

# Excess deaths directly or indirectly associated with COVID-19 epidemic in the city of Bishkek, Kyrgyz Republic, 2020

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# Outline

- Excess deaths, city of Bishkek in 2020
  - In population
  - In hospitals
  - Method
  - Results
  - Conclusions



# Methods: Excess deaths in the city of Bishkek in 2020

Data sources                       patient-level data from paper-based registers

Collection sites                 all Family medicine centers (21)

Data completeness           cross-check with other data sources

- National maternal and child health center,
- Coroner's bureau and Republican pathology bureau,
- F.12-Zdrav "Report on performance of a healthcare organization" and F.14 «Report on performance of an in-patient hospital» ,
- Reports of the Statistics committee

Collection period               deaths in 2015-2020



# Methods: Excess deaths in the hospitals of Bishkek in 2020

Data sources the hospitals)	 aggregated monthly data (on admissions and deaths in
Collection sites	 20 in-patient hospitals of Bishkek
Collection period	 deaths in 2015-2020



# Excess deaths (ED) calculation

- **ED = observed number of deaths – expected number of deaths (for certain period of time)**
- **Expected deaths were calculated with 2 approaches:**
  - (2) Baseline method: average registered deaths in the last 5 years
  - (2) Threshold method: upper level of the 95% confidence interval of deaths for the last 5 years
- **ED were calculated using Statcalc:**
  - By weeks and cumulatively for the year
  - By groups: age, sex, place of death, cause of death (CD-10)
  - By hospitals

<https://vital.box.com/v/ExcessMortalityCalculator>



## ED: percentage (%) and count

- $\text{ED (\%)} = \frac{\text{absolute number of ED}}{\text{Expected number fo deaths}} * 100\%$
- ED rate per 100,000 people
- $\text{ED in hospitals} = \frac{\text{Observed deaths per 10 thousand hospitalizations}}{\text{Expected deaths per 10 thousand hospitalizations}}$
- $\text{ED \% in hospitals} = \frac{\text{ED in hospitals}}{\text{Expected deaths per 10 thousand hospitalizations}} * 100\%$

# ED directly and indirectly associated with COVID-19

- **Calculation of indirectly associated deaths**
  - **COVID-19 deaths**
    - Deaths from PCR-confirmed SARS-CoV-2 (U07.1)
    - Deaths from probable COVID-19 (U07.2, B 34.2)
    - ED caused by unspecified pneumonia or influenza (J09–J18)
  - **Deaths indirectly associated with COVID-19**
    - All registered deaths (2020) – deaths from COVID-19 (2020)
- **Calculation of ED indirectly associated with COVID-19 (StatCalc)**
- **Proportion of ED directly and indirectly associated with COVID-19 from the total number of ED**

