International Completeness of Death Registration (ICDR) 2015-2019

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Completeness of Death Registration

- Death registration completeness, the share of deaths captured by countries' vital registration systems, vary substantially across countries.

- Estimates of completeness, even recent ones, are outdated or contradictory for many countries.

- Building upon the World Mortality Dataset (121 countries), I collected the annual amount of deaths registered in 61 additional vital registration systems around the world and contrasted them with standard estimates of expected deaths in order to derive the most comprehensive and up-to-date estimates of death-registration completeness from 2015 to 2019.

Why do we need this?

- Generally: “International organizations and civil society require up to date and reliable data in order to inform their decisions in all venues, especially in health matters. Without sufficient and well-understood data, the effect of policies and interventions cannot be understood properly. … for countries to understand if they are on the path to achieve many of the Sustainable Development Goals… reliable monitoring systems must be established and their performance tested.”

- Many countries have low completeness of vital registration and have undergone and currently undergoing reforms and investments to improve capacity. Supported by national governments, UN, WHO, the World Bank, Vital Strategies and more.

Estimating Completeness

- I have collected the annual number of registered deaths in 182 countries between 2015 to 2019. Sources are mostly NSOs, some from the scientific literature and media.

- Contrasting the counts with the expected mortality counts from the 2019 versions of the World Population Prospects (UN), Global Burden of Disease (IHME) and Global Health Estimates (WHO) results in a completeness estimate for each country-year.

Estimating Completeness

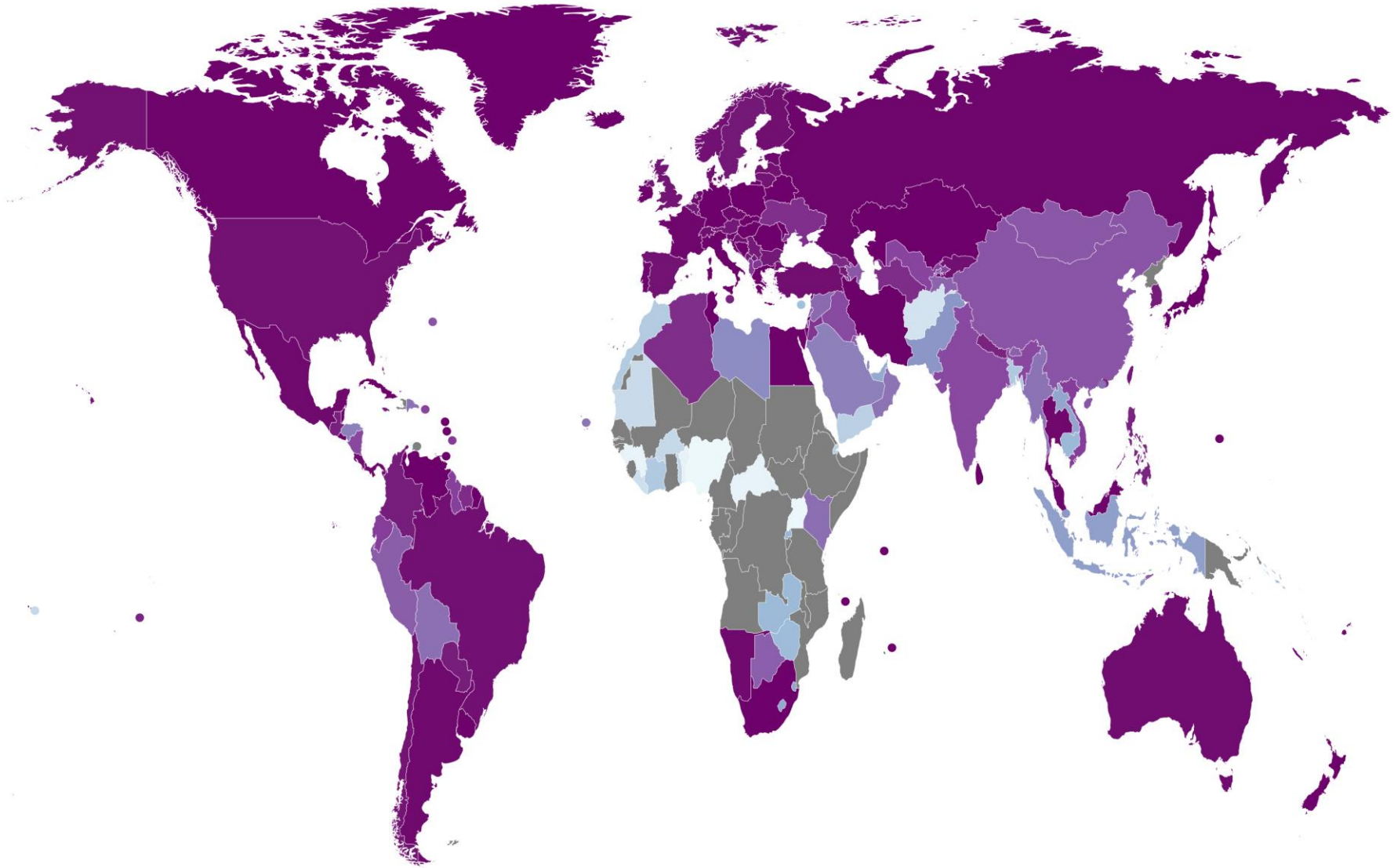
- My main estimate of expected mortality is the mean expected between WPP, GBD and GHE. Some small or partially recognized countries only have expected mortality estimates from GBD.

