

# Bridging Data Gaps in Pakistan: District-Level Life Expectancy at Birth through Machine Learning-Based Small-Area Estimation

## Background

In Pakistan, official statistics on life expectancy are available only at the national and provincial level, masking sharp differences between districts. Some communities enjoy longer, healthier lives, while others face much shorter lifespans. Without district-level evidence, resources cannot be directed where they are most needed. Using PSLM survey data and a globally trained model, we estimated district-wise life expectancy at birth in Pakistan. The findings reveal disparities across districts, identifying which districts are ahead, which lag behind, and how wide the gaps remain. This evidence enables policymakers to target resources more effectively and track progress in reducing health inequalities.

Table I: Ranking of District Level Life Expectancy in Pakistan (2019)

District (Top)	Life Expectancy	District (Bottom)	Life Expectancy
Chitral	73	Jaffarabad	60
Khanewal	72	Nasirabad	60
Khushab	72	Harnai	61
Jhelum	71	Upper Dir	61
Sialkot	71	Kashmore	61
Jhang	71	North Waziristan	61
Faisalabad	71	Kohistan	61
Islamabad	71	Pishin	61

Figure I: District Level Pakistan Life Expectancy (2019)

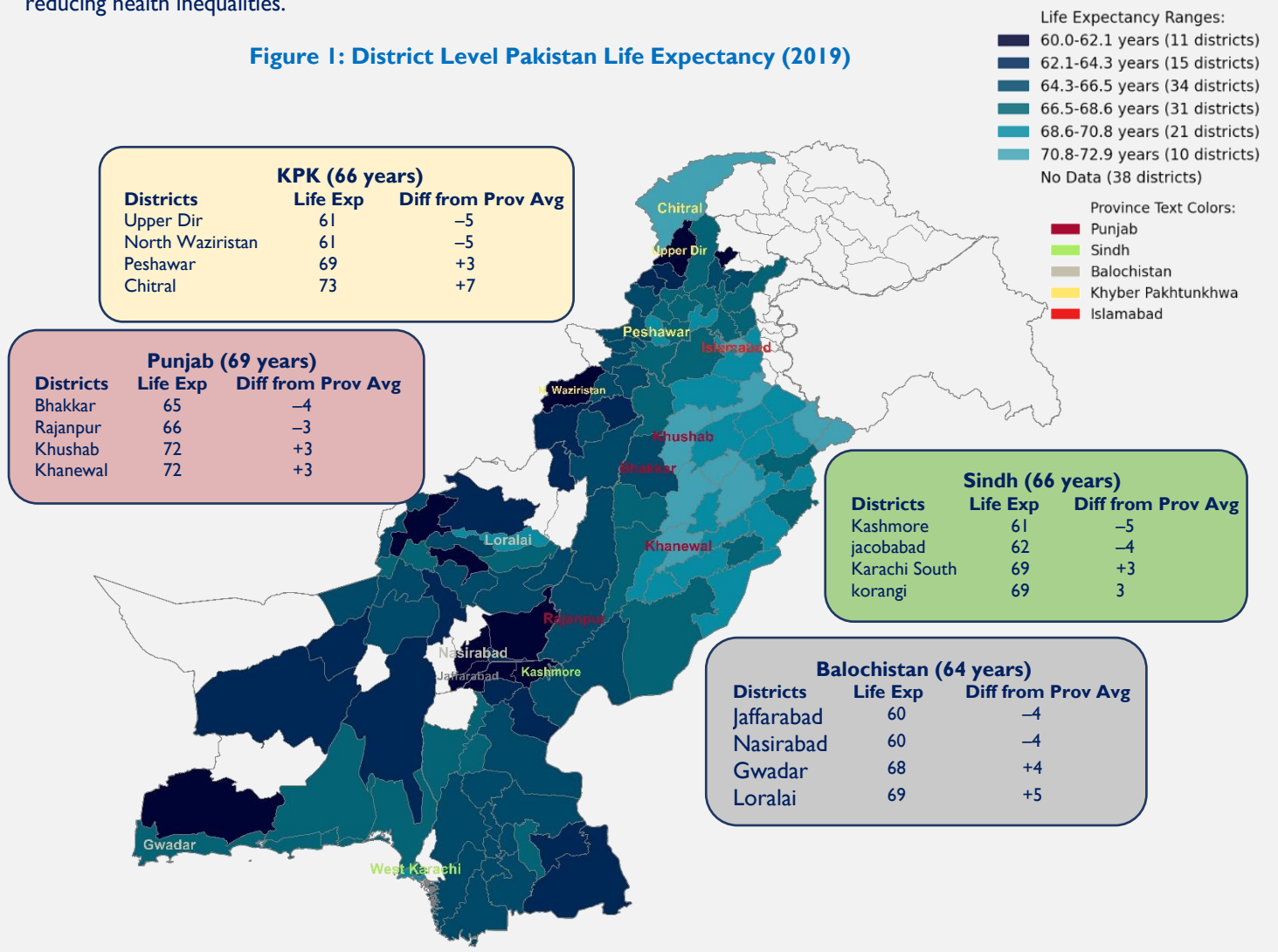
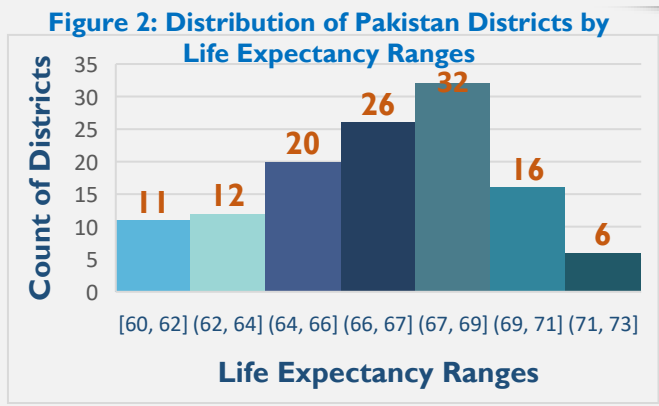


