

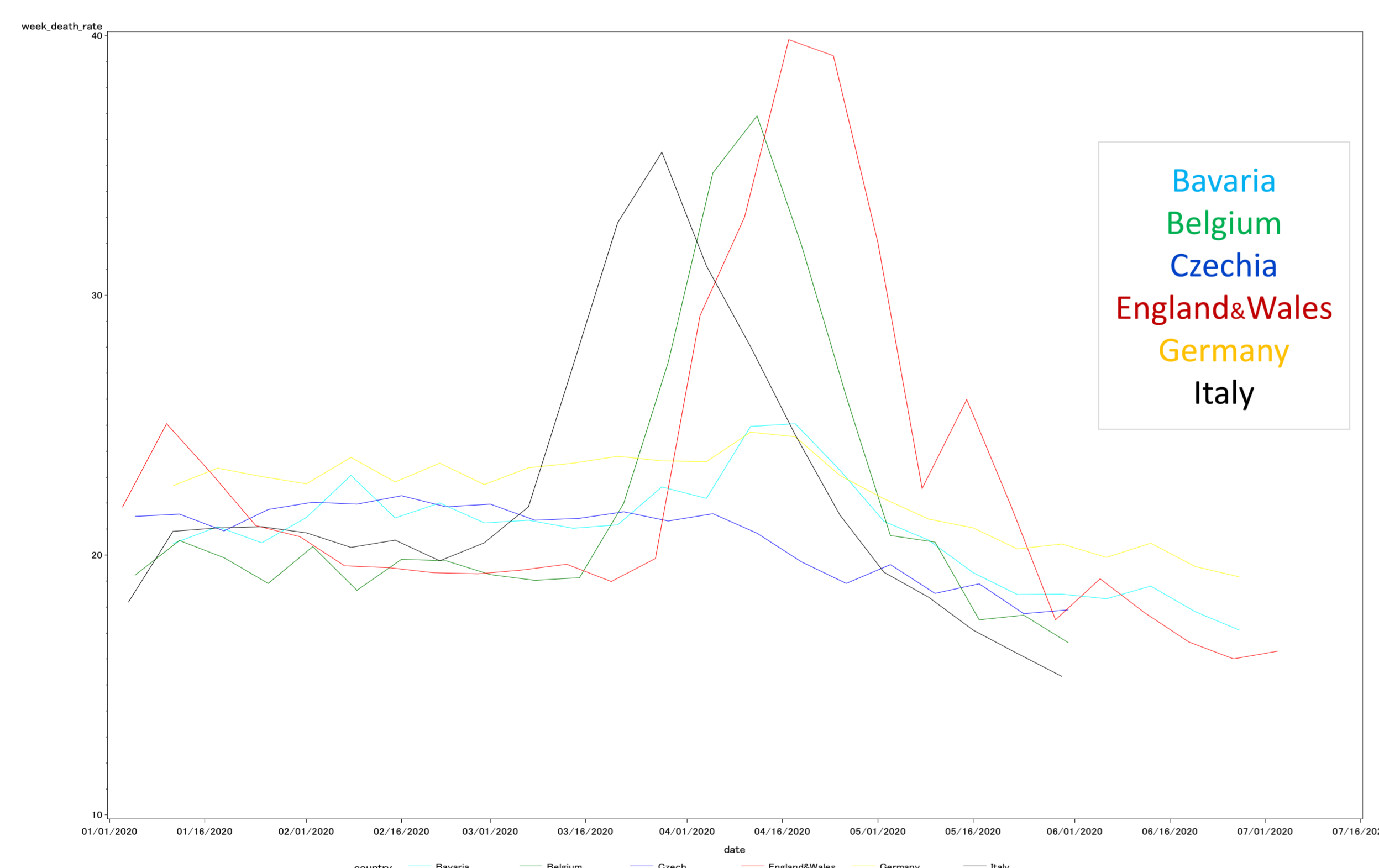
# Role of biobanks in „corona-crisis“ – example of biobanks in cross-border regions

