical theory in the classroom, but rarely have the opportunity to apply their knowledge to real-world data. Second, it allows students to gain insight and knowledge about countries world-wide and across time.

Because the IPUMS project contains data on so many countries and in so many census years, the possibilities for interesting and useful projects are endless. Below we offer an example of how we have used IPUMS data in our own undergraduate classrooms to further the statistical literacy of students, and to make them more knowledgeable global citizens. By this example, we hope that readers will see how easy and beneficial use of IPUMS data is to the educational enterprise.

2. The Course: World Population Problems (University of Minnesota)

The first author used the IPUMS-International project data in her World Population Problems course in the spring of 2009. The course is an upper level undergraduate course, enrolling mostly juniors and seniors. Almost all of the 55 students enrolled were American, but a few were first-generation immigrants and at least ten students had parents who had immigrated to the U.S. before the students were born. Several foreign students also enrolled in the course. Because of the topic and the diverse student body, the students and instructor had a keen interest in expanding their world views. In fact, the course objectives listed on the syllabus were as follows:

1. provide key demographic facts about the world and its major regions;
2. explain how social, economic, and cultural factors interrelate to produce demographic outcomes across the globe and in comparative perspective;
3. understand the basic social science theories that depict the relationship between population, society, and the environment; and
4. discuss the implications of population issues for the international community, the United States, and your own lives.

2.a. Population Profile Assignments

We used a text book, and the instructor delivered a series of lectures on topics ranging from global population trends to family planning to population and economic development. The highlight of the students' learning, however, was a series of assignments in which students accessed and analyzed census data from the IPUMS project along with other sources of data.

On the first day of class, each student was assigned a new identity: they were assigned a gender, age, and country of residence, along with a year in which they were living. For example, a female student was assigned to a new identity of a 22-year-old male from Iraq in 1997. In fact, the instructor created mock "passports" from their new country of residence which detailed each student's new identity. Each assigned country and year corresponded with an available IPUMS sample (e.g. Iraq census 1997), and three or four students were assigned the same country but different ages, genders, and/or census years. Students assumed their new identities when completing a series of assignments throughout the semester, culminating in the construction of a poster for a group session in the Minnesota Population Center at the end of the semester. Using the IPUMS data and other sources in conjunction with new student identities was meant to help students understand how population issues are experienced differently based on geography (where you live), history (when you live), and social location (your age and gender). Below we detail each assignment and illustrate some of the unique insights gained through this learning tool.

In the first several weeks of the semester, students learned about the demographic forces of health and mortality. Students accessed tables from the United

Nations World Population Prospects to document the crude death rate, infant mortality rate, and life expectancy at birth for their assigned country and year. To assess how different living conditions influence health and mortality, students used the IPUMS data to investigate infrastructure features such as the source of water supply and access to a flush toilet for someone of their assigned identity. Lectures discussed how such features are related to disease acquisition and spread. Students used SPSS software to generate simple descriptive statistics using the IPUMS data. With their statistical output, students created a health and mortality profile for someone of their assigned identity. To do this they combined statistics, graphics that displayed statistics across time (trends) or regions (comparatively), and a text evaluation of the health and mortality situation.

In the middle of the semester, the course turned to discussion of fertility and family situations around the globe. Again, students accessed data from IPUMS project for their country and year to understand marital status, number of children, and families per household to understand these family features for someone of their assigned identity. They combined this information with statistics on the crude birth rate, total fertility rate and population sex ratio to graph and discuss trends in and comparisons of the fertility and family profiles across the globe.

In their final assignment, students joined with others who had been assigned identities of the same country and year to combine what they had learned in a group poster depicting the population profile of their assigned country. Figure 1 is the population profile poster constructed by a group of students.

<Figure 1 here>

The posters were displayed in a poster session at the Minnesota Population Center. Faculty, graduate students, and staff of the Minnesota Population Center, were invited to view the posters and ask students questions. Students were evaluated on the content and presentation of their posters as well as how well they answered questions about the population of their country. Below are two pictures of students showcasing posters and fielding questions from those who attended the poster session.