<https://vital.box.com/v/ExcessMortalityCalculator>

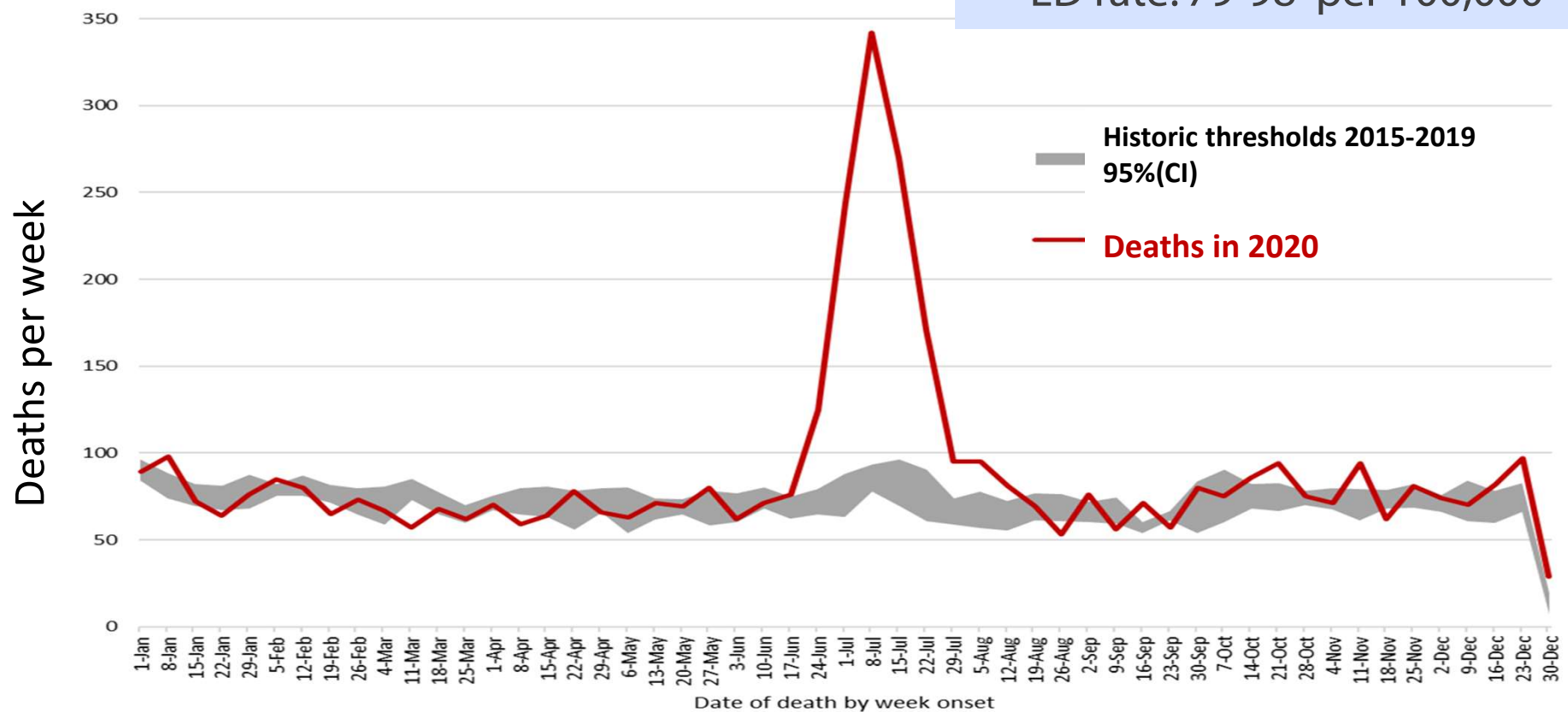


# ED in Bishkek, 2020

>3/4 of ED happened between 24 June-28 July

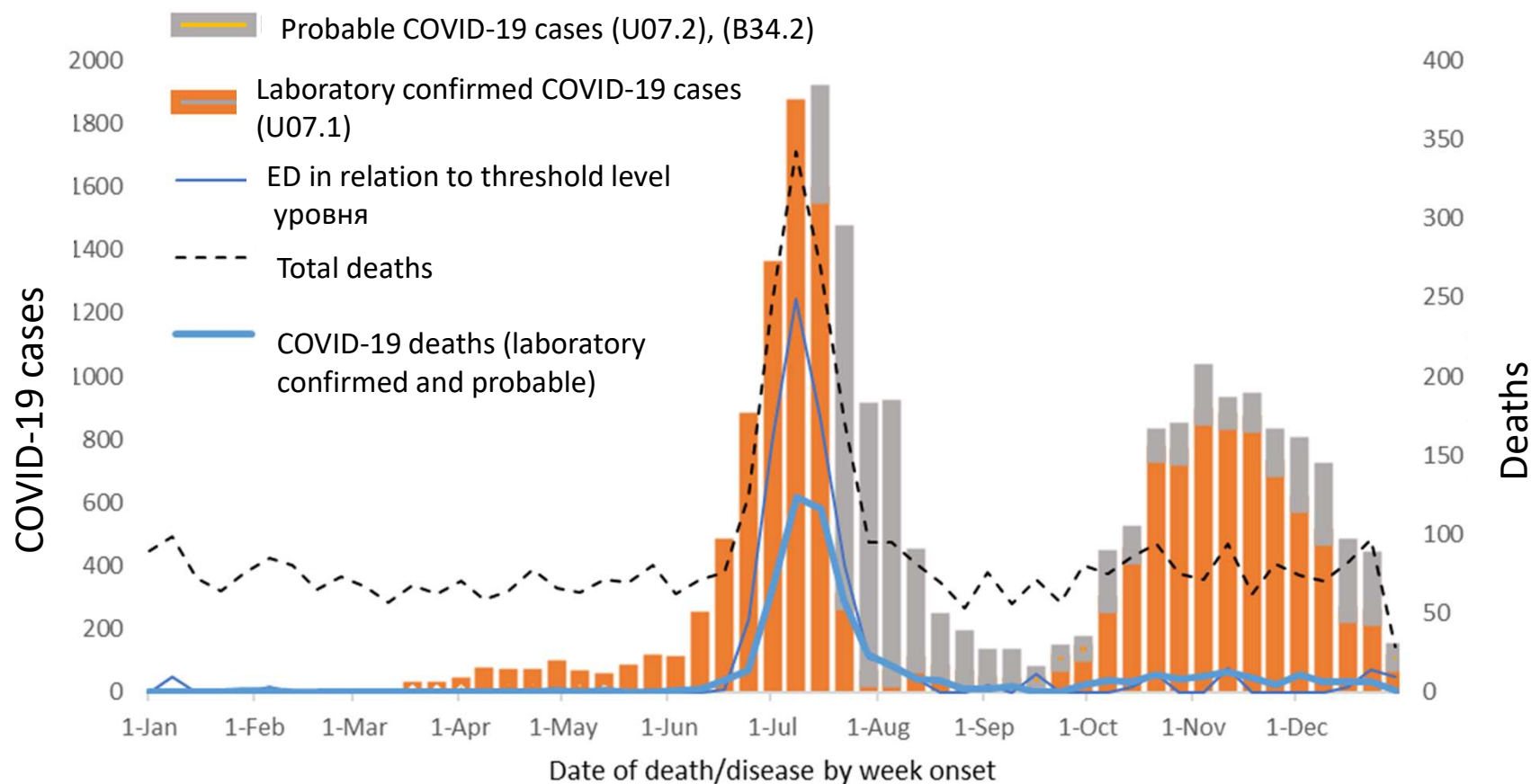
4,660 deaths

- ED count: 840-1,042
- ED %: 22%-29%
- ED rate: 79-98 per 100,000