Figure 2 shows that Most districts fall between **64 and 70 years**, but important gaps remain. At one end, **11 districts** have life expectancy between **60 and 62 years**, while at the other, only **2 districts** exceed **72 years**. This uneven distribution underscores sharp inequalities: while some communities are approaching global averages, many others lag far behind. Such disparities highlight the need for targeted investments and tailored health policies to ensure that everyone has the opportunity to live longer and healthier lives.

## Data and Methodology

Life expectancy at birth for every district of Pakistan was estimated by applying a gradient-boosting model trained on the 1990-2022 WDI<sup>2</sup> country-year panel, missing values in training data are handled via constrained random imputation, the trained model was then applied to district-level aggregates from PSLM 2019-20<sup>1</sup>. For sensitivity analysis, we compared predicted and actual life-expectancy-at-birth values across multiple countries.



## Policy Recommendation

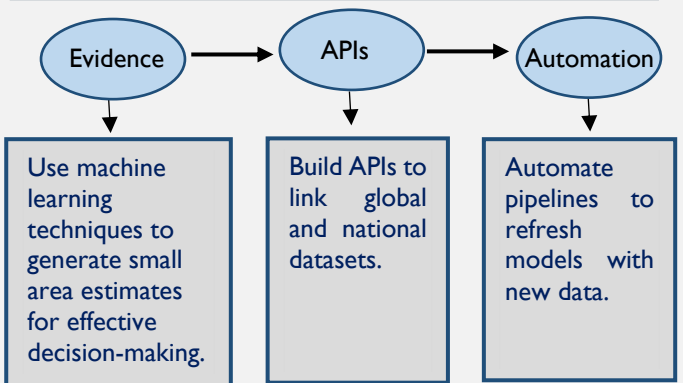
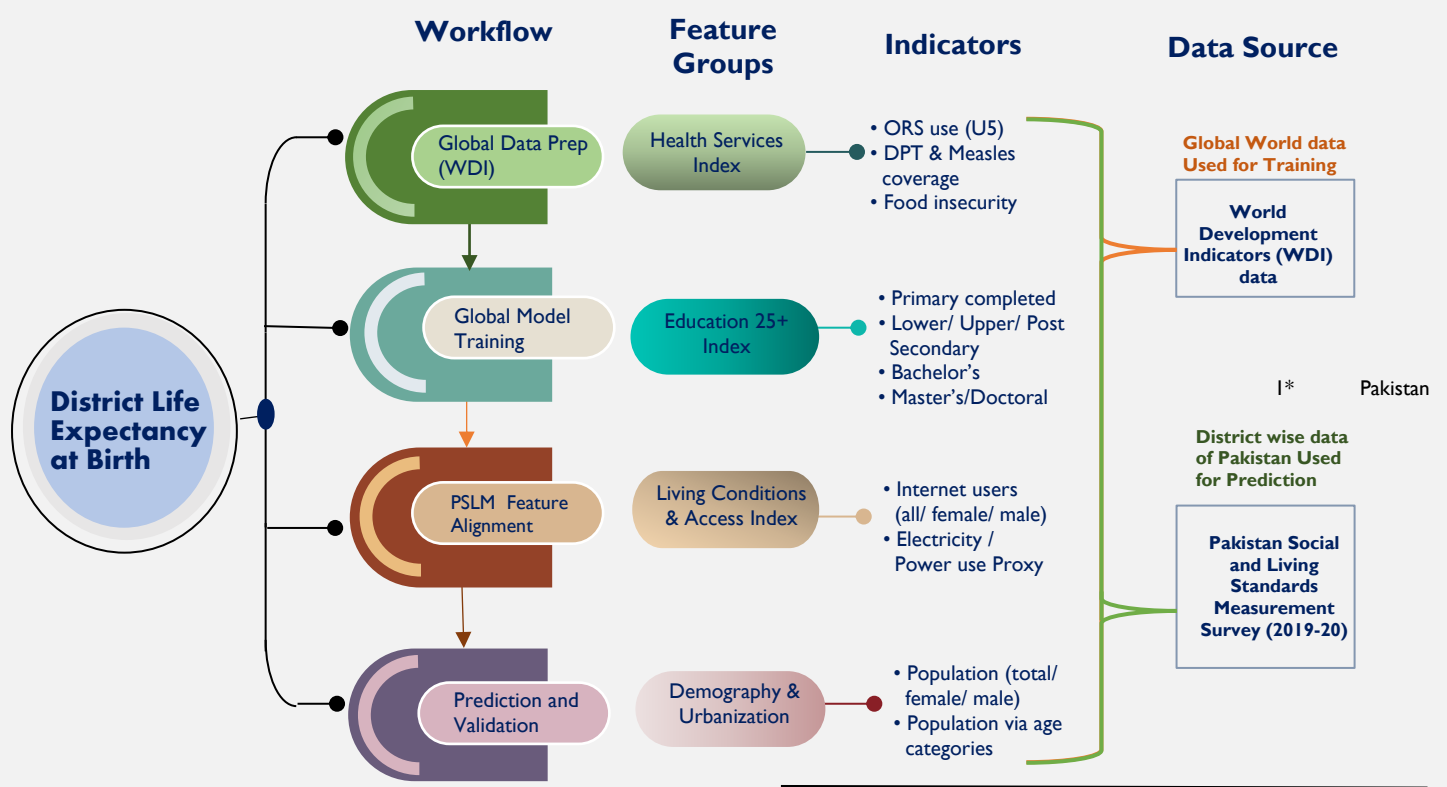


Figure 3: Methodology of Pakistan Districts Level Life Expectancy



Bureau of Statistics (2021) Pakistan Social and Living Standards Measurement Survey (PSLM) 2019–20: National/Provincial/District. Islamabad: Government of Pakistan, Statistics Division.  
 2\* World Bank (2025) World Development Indicators. Washington, DC: World Bank.