- The completeness rate for each country c in year y is defined as:

$$\text{Death Registration Completeness } (\%)_{c,y} = \frac{\text{Registered Deaths}}{\text{Expected Deaths}}_{c,y} = \frac{\text{Registered Deaths}}{AVG(\text{WPP+GBD+GHE})_{c,y}}$$

- Data is publicly available at https://github.com/akarlinsky/death_registration.

Main Results

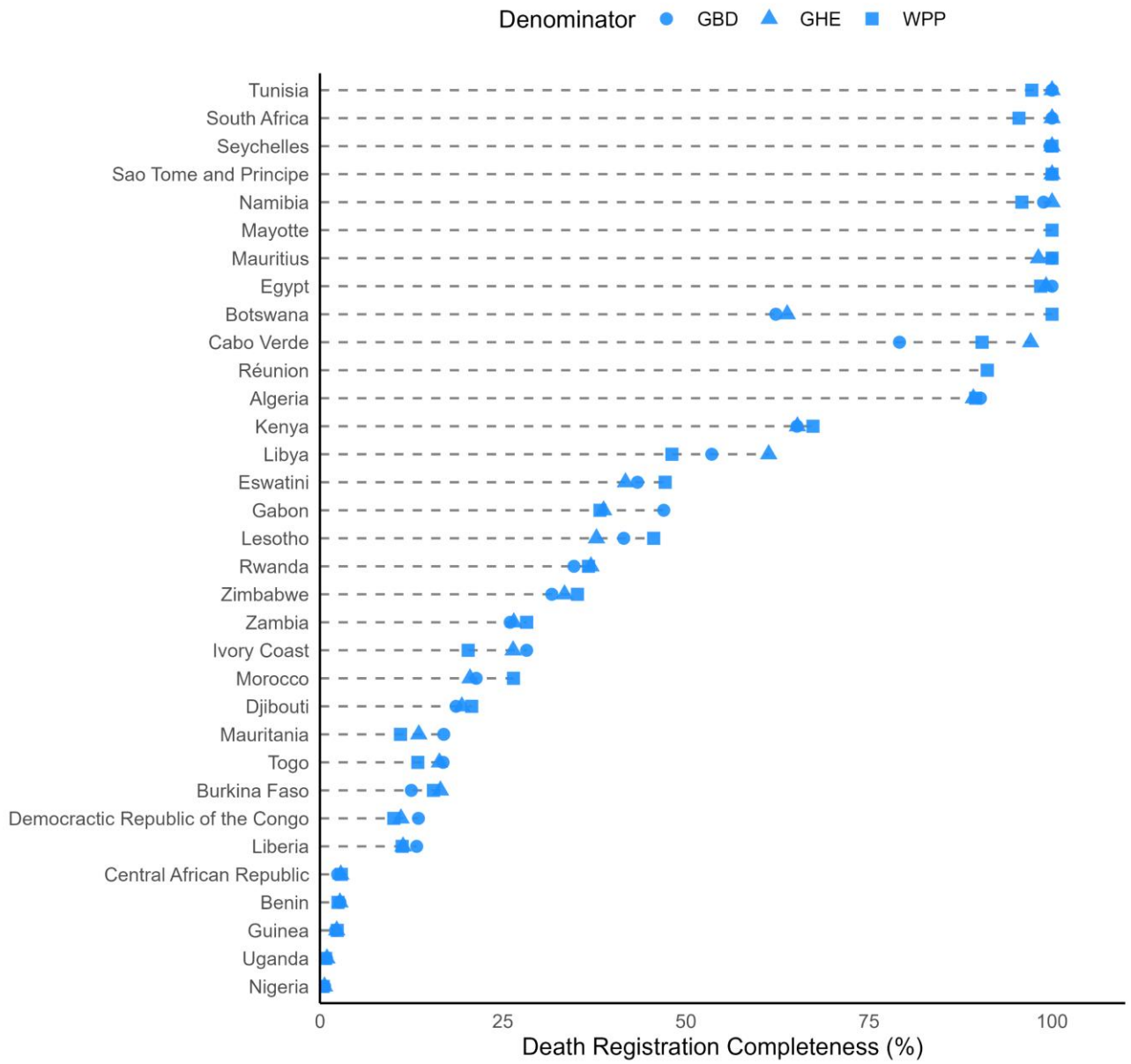


Main Results - Africa

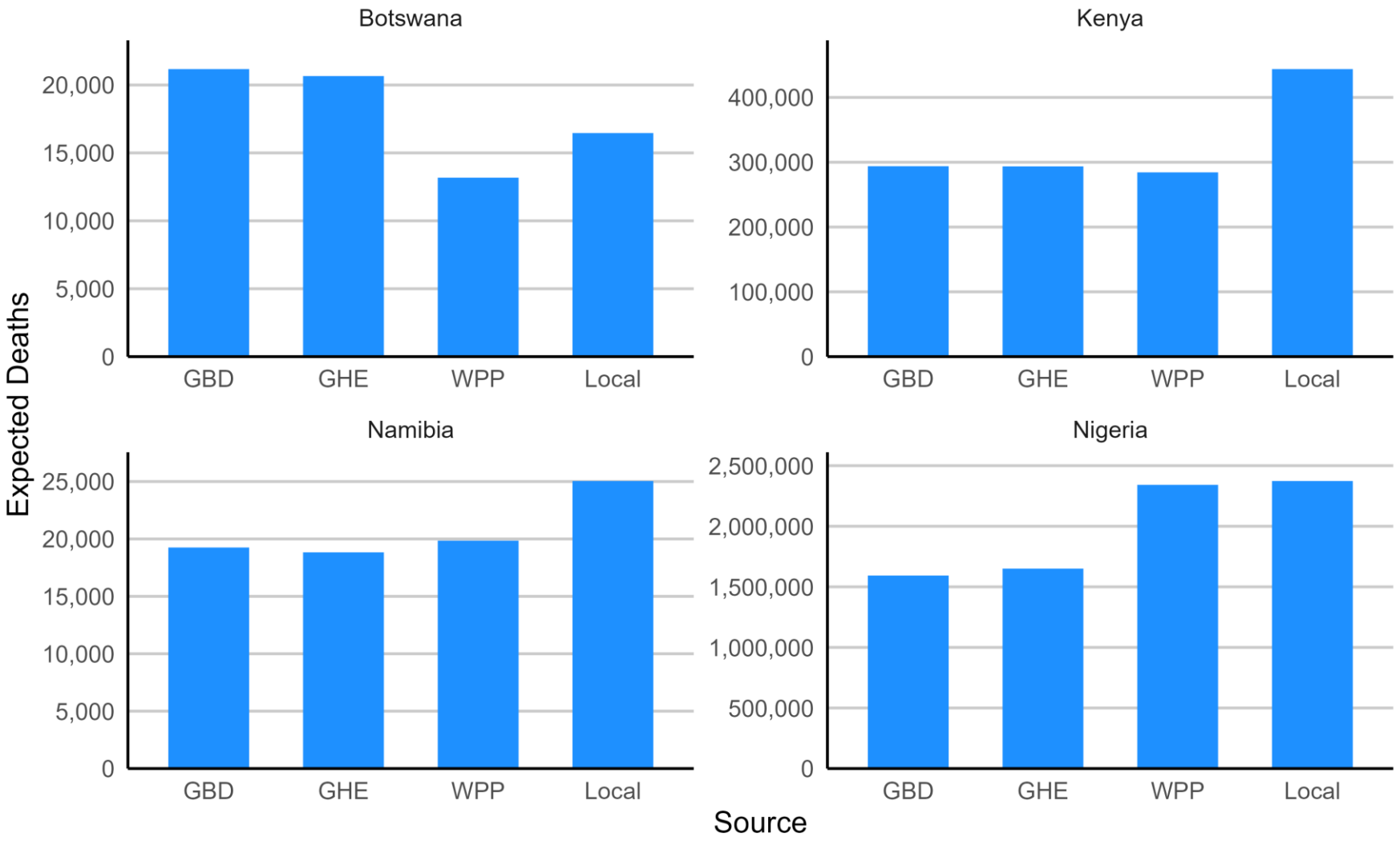
Country	ICDR	GBD	UNSD
Algeria	90% (2019)	31% (2006)	less than 90% (2001)
Benin	3% (2019)		
Botswana	72% (2019)		70-79% (2018)
Burkina Faso	15% (2018)		
Cabo Verde	88% (2019)	100% (2012)	75% or more (2010-2015)
Central African Republic	3% (2017)		
Democratic Republic of the Congo	11% (2016)		
Djibouti	20% (2019)		less than 90% (2010-2015)
Egypt	100% (2019)	100% (2014)	96% (2016)
Eswatini	44% (2018)		less than 75% (2010-2015)
Gabon	41% (2017)		
Guinea	2% (2018)		0.02% (2018)
Ivory Coast	24% (2019)		
Kenya	66% (2019)		38.9% (2018)
Lesotho	41% (2019)		less than 75% (2010-2015)
Liberia	12% (2016)		
Libya	54% (2017)	88% (2006)	less than 90% (2001)