## Weekly cases, deaths and ED from COVID-19 with a peak in mid July, Bishkek, 2020



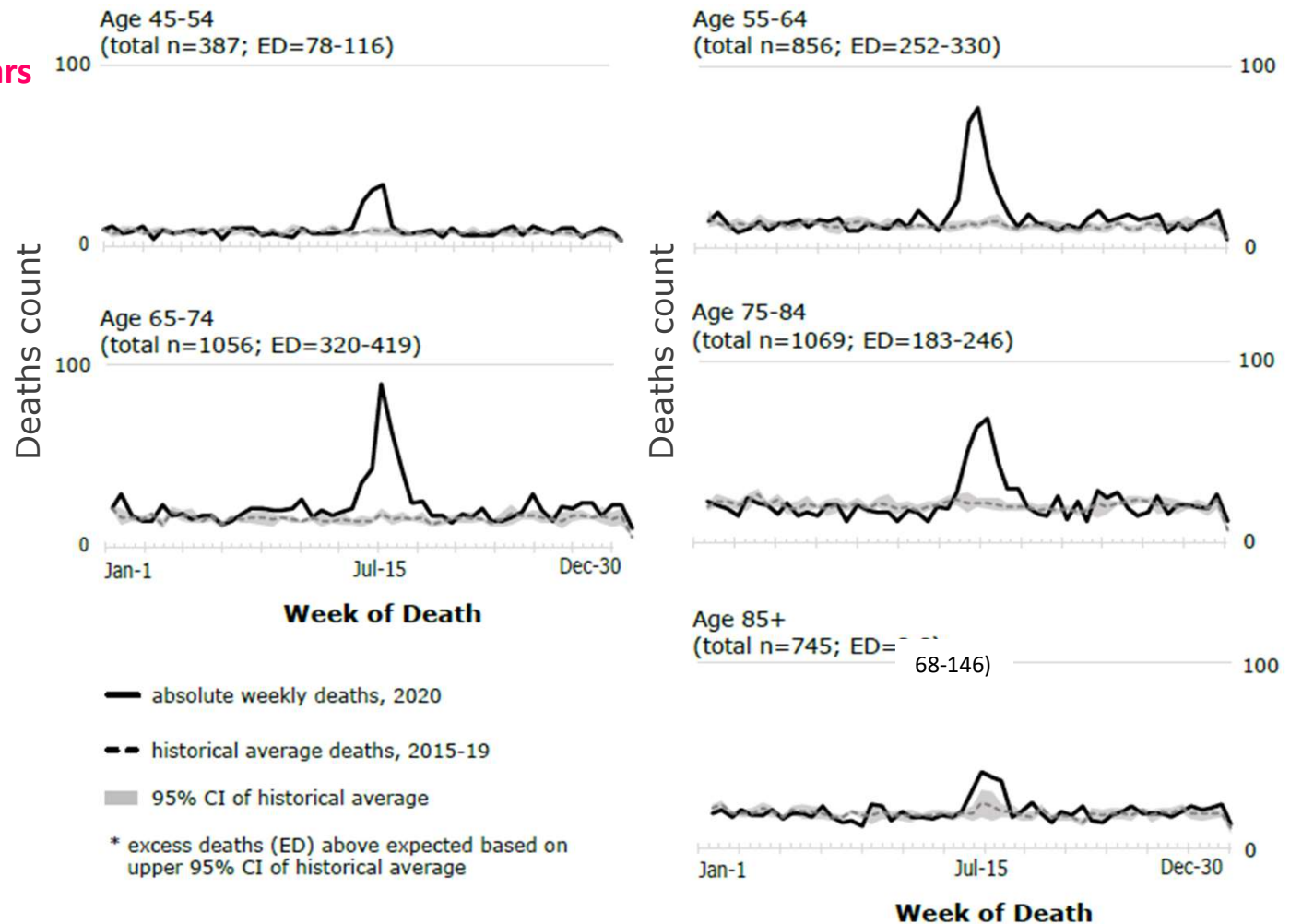
## ED by analyzed groups, Bishkek, 2020

	ED abs.count	ED (%)
<b>Sex</b>		
M	481-602	28%
F	398-541	20%
<b>Place of death</b>		
Home	323-474	13%
Hospital	490-608	45%
