Supplemental material

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BMJ Sex Reprod Health

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1   Supplementary Appendix

2   This appendix has been provided by the authors to give readers additional information about

3   their work.

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

5   Demand for Self-Managed Online Telemedicine Abortion in Eight European Countries

6   During the COVID-19 Pandemic

7 **Demand for Self-Managed Online Telemedicine Abortion in Eight European**

8 **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,

59 2020 (the last day that lockdown measures were lifted in a country included in the analysis).

60 Our analytic sample includes eight countries: Germany, Hungary, Italy, Malta, The

61 Netherlands, Northern Ireland, Portugal, and Great Britain. WoW does not accept

62 consultations from all countries in Europe, because abortion is legal and normally relatively

63 accessible in most places. Among those countries that WoW does serve, some have only a

64 few consultations requests over the course of a year. We excluded countries that had too few

65 requests to reliable detect differences in request numbers between the 'before' and 'after'

66 periods (i.e. fewer than 10 expected requests in the 'after' period). We also excluded Spain,

67 because the Spanish Government censored the WoW website during the study period and so

68 no requests could be made,[10] and Poland because the number of requests made to WoW has

69 been unstable since the beginning of 2020.

70 We analyzed trends in these requests using a regression-discontinuity design, using a

71 likelihood-ratio test to compare count models.[11,12] For each country, we include data from 1st

72 January 2019 to the date that lockdown measures were lifted in each country.   We

73 designated a 'before' period, which began on 1st January 2019 and ended on the date that

74 each individual country's government issued their first 'stay-at-home' directive. The one

75 exception was Germany, where the 'before' period begins on 1st January 2020, due to the

76 fact that WoW did not accept consultations from Germany in until late 2019. The 'after'

77 period began the first day after the 'stay-at-home' directive was issued for each country, and

78 ended on the first day that the directives were eased in each country. We incorporate a

79 discontinuity for each country for the dates on which stay-at-home orders were in place.   To

80 allow sufficient power to detect differences, our analysis included only countries that had at

81 least 10 total expected requests in the "before" period based on baseline trends. As only

82   Malta did not issue a population-wide directive, we instead used the date that the Maltese

83   government issued a directive to close public places as the discontinuity point.[13] Women on

84   Web has accepted consultations from Northern Ireland and Malta since 2006, Hungary since

85   2013, Great Britain since 2016, Italy since 2018, and Germany, the Netherlands, and

86   Portugal since 2019.

87   Our aim was to test whether the rate of Women on Web requests significantly changed in

88   the "after" period. We fit separate generalized linear models (GLMs) to each country's daily

89   requests from the beginning of the "before" period until the date stay-at-home measures

90   were lifted. Each country's model incorporated a dummy variable taking the value of 1 for

91   days in the "after" period, where the stay-at-home order was in place. For Northern Ireland,

92   both the null and discontinuity models included a dummy variable indicating the period after

93   11th April 2020, when Northern Ireland's service model changed due to legalization of

94   abortion. [14]

95   To determine the functional form of each country's GLM, we first fit a Poisson model with

96   a log link and assessed goodness of fit using a chi-squared test. For any countries with a poor

97   Poisson model fit ($p<0.05$), we refit a Negative Binomial GLM to account for over-

98   dispersion and reassessed fit. This resulted in well-fitting models ($p \geq 0.05$) for all countries.

99   For a single country, our Poisson GLM can be formalized as

100
$$log(cases_t) = t + x_t + \epsilon_t, \ \ \epsilon_t \sim N(0, \sigma^2) \tag{1}$$

101   while the corresponding null model is written as

102
$$log(cases_t) = t + \epsilon_t, \ \ \epsilon_t \sim N(0, \sigma^2) \tag{2}$$

103   where t represents days, $cases_t$ is the number of Women on Web requests on day t, and

104   and x_t takes values of 0 or 1, depending on whether stay-at-home restrictions for that

105   country are in place on day t.

106

107   We include an additional term in the models for Northern Ireland due to the change in

108   abortion legalization. The Poisson GLM model for Northern Ireland can be formalized as

109
$$log(cases_t) = t + x_t + z_t + \epsilon_t, \ \ \epsilon_t \sim N(0, \sigma^2) \tag{3}$$

110   where z_t takes values of 0 or 1, depending on whether day t falls before 11th April, 2020.

111   The corresponding null model is

112
$$log(cases_t) = t + z_t + \epsilon_t, \ \ \epsilon_t \sim N(0, \sigma^2). \tag{4}$$

113   We also compiled information for each country included in the analysis on several metrics

114   we hypothesised could be related to demand for online abortion: stringency of 'stay-at-

115   home' requirements; deaths due to COVID-19; economic assistance provided by

116   governments in response to the pandemic; and abortion service provision before and during

117   the pandemic. These metrics were defined by and obtained from the Oxford COVID-19

118   Government Response Tracker (OxCGRT). The stringency of 'stay-at-home' requirements

119   is expressed as a normalised ordinal score resulting in an index (0-100) that reflects the

120   stringency of lockdown on any given day. We selected the highest daily score for each

121   country within the study period. Deaths due to COVID-19 were defined as the cumulative

122   total of COVID-19 deaths reported by each country on the first day during the study period

123   when the stringency of 'stay-at-home' index fell. The number of deaths reported is

124   dependent on how each country defines COVID-19 deaths. Economic assistance provided

125   by governments is based on the maximum level of the normalised economic support index,

126   based on both the level of income support and household debt/contract relief provided by

127   the government of each country. We selected the highest daily score for each country within

128   the study period. We examined each of these metrics across each country included in the

129   analysis to assess their relationship to changes in requests to WoW.

130   Results

131   We refer readers to Figure 1 and Table 1 in the main paper for presentation of our main

132   results. Here, we provide a supplementary figure to illustrate our methods. Figure S1 lends

133   intuition to the regression discontinuity model for a single country, and illustrates Hungary's

134   significant increase in cumulative WoW requests after implementation of the stay-at-home

135   request, compared to the expected number requests under the null model.

136

137   Figure S1
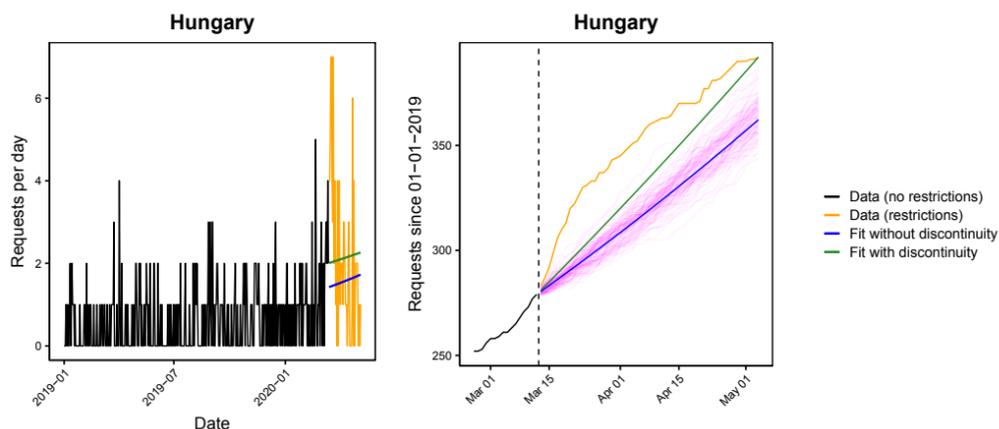
138   Left panel: The daily number of requests for Hungary since January 1, 2019. Requests on

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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