Country	ICDR	GBD	UNSD
Mauritania	13% (2019)		
Mauritius	100% (2019)	100% (2014)	90% or more (2013)
Mayotte	100% (2019)		
Morocco	22% (2016)	25% (2014)	62.36% (2007)
Namibia	99% (2017)		70% (2008)
Nigeria	1% (2019)	1% (2007)	
Réunion	91% (2019)		90% or more (2004)
Rwanda	36% (2019)		less than 75% (2010-2015)
Sao Tome and Principe	100% (2017)	100% (1985)	75% or more (2010-2015)
Seychelles	100% (2019)	100% (2011)	90% or more (2012)
South Africa	100% (2019)	100% (2014)	75-89% (2008)
Togo	15% (2019)		
Tunisia	100% (2019)	37% (2013)	64% (2000)
Uganda	1% (2019)		
Zambia	27% (2019)		
Zimbabwe	33% (2015)	59% (2007)	

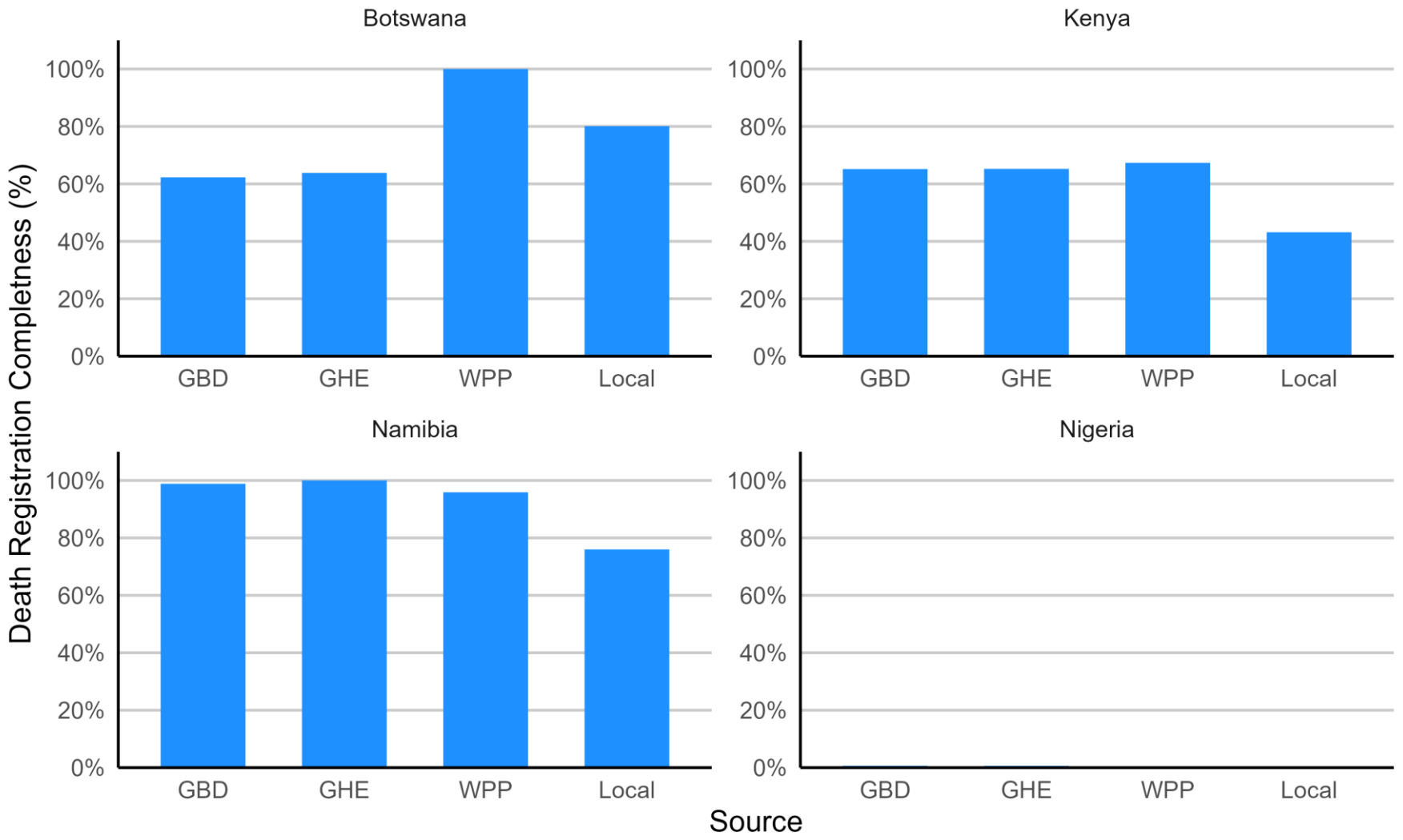
Main Results - Africa



The Importance of Local Knowledge



The Importance of Local Knowledge



Limitations & Discussion

- For many countries we were unable to locate information on the number of deaths recorded by their vital registration systems. We have chosen to treat such instances as missing rather than at 0% completeness - since the data might exist but it is not shared.

- Some countries have completeness of death registration estimates as arises from surveys or census. These were not included as information on vital registration is essentially missing.

- Large uncertainty embodied in the expected number of deaths, as derived from WPP, GBD and GHE. The expected number of deaths involves a complex estimation method that relies on many demographic variables as input. Some gauge of the uncertainty in the expected number of deaths is the disagreement between the three sources.

Limitations & Discussion

- In some countries, vital registration is functioning only in some regions, such that the NSOs report these figures as the total known registered counts. For example, in Djibouti, only the capital region of Djibouti-Ville, which contains about 66% of the total population, reports registered deaths.

- In Benin, the civil registration report explicitly states that the number of registered deaths is available only for "some communities", resulting in a completeness estimate of about 2.6% in 2019.

- In incomplete vital registration systems, differences in death completeness are known to arise on other dimensions such as Urban/Rural, Sex, Age, Income and more.

Limitations & Discussion

- Deaths that occur outside health facilities remain a challenge for many vital registration systems.
  For example, Burkina Faso and Liberia's figures only relate to deaths that occur in hospitals and basic health facilities.

- How does this inform 2020 onward?
  - Do we assume coverage has stayed at about the same level?
  - It might have decreased due to disruption of COVID and lockdowns.
  - It might have increased (Ecuador? Peru?).

- Other measures of vital registration quality? Timeliness, cause of death coding, demographic coding, etc. are outside the scope of this work.

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Data is free and open for all:
https://github.com/akarlinsky/death_registration

Preprint of paper (previous version, not yet updated):
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תודה רבה!