<b>Age</b>		
Age <65	323-417	22%
Age ≥65	525-684	22%

# ED% by age

The highest percentage in 54 -74 years

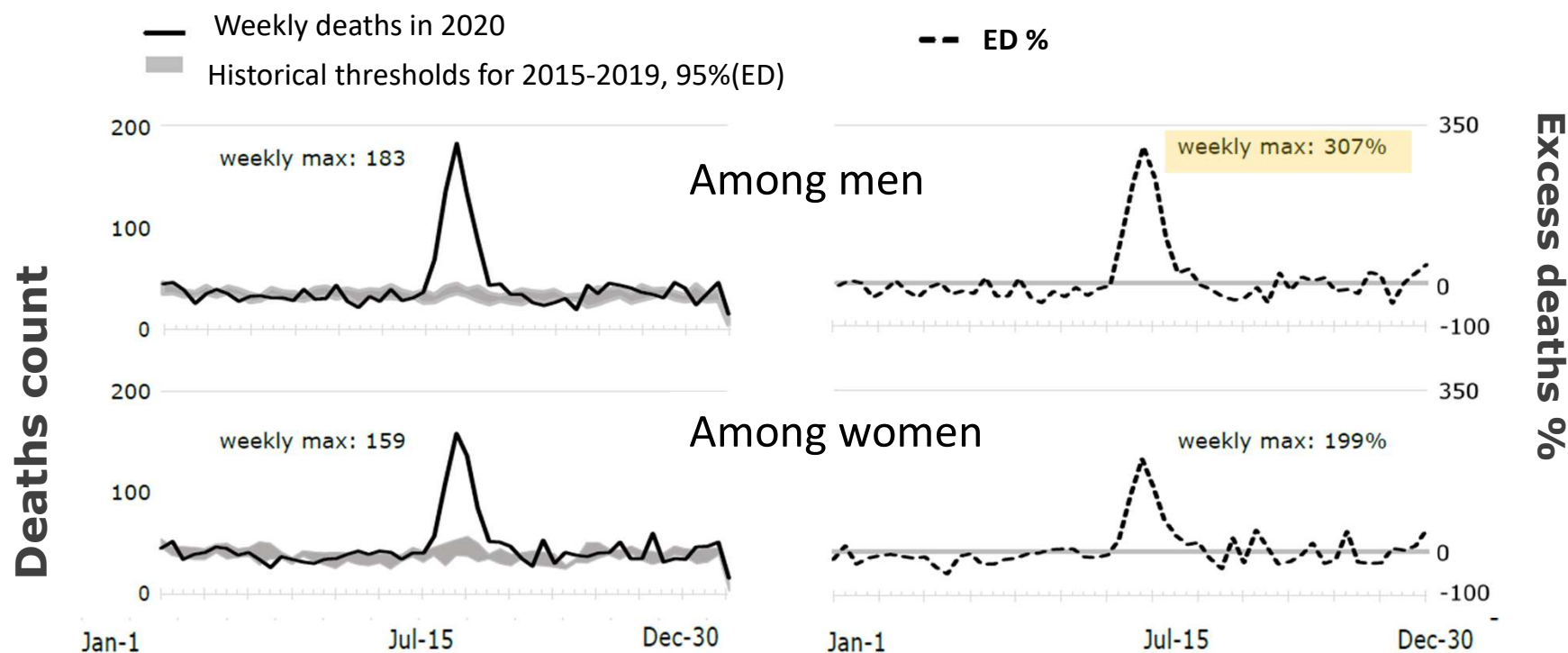
- **55–64 years**
  - 42% (cumulatively)
  - 550% (during peak week)
- **65–74 years**
  - 43% (cumulatively)
  - 424% (during peak week)