Picture 1: Students display their population profile posters in the Minnesota Population Center seminar room. Credit: Wade Stebbings

Picture 2: Students answer questions about their poster from attendees. Credit: Wade Stebbings

2.b. Learning Outcomes

The series of population profile assignments described above resulted in four key learning outcomes. First, students became "experts" on the population characteristics in a country other than their own. Being assigned a new identity with a mock "passport" personalized the assignments, and therefore made students more invested in doing a good job. In addition, having to present what they have learned in a formal poster format and then answer questions from a live audience of faculty, staff and graduate students motivated students to gain competency in explaining what they learned. Second, students learned how history and geography shape population issues. By comparing health, mortality, fertility and family statistics across time and/or between countries or regions, students gained a better understanding of how historical events and geographic location can influence population. Third, students learned how to analyze secondary data by using the IPUMS-International database and SPSS software. This is

a practical skill that they can carry forward into their other coursework and future professional lives. Many students expressed surprise and pride in their ability to easily generate graphs and tables based on their analysis of IPUMS census microdata. Conducting their own analysis brought dry statistics to life. We would not be surprised if several of these students pursued statistical analysis as a career path. At the very least, students gained a baseline level of statistical literacy that they did not possess before. Finally, the availability of the IPUMS data helped make the world seem like a smaller place for students; it helped them feel more connected to those from other parts of the world. It is our hope that this makes them better global citizens.

3. Conclusions

In summary, the IPUMS International project offers researchers, teachers and their students access to the world's largest collection of census microdata. In fact, every few months a new official statistical agency signs the project memorandum of understanding to become part of this amazing global initiative. Statistical offices which are interested but have not yet joined the project should contact the second author. The IPUMS project staff has worked hard to ensure that the data are easily accessible and comparable across countries and census years. In this paper we have talked more about harmonization efforts than the accessibility of these data. For more information about accessing the data, readers can refer to McCaa, Esteve, Ruggles and Sobek (2006) or simply visit the IPUMS website at: https://international.ipums.org/international/ where they can sign in as a guest user to study the data extract system.

As demonstrated by the teaching example presented here, the IPUMS data provide a unique opportunity for students to learn new skills and important understanding about other countries. The skills contribute greatly to students' statistical literacy, while the understanding makes them more informed and compassionate global citizens. We encourage others to use or adapt this example of the use of IPUMS data for their own teaching needs, or to develop their own creative use of the data to facilitate learning.

