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Supplementary Appendix

This appendix has been provided by the authors to give readers additional information about their work.

Supplement to: Aiken ARA, Starling JE, Gomperts R, Scott JG, Aiken CE.

Demand for Self-Managed Online Telemedicine Abortion in Eight European Countries During the COVID-19 Pandemic

Demand for Self-Managed Online Telemedicine Abortion in Eight European Countries During the COVID-19 Pandemic

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Introduction

The first wave of the COVID-19 pandemic posed challenges for the provision of abortion care in Europe. Reallocation of resources, redeployment of staff, and social distancing requirements all introduced new barriers to in-person clinic visits.[1,2]

Countries differed in their policy responses to these new challenges. Great Britain expanded remote access to medication abortion, allowing teleconsultation with providers, and mifepristone and misoprostol to be provided by mail.[3-5] France extended the ability to take abortion medications at home following an in-person visit with a healthcare professional from 7 weeks to 9 weeks of gestation.[6] Germany allowed mandatory pre-abortion counselling to take place by phone or video teleconsult instead of in person.[7] Most other countries, however, made few changes to medication abortion service models and continued to require fully in-person provision, despite calls from human rights groups to prioritize patient safety and expand remote access.[7,8]

We assessed whether demand for online medication abortion changed significantly in eight countries after implementation of stay-at-home orders intended to reduce the spread of COVID-19 in Europe, using online medication abortion request data from Women on Web, a non-profit organisation that provides telemedicine medication abortion services up to 10 weeks of gestation.[9]

Study Design and Methods

We examined data from Women on Web, a non-profit organization that provides medical abortion services in Europe up to 10 weeks' gestation via online telemedicine.[9] We obtained the daily number of requests from eight countries between January 1st, 2019 and June 1st,

2020 (the last day that lockdown measures were lifted in a country included in the analysis). Our analytic sample includes eight countries: Germany, Hungary, Italy, Malta, The Netherlands, Northern Ireland, Portugal, and Great Britain. WoW does not accept consultations from all countries in Europe, because abortion is legal and normally relatively accessible in most places. Among those countries that WoW does serve, some have only a few consultations requests over the course of a year. We excluded countries that had too few requests to reliable detect differences in request numbers between the 'before' and 'after' periods (i.e. fewer than 10 expected requests in the 'after' period). We also excluded Spain, because the Spanish Government censored the WoW website during the study period and so no requests could be made,[10] and Poland because the number of requests made to WoW has been unstable since the beginning of 2020.

We analyzed trends in these requests using a regression-discontinuity design, using a likelihood-ratio test to compare count models.[11,12] For each country, we include data from 1st January 2019 to the date that lockdown measures were lifted in each country. We designated a 'before' period, which began on 1st January 2019 and ended on the date that each individual country's government issued their first 'stay-at-home' directive. The one exception was Germany, where the 'before' period begins on 1st January 2020, due to the fact that WoW did not accept consultations from Germany in until late 2019. The 'after' period began the first day after the 'stay-at-home' directive was issued for each country, and ended on the first day that the directives were eased in each country. We incorporate a discontinuity for each country for the dates on which stay-at-home orders were in place. To allow sufficient power to detect differences, our analysis included only countries that had at least 10 total expected requests in the "before" period based on baseline trends. As only

Malta did not issue a population-wide directive, we instead used the date that the Maltese government issued a directive to close public places as the discontinuity point.[13] Women on Web has accepted consultations from Northern Ireland and Malta since 2006, Hungary since 2013, Great Britain since 2016, Italy since 2018, and Germany, the Netherlands, and Portugal since 2019.

Our aim was to test whether the rate of Women on Web requests significantly changed in the "after" period. We fit separate generalized linear models (GLMs) to each country's daily requests from the beginning of the "before" period until the date stay-at-home measures were lifted. Each country's model incorporated a dummy variable taking the value of 1 for days in the "after" period, where the stay-at-home order was in place. For Northern Ireland, both the null and discontinuity models included a dummy variable indicating the period after 11th April 2020, when Northern Ireland's service model changed due to legalization of abortion. [14]

To determine the functional form of each country's GLM, we first fit a Poisson model with a log link and assessed goodness of fit using a chi-squared test. For any countries with a poor Poisson model fit ($p<0.05$), we refit a Negative Binomial GLM to account for over-dispersion and reassessed fit. This resulted in well-fitting models ($p \geq 0.05$) for all countries. For a single country, our Poisson GLM can be formalized as

$$log(cases_t) = t + x_t + \epsilon_t, \;\; \epsilon_t \sim N(0, \sigma^2) \quad (1)$$

while the corresponding null model is written as

$$log(cases_t) = t + \epsilon_t, \;\; \epsilon_t \sim N(0, \sigma^2) \quad (2)$$

where t represents days, $cases_t$ is the number of Women on Web requests on day t, and and x_t takes values of 0 or 1, depending on whether stay-at-home restrictions for that country are in place on day t.