## Deaths and ED (%) by weeks and sex

Deaths by weeks of 2020 compared to historical levels, 2015-2019

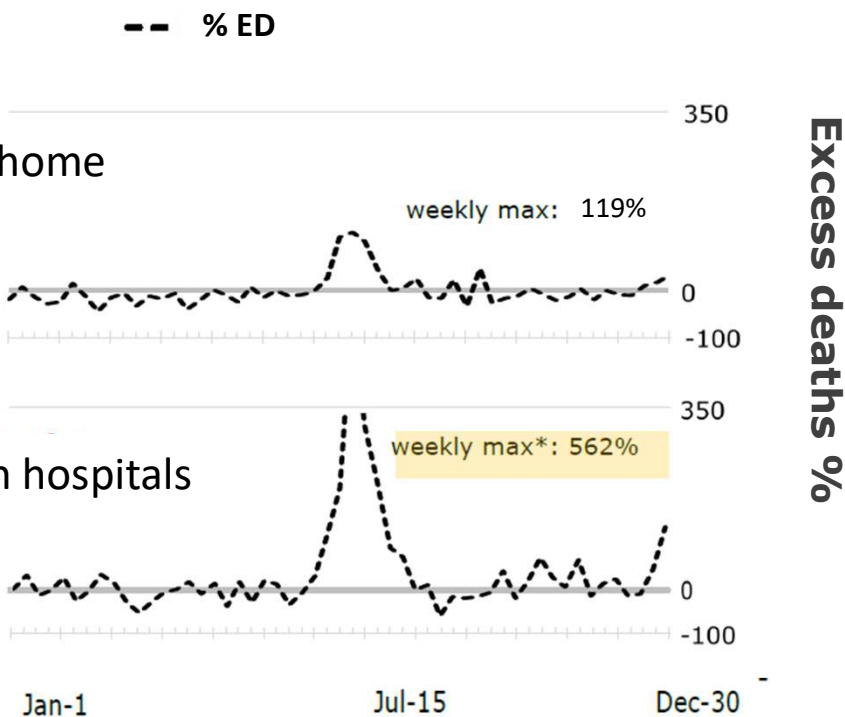
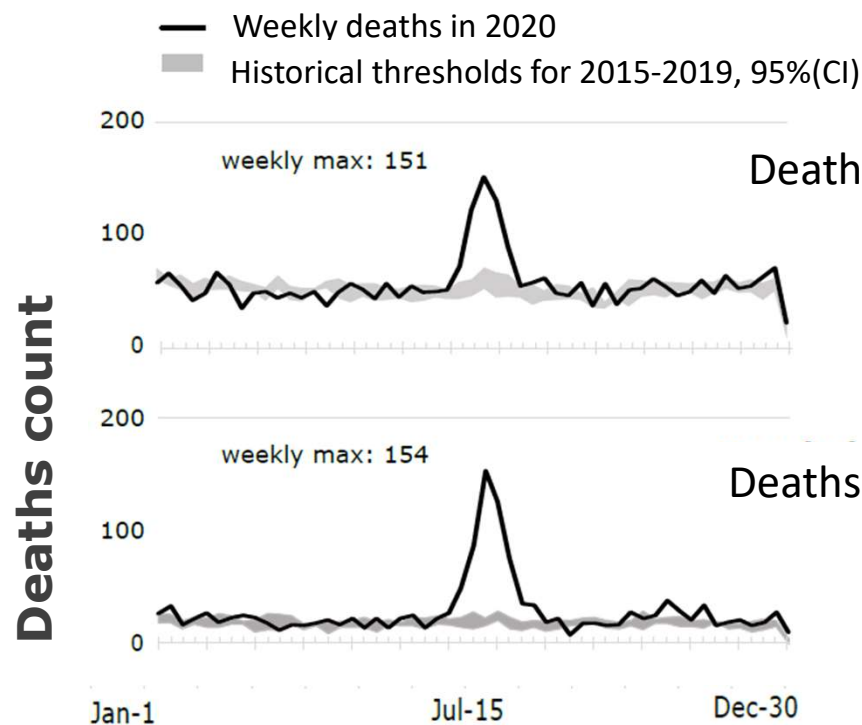
Excess death percentage by weeks compared to 95% upper historical threshold, 2015-2019



# Deaths and ED (%) by weeks and place of death

Deaths by weeks of 2020 compared to historical levels, 2015-2019

Excess death percentage by weeks compared to 95% upper historical threshold, 2015-2019



**High percentage of ED (10-57%)** registered among patients with *diabetes mellitus and cardiovascular diseases*. Proportion of ED indirectly associated with COVID-19 was **31%**.