References

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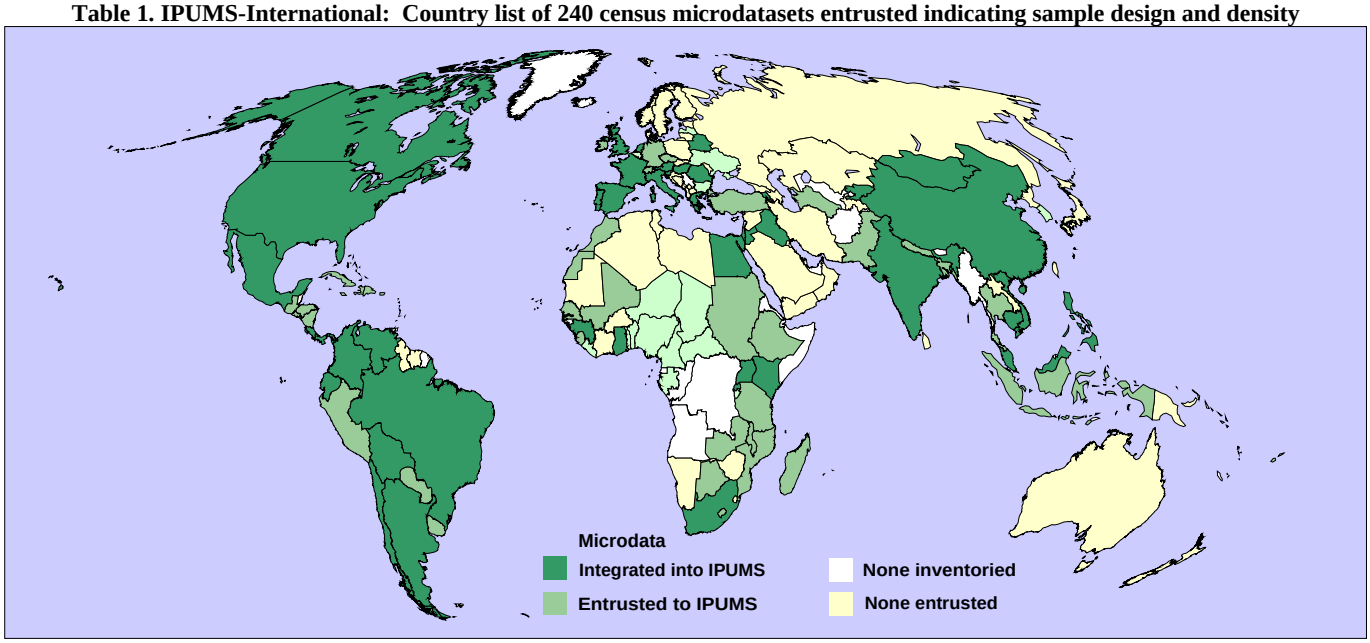
Table 1. IPUMS-International: Country list of 240 census microdatasets entrusted indicating sample design and density



Note: bold country = Memorandum of Understanding signed with Regents of the University of Minnesota;
IPUMS = systematic household sample(s) drawn to IPUMS specifications: every nth household stratified by enumeration district.
Year = census conducted; **Bold year** = microdata survive; ***** = 100% microdata entrusted, where extant; m = microcensus; p = person sample

Sample density					Census decade				
10%	~5%	<=4%	Country	Sample design	2000s	1990s	1980s	1970s	1960s
Integrated and Disseminating 2002-2008 (44 countries, 130 censuses, 76 million households and 279 million person records)									
4			**Argentina**	IPUMS	**2001**	**1991**	**1980**	**1970**	1960
1			**Armenia**	IPUMS	**2001**		1989	1979	1970
4			**Austria**	IPUMS	**2001**	**1991**	**1981**	**1971**	1961
1			**Belarus**	IPUMS		**1999**	1989	1979	1970
3			***Bolivia**	IPUMS	**2001**	**1992**		**1976**	
5			**Brazil**	IBGE (clustered)	**2001**	**1991**	**1980**	**1970**	**1960p**
1			**Cambodia**	IPUMS		**1998**			1962
		4	**Canada**	STATSCAN	**2001**	**1991**-6	**1981**-6	**1971**-6	1961, 6
4		1	***Chile**	IPUMS	**2002**	**1992**	**1982**	**1970**	**1960p**
		2	**China**	NBS	**2000**	**1990**	**1982**		1964
3		2	***Colombia**	DANE/IPUMS	**2005,6**	**1993**	**1985**	**1973**	**1964p**
3	1		***Costa Rica**	IPUMS	**2000**		**1984**	**1973**	**1963**
4		1	***Ecuador**	IPUMS	**2001**	**1990**	**1982**	**1974**	**1962p**
2			**Egypt**	CAPMAS/IPUMS	**2006**	**1996**	**1986**	1976	1964
	6		**France**	IPUMS	**1999**	**1990**	**1982**	**1975**	**1968, 2**
2			***Ghana**	IPUMS	**2000**		**1984**	1970	
4			**Greece**	IPUMS	**2001**	**1991**	**1981**	**1971**	1961
2			***Guinea, Conakry**	IPUMS		**1996**	**1983**		1960
	4		**Hungary**	IPUMS	**2001**	**1990**	**1980**	**1970**	
		5	**India (microcensuses)**	NSSO	**2005m**	**1993,9m**	**1983,7m**		
1			***Iraq**	IPUMS		**1997**	1987	1977	1967
3			**Israel**	IPUMS		**1995**	**1983**	**1972**	1961,7
	1		**Italy**	IPUMS	**2001**	**1991**	1981	1971	1961
1			**Jordan**	IPUMS	**2004**	**1994**	1979		