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### District Life Expectancy (2020 Estimates on PSLM data)

Balochistan	
District	Life Expectancy
Loralai	68.8
Gwadar	67.8
Duki	67.4
Lasbela	66.9
Quetta	66.7
Awaran	66.5
Barkhan	66.0
Mastung	65.7
Nushki	65.5
Kalat	65.4
Kohlu	65.4
Sibbi	64.8
Ziarat	64.8
Qilla Abdullah	64.7
Washuk	64.1
Qilla Saifullah	63.6
Kharan	63.2
Kachhi/ Bolan	63.2
Sherani	62.9
Khuzdar	62.8
Sohbatpur	62.2
Kech/Turbat	61.8
Dera Bugti	61.8
Pishin	60.8
Harnai	60.6
Nasirabad/ Tamboo	60.4
Jaffarabad	60.0

Khyber Pakhtunkhwa	
District	Life Expectancy
Chitral	72.9
Peshawar	68.9
Swabi	68.6
Swat	68.4
Mansehra	68.2
Mardan	67.8
Charsada	67.8
Nowshera	67.7
Kohat	67.7
Haripur	67.6
Malakand	67.5
Abbottabad	67.4
Tor Garh	67.3
Bunair	66.9
Batagram	66.4
Hangu	66.3
Dera Ismail Khan	66.3
Karak	66.0
Orakzai	65.8
Khyber	65.5
Bannu	65.4
Shangla	64.9
Mohmand	64.9
Tank	64.7
Lakki Marwat	64.0
Lower Dir	63.9
Kurram	63.6
South Waziristan	63.2
Bajur	62.7
Kohistan	60.8
North Waziristan	60.8
Upper Dir	60.7

## District Life Expectancy (2020 Estimates on PSLM data)

Punjab	
District	Life Expectancy
Khanewal	72.0
Khushab	71.5
Jhelum	71.4
Sialkot	71.4
Jhang	71.2
Faisalabad	71.0
Islamabad	71.0
Chiniot	70.9
Narowal	70.9
T.T. Singh	70.7
Lodhran	70.7
Gujrat	70.6
Gujranwala	70.5
Nankana Sahib	69.8
Bahawalnagar	69.8
Rawalpindi	69.6
Mandi Bahauddin	69.6
Hafizabad	69.4
Multan	69.4
Sargodha	69.3
Chakwal	69.3
Okara	69.0
Sahiwal	68.8
Vehari	68.7
Lahore	68.7
Bahawalpur	68.5
Mianwali	68.5
Muzaffar Garh	68.2
Layyah	68.0
Sheikhupura	68.0
Kasur	67.8
Attock	67.7
Pakpattan	67.4
Dera GhaziKhan	66.4
Rahim Yar Khan	66.3
Rajanpur	66.2
Bhakhar	64.7

Sindh	
District	Life Expectancy
Karachi South	69.1
Korangi	69.1
Dadu	68.1
Karachi West	68.1
Larkana	68.0
Karachi East	67.5
Karachi Central	67.2
Nowshero Feroze	66.9
Mir Pur Khas	66.5
Khairpur	66.4
Jamshoro	66.2
Tando Muhammad Khan	66.1
Badin	65.9
Sujawal	65.8
Ghotki	65.8
Thatta	65.7
Sanghar	65.6
Hyderabad	65.4
Shaheed Banazir Abad	65.3
Matari	65.0
Tando Allah Yar	64.7
Sukkur	63.9
Umer Kot	63.1
Tharparkar	63.0
Shikarpur	62.2
Jacobabad	61.6
Kashmore	60.7