# The Impacts of Accessibility to Telephone-Based Services in Primary Care on Health Care Utilization

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**Work in progress**

# Background and Motivation

## The Impacts Integrating Telephone-Based Health Services



- During the COVID-19 pandemic, telephone-based services became an integral part of healthcare services.
- This study explores the effects and implications of this integration:
  - ❑ Significantly enhanced access to healthcare
  - ❑ Potentially influencing the frequency of patient-physician interactions and the volume of referrals and prescriptions issued.
  - ❑ Different impacts on various population groups may affect disparities in access to healthcare services among these groups.
- Substantial economic impact (potentially) – The budget of health funds in 2023 was approximately 71 billion shekels.

# Contributions to the Existing Literature



1. **High-Quality Data Files- Reliance on a large, comprehensive, and stable sample over the years.**
   - **Maccabi Healthcare Services**: The second-largest health insurer in Israel, covering 27% of the population.
   - **High coverage rates -** resulting from the National Health Insurance Law
   - Low switching rates between insurers (HMOs) in Israel **- contribute to a stable sample over the years**
2. **Time Frame: 2017-2022: can reflect impacts during the post-pandemic period.**
3. **Methodology: Utilization of the difference-in-differences approach.**
4. **Additional Analyses**: Examination of doctors' propensity to use telephone-based services and the specific effects on various population groups.
5. **Focus on areas less emphasized in previous studies**, such as the impacts on asynchronous healthcare and sick leave.

# Research Questions and Main Findings



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1. How did the implementation of phone-based healthcare services in primary care during the COVID-19 pandemic impact healthcare service utilization?
2. Did these effects vary among different population groups?

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1. How did the implementation of phone-based healthcare services in primary care during the COVID-19 pandemic impact healthcare service utilization?
2. Did these effects vary among different population groups?

**Main Findings:**

1. The implementation has likely led to an increase in the total number of synchronous interactions between doctors and patients, a shift from asynchronous to synchronous services, and a reduction in the number of prescriptions issued.
2. The implementation may have resulted in a decrease in the proportion of medical services received by older adults and individuals with chronic illnesses compared to the rest of the population.

# Data and Sample



1. **Based on Maccabi Healthcare Services Database:**
   - Comprehensive demographic information for all members, including gender, age, socioeconomic status, peripherality index, and chronic illness.
   - Detailed records of all primary care physician interactions, including prescriptions, referrals, and sick leave approvals.
2. **Sample:**
   - **Non-Haredi Jewish population -** to avoid potential biases.
   - **Adults aged 25 and older -** to avoid potential biases.
   - **Panel data -** of individuals continuously enrolled with Maccabi throughout the research period (2017-2022).
3. **Scope: Nearly one million insured individuals (963,374) treated by 2,042 primary care doctors.**

# Methodology – Difference-in-Differences

## Two Stages - Model Equations



**First stage -** Estimating Physicians' Propensity to Adopt Telephone-based Services in Primary Care

$$\mathbf{Remote_{ijt}} = \alpha_j + \mathcal{T}_t + \gamma \mathbf{X_i} + \mathcal{V}_{ijt}$$

**Where:**

$\mathbf{Remote}_{ijt}$ **-** Binary indicator for the mode of communication during interactions (1 = via telephone, 0 = face-to-face).

patient (i) received service from physician (j) in quarter (t).

$\mathbf{X_i}$ **-** Represents a set of demographic characteristics for the patient (age, gender, socioeconomic, periphearlity, chronic illness)

$\mathcal{T}_t$ **-** Fixed effects for the quarter to account for potential seasonal variations.

$\alpha_j$ **- The main component estimated in the regression represents the fixed effects related to the physician's propensity to provide health services via phone**

Measured during the period when the COVID-19 pandemic significantly influenced public behavior **(Q2-2020 to Q1 2021).**

# Methodology – Difference-in-Differences

## Two Stages - Model Equations



**Second stage -** Assessing the Impacts of Access to Telephone-Based Health Services in Primary Care on Healthcare Utilization

$$\mathbf{Outcome_{it}} = \mathbf{\beta High_{j(i)} * Post_t} + \rho\mathbf{Post_t} + \mu_i + \zeta_t + \mathbf{\omega_{l(i)}} + \mathbf{\delta X_{it}} + \mathbf{\varepsilon_{it}}$$

**Where:**

$\mathbf{Outcome_{it}}$**-** Represents a set of dependent variables, specifically the total number of each health service provided per quarter for patient (i) in quarter (t).

$\mathbf{High_{j(i)} * Post_t}$ **-** Interaction between high access to telephone−based services and period following the significant impact of COVID−19

$\zeta_t$ - Fixed effects for the quarter to account for potential seasonal variations.