	3		**Kenya**	IPUMS	**1999**	**1989**	**1979**	**1969**	
1			**Kyrgyz Republic**	IPUMS		**1999**			
		4	**Malaysia**	IPUMS	**2000**	**1991**	**1980**	**1970**	1960
3		3	**Mexico**	INEGI/IPUMS	**2000,5**	**1990,5**	1980	**1970**	**1960p**
2			***Mongolia**	IPUMS	**2000**		**1989**	1979	1970
		3	**Netherlands**	CBS/IPUMS	**2001m**			**1971**	**1960**
1			**Palestine**	CBS		**1997**			
5			***Panama**	IPUMS	**2000**	**1990**	**1980**	**1970**	**1960**
3			***Philippines**	IPUMS	**2000**	**1990**	**1980**	**1970**	**1960p**
	3		**Portugal**	IPUMS	**2001**	**1991**	**1981**	1970	1960
3			**Romania**	IPUMS	**2001**	**1992**		**1977**	1965
2			***Rwanda**	IPUMS	**2002**	**1991**			
1			**Slovenia**	IPUMS	**2001**	1991	1981		
3			**South Africa**	StatsSA	**2001,7**	**1996**-1	1985-0	1970	1960
	3		**Spain**	IPUMS	**2001**	**1991**	**1981**	1970	1960
2			***Uganda**	IPUMS	**2002**	**1991**	1980		1969
		2	**United Kingdom**	ONS	**2001p**	**1991**	**1981**	**1971**	**1966,1**
	6		**United States**	USCB	**2000,5**	**1990**	**1980**	**1970**	**1960**
4			***Venezuela**	IPUMS	**2001**	**1990**	**1981**	**1971**	1961
	2		**Vietnam**	IPUMS		**1999**	**1989**	1979	
Europe (21 countries, 76 censuses—including samples for 11 countries released above)									
			Bulgaria	-	**2001**	**1992**	**1985**	1975	1965
			Belgium (negotiating)	-	**2001**	**1991**	**1981**	**1970**	1961
	2		**Czech Republic**	IPUMS	**2001**	**1991**	**1980**	**1970**	1961
1			**Germany**	IPUMS/FSO	**2001m**	**1991m**	**1981-7**	**1970-1**	1961
			Ireland (in process)	IPUMS/CSO	**2002, 6**	**1991, 6**	**1981, 6**	**1971, 9**	
			Latvia (negotiating)	-	**2000**		**1989**	1979	
			Poland (negotiating)	-	**2001**		**1988**	**1970-8**	1960
			Russia (negotiating)	-	**2002**		**1989**	1979	1970
	4		**Switzerland**	IPUMS	**2000**	**1990**	**1980**	**1970**	1960
			Turkey (in process)	TurkSTAT	**2000**	**1990**	1980-**5**	1970-5	1960, 5
1			**Ukraine** (in process)	IPUMS	**2001**		1989	1979	1970
North America and the Caribbean (15 countries, 48 censuses—including samples for 5 countries released above)									
1			**Cuba**	IPUMS	**2002**		1981	1970	
1	1	2	***Dominican Republic**	IPUMS	**2003**	1993	**1981**	**1970**	**1960p**
1			***El Salvador**	IPUMS	**2007**	**1992**		1971	1961
2		3	***Guatemala**	IPUMS	**2002**	**1994**	**1981**	**1973**	**1964**
			***Jamaica** (in process)	IPUMS	**2001**	**1991**	**1982**	1970	1960
2			***Haiti**	IPUMS	**2003**		**1982**	**1971**	
3		1	***Honduras**	IPUMS	**2000**		**1988**	**1974**	**1961**
2		1	***Nicaragua**	IPUMS	**2005**	**1995**		**1971**	1963
	4		**Puerto Rico**	USCB	**2000**	**1990**	**1980**	**1970**	1960
2			***Saint Lucia**	IPUMS	**2001**	**1991**	**1980**	1970	1960
South America (9 countries, 40 censuses—including samples for 6 countries released above)									
4		1	***Paraguay**	IPUMS	**2002**	**1992**	**1982**	**1972**	**1962**
2			**Peru**	IPUMS/INEI	**2007**	**1993**	1981?	1972	1961
4			***Uruguay**	IPUMS		**1996**	**1985**	**1975**	**1963**
Africa (22 countries, 47 censuses—including samples for 7 countries released above)									