We include an additional term in the models for Northern Ireland due to the change in abortion legalization. The Poisson GLM model for Northern Ireland can be formalized as

$$log(cases_t) = t + x_t + z_t + \epsilon_t, \;\; \epsilon_t \sim N(0, \sigma^2) \quad (3)$$

where z_t takes values of 0 or 1, depending on whether day t falls before 11th April, 2020. The corresponding null model is

$$log(cases_t) = t + z_t + \epsilon_t, \;\; \epsilon_t \sim N(0, \sigma^2). \quad (4)$$

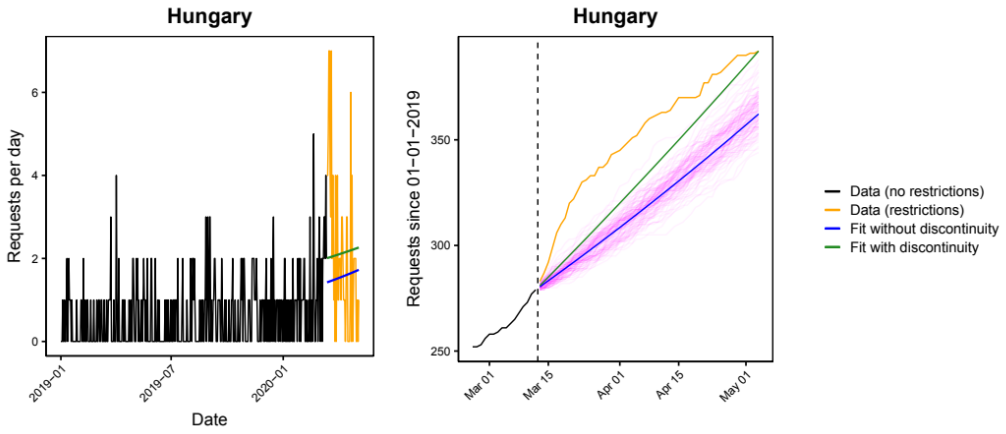
We also compiled information for each country included in the analysis on several metrics we hypothesised could be related to demand for online abortion: stringency of 'stay-at-home' requirements; deaths due to COVID-19; economic assistance provided by governments in response to the pandemic; and abortion service provision before and during the pandemic. These metrics were defined by and obtained from the Oxford COVID-19 Government Response Tracker (OxCGRT). The stringency of 'stay-at-home' requirements is expressed as a normalised ordinal score resulting in an index (0-100) that reflects the stringency of lockdown on any given day. We selected the highest daily score for each country within the study period. Deaths due to COVID-19 were defined as the cumulative total of COVID-19 deaths reported by each country on the first day during the study period when the stringency of 'stay-at-home' index fell. The number of deaths reported is dependent on how each country defines COVID-19 deaths. Economic assistance provided by governments is based on the maximum level of the normalised economic support index, based on both the level of income support and household debt/contract relief provided by the government of each country. We selected the highest daily score for each country within the study period. We examined each of these metrics across each country included in the analysis to assess their relationship to changes in requests to WoW.

Results

We refer readers to Figure 1 and Table 1 in the main paper for presentation of our main results. Here, we provide a supplementary figure to illustrate our methods. Figure S1 lends intuition to the regression discontinuity model for a single country, and illustrates Hungary's significant increase in cumulative WoW requests after implementation of the stay-at-home request, compared to the expected number requests under the null model.

136

137 Figure S1



138 Left panel: The daily number of requests for Hungary since January 1, 2019. Requests on
139 dates without stay-at-home restrictions are black; requests on dates with restrictions are
140 orange. The blue line shows the model fit without discontinuities (the null model), and the
141 green line shows the model fit with the stay-at-home discontinuity. Right panel: The same
142 data, shown in terms of cumulative requests since 1st January, 2019. The pink lines are 250
143 Monte Carlo simulations from the null model. These corroborate the likelihood-ratio test
144 and suggest the observed rate of requests in Hungary is inconsistent with the null model.
145 The model with a discontinuity fits the data well, as measured by a chi-squared goodness-of-
146 fit test ($p > 0.05$).

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