- COVID-19-like illnesses (pneumonia and influenza) - 291%
- **Non-respiratory or COVID-19-like diseases:**
  - Diabetes— 57%
  - Chronic ischemic heart diseases— 20%
  - Other circulatory diseases— 20%
  - Myocardial infarctions- 15%
  - Perinatal deaths-10%
- **Proportion of ED directly associated with COVID-19 - 69%**
- **Proportion of ED indirectly associated with COVID-19 - 31%**

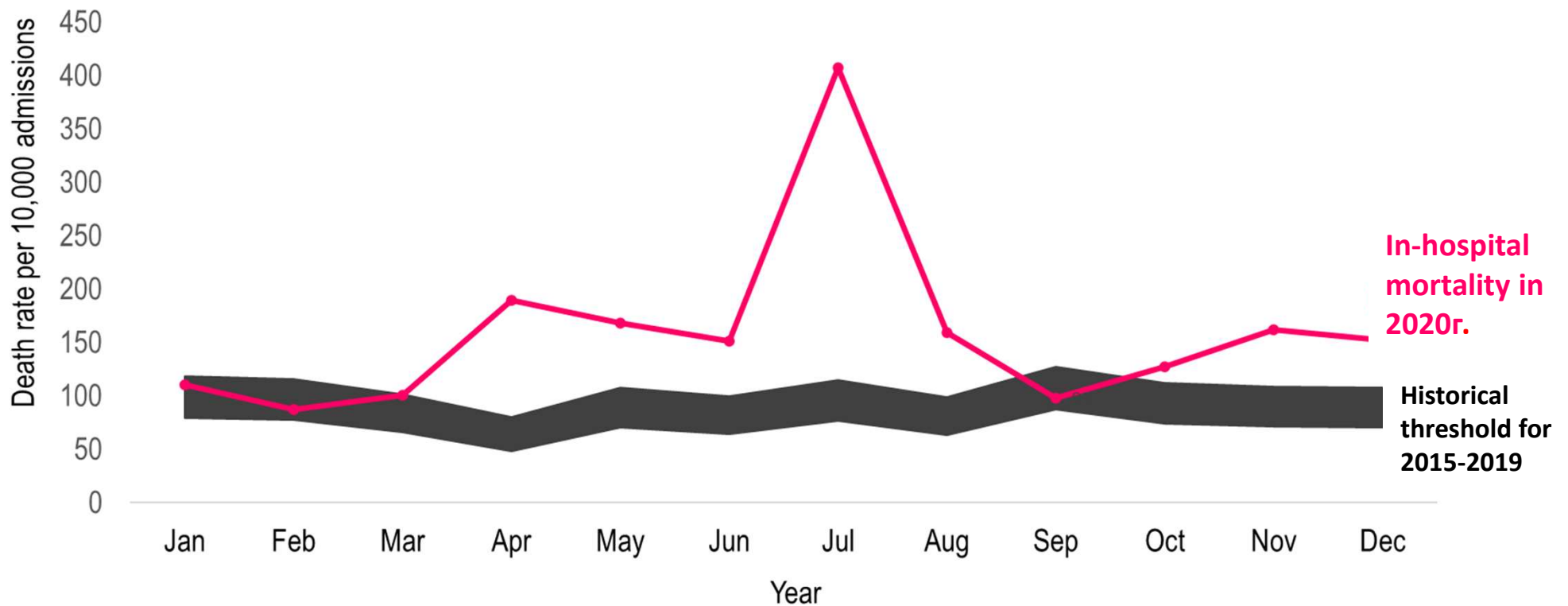


## Excess deaths in hospitals were **73% more than expected**

- 174 thousand patients admitted in 20 hospitals
- 2600 patients died
- 1015 excess deaths (73% more than expected)