			Benin (negotiating)		**2002**	**1990**		1979?	
1			***Botswana**	IPUMS	**2001**	**1991**	**1981**	1971	1964
			Cameroon (negotiating)		**2002**		**`1987**	1976?	
			Central African Rep. (negotiating)		**2003**		**1988**	1974	
			Chad (negotiating)		**2008**	**1993**	**1989**		1969
2			***Ethiopia**	IPUMS	**2007**	**1994**	**1984**		
			Guinea Bissau (in process)	IPUMS	**2009**	**1991**	**1979**		
			Lesotho (in process)	IPUMS	**2006**	**1996**	**1986**	**1976**	1966
1			***Madagascar**	IPUMS		**1993**			
2			***Malawi**	IPUMS	**2008**	**1997**	**1987**	**1977**	1967
3			***Mali**	IPUMS		**1998**	**1987**	**1976**	
2			***Mauritius**	IPUMS	**2000**	**1990**	1983	1972	1962
			Morocco (in process)	IPUMS	**2004**	**1994**	**1982**	1971?	1960?
2			**Mozambique**	IPUMS	**2007**	**1997**	1980?		
			Niger (negotiating)		**2001**		**1987**	1977	
			Nigeria (negotiating)	NatPopCom	**2006**	**1991**		1973	1963
3			***Senegal**	IPUMS	**2002**		**1988**	**1976**	
1			***Sierra Leone**	IPUMS	**2004**		1985?	1974	1963
3			***Sudan**	IPUMS	**2008**	**1993**	**1983**	**1973**	
2			***Tanzania**	NBS/IPUMS	**2002**		**1988**	1978	1967
			Togo (negotiating)		**2009**	**1993**	1981	1970	1961
2			***Zambia**	IPUMS	**2000**	**1990**	1980	1969	1963
Asia and Oceania (22 countries, 52 censuses—including samples for 13 countries released above)									
1		1	***Bangladesh**	IPUMS	**2001**	**1991**	**1981**	1974	1961
3			***Fiji Islands**	IPUMS	**2007**	**1996**	**1986**	**1976**	**1966**
7			**Indonesia**	BP/IPUMS	**2000**	**1990**	**1980**	**1971**	1961
			Korea, Republic of (negotiating)	KNSO	**2005, 0**	**1995, 0**	**1985, 0**	**1975, 0**	**1960, 6**
1			**Nepal**	CBS	**2001**	1991?	1981?	1971	1961
3			***Pakistan**	SD/IPUMS		**1998**	**1981**	**1973**	1961
		4	**Thailand**	NSO	**2000**	**1990**	**1980**	**1970**	1960
1			**Turkmenistan**	IPUMS		**1995**	1989	1979	1970

Iraq: A Profile of Health and Mortality in the Country from 1960-2000

SOC 3511 World Population Problems, University of Minnesota

RESEARCH QUESTION

What was the health and mortality situation for people living in Iraq from 1960 to 2000?