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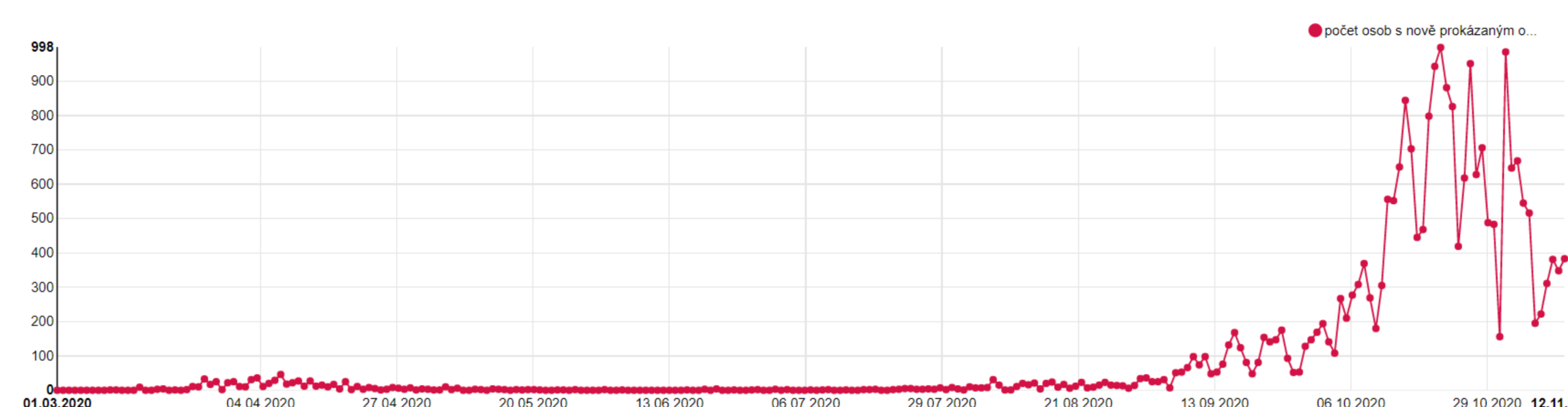
Biobank Pilsen is a hospital-based biobank incorporated in the Department of Immunodiagnosics (OID) of University Hospital Pilsen. It maintains disease-based collections of human serum and plasma specimens, focused on oncological diseases. It has a storage capacity of 7 deep-freezing units (-80°C) (total volume 3300 L). It is equipped with an automated pipetting system including an Intelligent Sample Bank (I.S.B.) system for aliquoting specimens on coded plates.

Already in March 2020, as the corona virus spreaded in the Czech Republic, the Biobank Pilsen started the „population“ collection of all serum and plasma samples which arrived to the laboratory; in May the collection reached 3.800 subjects. This collection is available for a population study.

In the spring and summer 2020, due to the firm measures taken in the Czech Republic (lockdown of schools, stores, culture, ...), the covid-19 pandemics was very well managed, as the Figure 1 shows. The week all-cause mortality rates of several european countries including Bavaria (cross-border region) are compared.



However, in the autumn 2020, the situation has worsened significantly. On the Figure 2, there is a plot of SARS-Cov2 positive subjects in the Pilsen region, from March to November 2020. The mortality data are not available yet.



In May 2020, the OID laboratory performed a comparison study of five automated immunoassays and 2 rapid tests for Cov 2 antibody detection in blood sera of 150 PCR-confirmed positive subjects. The results are in Table 1. According to our results, the best test was IgG SARS-COV2 test from Roche.

Company	Median	Positive results (N <sub>p</sub> / N <sub>c</sub> / %)	Negative results (N <sub>n</sub> / N <sub>c</sub> / %)
Abbott	3.07	83 / 100 / 83	26 / 26 / 100
Beckman Coulter	3.87	83 / 100 / 83	26 / 26 / 100
Diasorin	65.2	93 / 100 / 93	24*1, **1 / 26 / 92
Roche	75.7	98 / 100 / 98	25*1 / 26 / 96
Euroimmun	3.04	72 / 82 / 88	26 / 26 / 100
WIZ BIOTECH	-	62 / 82 / 76	26 / 26 / 100
Innovita	-	3 / 82 / 4 Invalid 22 / 82 / 25	26 / 26 / 100 Invalid 4 / 26 / 15

With this test, we measured Cov2 antibodies and also 25OH vitamin D which seems to have protective effect in COVID-19 disease, in sera of several groups of subjects:

- employees of University Hospital Pilsen (1500 subjects) as a „population sample“, and
- subjects after COVID-19 disease (PCR-confirmed) (450 subjects).

From 1500 UHP employees, only 78 had Cov 2 antibodies which indicate a 5,2% immunity rate in Czech population which corresponds with the results of similar studies.

Vitamin D nmol/L	UHP employees n = 1128	Covid 19 patients n = 180	
		JIP n = 70	Standardní n = 110
0 - 30	7 (1%)	51 (72%)	40 (25%)
30 -50	129 (11%)	4 (6%)	20 (16%)
50 -75	587 (52%)	13 (19%)	25 (20%)
75 -150	405 (36%)	2 (3%)	25 (22%)

In Table 2 there are results of vitamin D levels in UHP employees and COVID-19 patients hospitalized in UHP. While 36% of „population sample“ have normal vitamin D values, only 22% from COVID-19 patients in standard care and 3% of patients in intensive care have normal vit. D values. The cause-effect of huge vitamin D deficiency in patients is not determined yet.

These are several examples of research on COVID-19 disease performed on samples collected in the Biobank Pilsen.

Currently a collaborative project of UHP and University Clinic Regensburg is going on with the aim to compare the economic workflows of biobanks in order to optimize the cross-border collaboration in pandemic situation. Both biobanks are actively communicating and sharing their datas and experience.

**Conclusion:** Analysing the economical burdens and logistic difficulties and comparing them between biobanks would make the reaction to similar situations as the Covid-19 pandemic faster and much more effective. Working out similarities and regional differences and the sharing of knowledge will be an asset. Even with closed borders, it will be possible for the cooperating biobanks to work together, due to the establishment of standardised operating procedures and a functioning digital infrastructure. With this, the partners build a foundation for effective cross-border help during future pandemics.