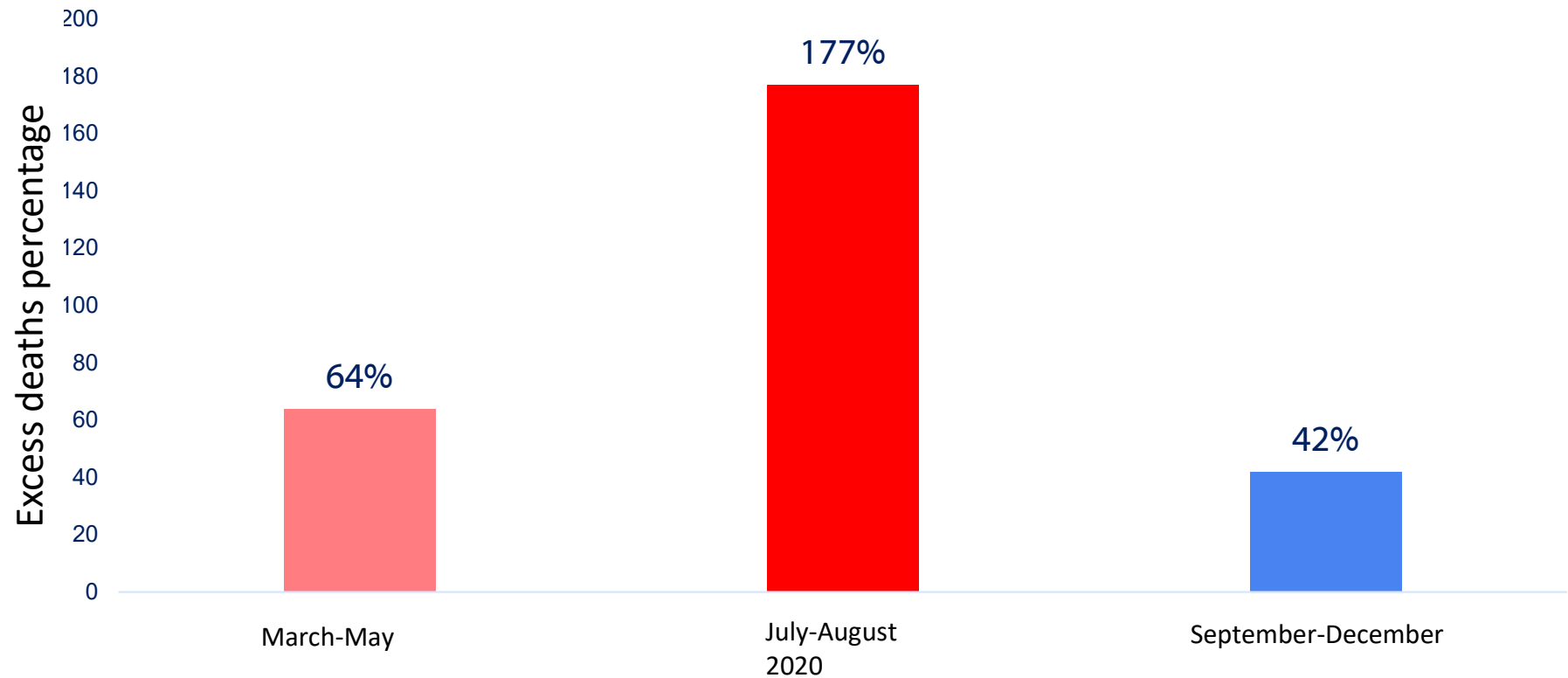


Deaths in hospitals in **2020 by 10,000 admissions** in 20 monthly compared to upper and lower thresholds (95% CI) of the historical average