METHOD

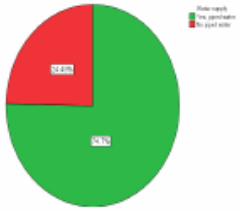
We collected information from various government and non-government websites about the health and mortality situation in Iraq from the years 1960 to 2000. We obtained data from the Integrated Public Use Microdata Series (IPUMS) as well as the United Nations website, and SPSS to create graphs in order to better illustrate the trends.

BACKGROUND

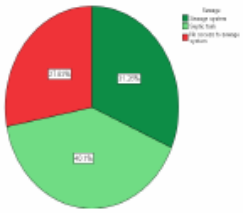
- In 2000 in Iraq the top ten leading causes of death are health related (World Health Organization)
- Between 1958 and 1979, the Iraqi government changes hands 5 times (BBC Timeline: Iraq). In general, political instability places serious obstacles in the way of a country's ability to look after such important health aspects as sewage, sanitation and running water.
- Following the 1979 installation of Saddam Hussein as President, Iraq faces serious military conflict including the Iran-Iraq War, the Invasion of Kuwait, chemical attacks on Kurds, the Gulf War, Desert Storm and operation Desert Fox (BBC Timeline: Iraq).

HEALTH AND MORTALITY DATA

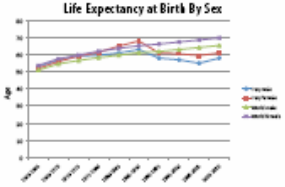
Water Supply Distribution in Iraq (1997)



Sewage Distribution in Iraq (1997)

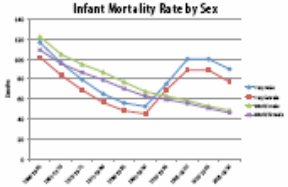


Life Expectancy at Birth By Sex



- Life Expectancy at Birth by sex Medium variant. 1960-2010
- Source: United Nation-World Population Prospect

Infant Mortality Rate by Sex



- Infant Mortality Rate by sex (infant deaths per 1000 live male/female births). 1960-2010
- Source: United Nation-World Population Prospect

Specific Profiles

Males Age 10
This male in particular lived between 1987 and 1997 when roughly 70% of the population had access to proper sewage and 30% did not. Therefore, males of age 10 at this time had a 30% chance of coming in contact with communicable diseases. (BBC Timeline: Iraq).

Males Age 22
In 1997, when the country was going through its worst moment, the numbers for 22-year old males were very similar to the total population, 23.6% without piped water, 26.6% without access to sewage and 7.9% without toilet.

Females age 24
In 1990, concurrent with the rest of the population, Crude Death Rate and Infant Mortality skyrocketed as E0 dropped. The percentage of women with access to piped water and sewage is comparable to the general population in 1997.

Females age 37
This profile's life expectancy, 49.4, was comparable to the life expectancy of other women in the world born in 1960, 50.6. There was a 23% chance she wouldn't have had piped water and a 25% chance of not having some sort of sewage system or septic tank.

RESULTS

- ~1/4 of the population does not have access to piped water and/or sewage
- Clean water, separate from waste, is important in protecting against communicable diseases, especially in infants
- E0 is increasing and Infant Mortality Rate is decreasing until ~1990; this coincides with the Gulf War and multiple attempted invasions
- Compared to the rest of the world, Iraq is "healthier" until a reversal in 1990

CONSLUSION

Iraqi health and mortality are improving (high E0, Low Infant Mortality), and are better than the world as an average, until the political upheavals and wars beginning ~1990. At this point the situation reverses as Iraq experiences a dramatic decline in E0 and steep increase in Infant Mortality, among other indicators. In 1997 an entire 25% of the Iraqi population does not even have access to sewage or clean piped water. This is now sub-world standard.

Sources

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United Nation-World Population Prospect

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