## Percentage of excess deaths (ED%) by time periods (cumulatively for 20 hospitals)

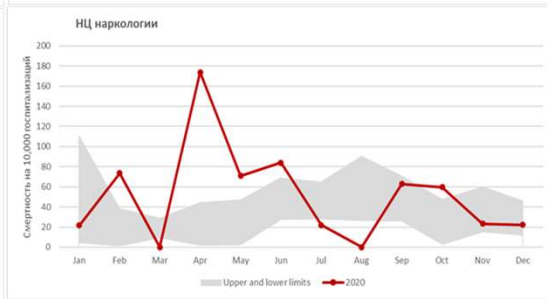
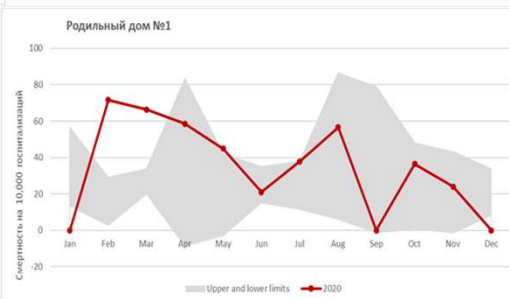
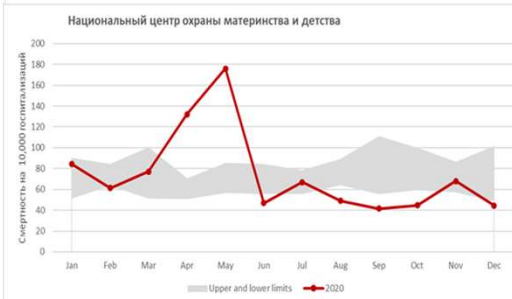
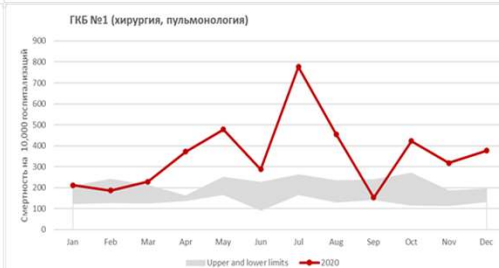
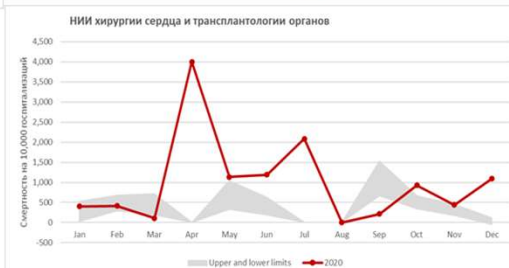
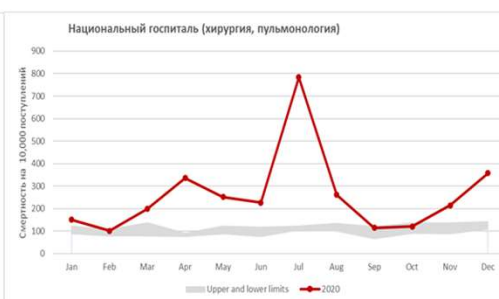
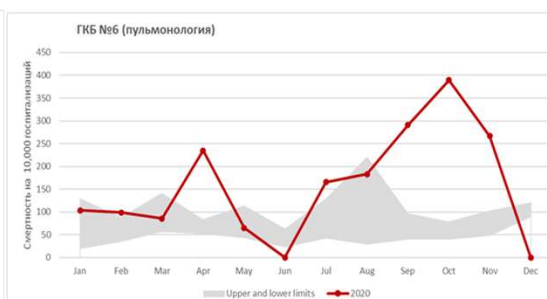
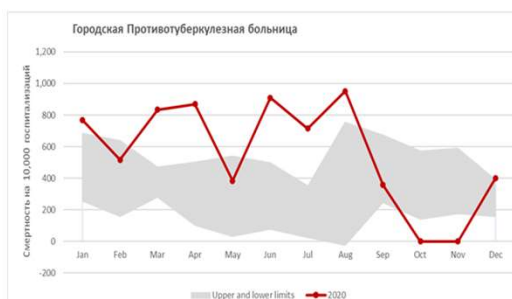


## ED in hospitals of Bishkek in 2020

- ED observed in 85% (17 of 20) hospitals
- ED on the level >100% was observed in 20% (4 of 20), (treatment with patients with COVID-19)
  - Infectious diseases hospital – 1026%
  - Maternity hospital №2 (repurposed into COVID hospital in March)-669%
  - Railroad hospital-244% (in May)
  - National center of oncology and hematology -116% (in March)



Out of 11 hospitals with ED in the beginning of the pandemic (March-May) until the peak in the population, **9(82%)** were ***TB treatment, surgical and obstetrics hospitals***



## Conclusions

- In general population (22%) and hospitals (73%) of Bishkek, mortality was higher than expected. ED was the highest in the periods when the healthcare system was overloaded (July 2020).
- The highest risk of death occurred in elderly people, men, as well as those with chronic and acute cardiac diseases, circulatory system diseases, diabetes mellitus, in children in the perinatal period.
- The 64% increase of ED in 30% of hospitals in the early stage of the pandemic (March-May) may be due to the fact that surgical manipulations, tuberculosis, and maternal/perinatal status are risk factors for fatal outcomes in combination with COVID-19.



## Measures supporting the reduction of ED

- Timely corrected mitigation measures in the population, increasing vaccination coverage especially among those at higher risk of hospitalization and death, can help prevent future spikes in ED and reduce the burden of COVID-19 on the health care system.
- It is important to ensure provision of required care to the population
  - Acute and emergency care,
  - Care for patients with chronic condition or those requiring prevention care (this type of care was delayed during the pandemic) in order to avoid future excess deaths



## Measures supporting the reduction of ED

- Providing regular prenatal care for pregnant women and care for newborns during and after delivery, as well as vaccinations during pregnancy are important to reduce ED in the perinatal and early neonatal periods.
- In the general population and hospitals, ongoing ED surveillance is recommended to respond quickly to increases in ED and the burden on the health care system and hospitals.
- This study prompted the development of electronic deaths register in the country



## Thanks:

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For more information, contact CDC  
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TTY: 1-888-232-6348 [www.cdc.gov](http://www.cdc.gov)

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