$\mu_i$ **- fixed effect for each patient**

*** 2017-2022 Excluding the Period of significant COVID-19 Impact (2020.Q2 – 2021.Q1).**

**In addition, a number of triple difference-in-differences (DDD) analyses were conducted for specific population groups.**

# Findings set 1 - The Impacts of Access to Telephone-Based Services, Continuous Variable



**The Impacts of Access to Telephone-Based Services in Primary Care on Healthcare Utilization Patterns finding from Difference-in-Differences analysis**

Number of interactions between individuals and doctors per quarter, 2017-2022**

| | Face to face interactions | Telephone-based interactions | Total synchronous interactions | Asynchronous interactions (massages left in website) |
|---|---|---|---|---|
| Post COVID-19 pandemic | -0.084***<br>(0.015) | 0.070***<br>(0.005) | -0.014<br>(0.014) | 0.404***<br>(0.007) |
| DiD main interaction: post COVID-19 * higher access to telephone-based services | -0.385***<br>(0.042) | 0.501***<br>(0.019) | 0.116***<br>(0.039) | -0.136***<br>(0.022) |
| Fixed effects: individual and quarter in year | V | V | V | V |
| Number of Observations | 963,374 | 963,374 | 963,374 | 963,374 |
| Adjusted $R^2$ | 0.418 | 0.178 | 0.413 | 0.431 |

# Findings set 1 - The Impacts of Access to Telephone-Based Services, Continuous Variable



**The Impacts of Access to Telephone-Based Services in Primary Care on Healthcare Utilization Patterns finding from Difference-in-Differences analysis**

Number of referrals, prescriptions and sick leaves to individual per quarter, 2017-2022**

| | Referrals | Prescriptions | Sick leaves |
|---|---|---|---|
| Post COVID-19 pandemic | 0.165***<br>(0.006) | 0.220***<br>(0.008) | 0.008***<br>(0.003) |
| DiD main interaction: post COVID-19 * higher access to telephone-based services | -0.03<br>(0.02) | -0.073***<br>(0.026) | 0.016**<br>(0.008) |
| Fixed effects: individual and quarter in year | V | V | V |
| Number of Observations | 963,374 | 963,374 | 963,374 |
| Adjusted $R^2$ | 0.234 | 0.467 | 0.338 |

# Findings set 2 - Disparities Among Different Population Groups (Triple diff in diff, DDD)



**Sum table for the relative impacts of access to telephone-based services on specific population groups - finding from triple Difference-in-Differences analysis**

Number of interactions between individuals and doctors per quarter, 2017-2022**

| | Face to face interactions | Telephone-based interactions | Total synchronous interactions | Asynchronous interactions (massages left in website) |
|---|---|---|---|---|
| Diagnosed Chronic Illness | -0.154***<br>(0.017) | 0.089***<br>(0.006) | -0.064***<br>(0.017) | 0.032***<br>(0.009) |
| Older People (66+) versus Younger | -0.163***<br>(0.02) | 0.084***<br>(0.007) | -0.080***<br>(0.02) | 0.056***<br>(0.012) |
| Low Socioeconomic Status - clusters 1-4 (lower) versus clusters 5-10 (higher) | -0.130***<br>(0.032) | 0.069***<br>(0.012) | -0.062*<br>(0.032) | 0.054***<br>(0.014) |
| Living in peripheral areas – Clusters 1-4 (more peripheral) versus clusters 5-10 | -0.056<br>(0.055) | 0.035<br>(0.023) | -0.02<br>(0.053) | -0.001<br>(0.03) |
| Women versus men | -0.037***<br>(0.007) | 0.054***<br>(0.003) | 0.017**<br>(0.007) | -0.012**<br>(0.005) |

# Findings set 2 - Disparities Among Different Population Groups (Triple diff in diff, DDD)



**Sum table for the relative impacts of access to telephone-based services on specific population groups - finding from triple Difference-in-Differences analysis**

Number of referrals, prescriptions and sick leaves to individual per quarter, 2017-2022**

| | Referrals | Prescriptions | Sick leaves |
|---|---|---|---|
| Diagnosed Chronic Illness | -0.016**<br>(0.008) | -0.024**<br>(0.01) | 0.002<br>(0.003) |
| Older People (66+) versus Younger | -0.022***<br>(0.008) | -0.018<br>(0.011) | -0.001<br>(0.004) |
| Low Socioeconomic Status - clusters 1-4 (lower) versus clusters 5-10 (higher) | 0.013<br>(0.012) | -0.019<br>(0.018) | 0.002<br>(0.005) |
| Living in peripheral areas – Clusters 1-4 (more peripheral) versus clusters 5-10 | 0.02<br>(0.02) | 0.021<br>(0.026) | 0.006<br>(0.011) |
| Women versus men | 0.005<br>(0.004) | -0.003<br>(0.005) | 0.006**<br>(0.002) |

# Conclusions and Policy Recommendations



**The implementation of telephone-based services has likely resulted in:**

1. **An increase in the total number of synchronous interactions between doctors and patients.**
2. **A shift from asynchronous to synchronous interactions** (more moderate increase)
3. **A reduction in the number of prescriptions issued** (more moderate increase)
4. **A decrease in the proportion of medical services received by older adults and individuals with chronic illnesses compared to the rest of the population.**

**While these findings may highlight several benefits of implementing telephone-based health services, they also emphasize the need to ensure that all population groups can benefit equally, or at least, are not adversely affected by the implementation of these services.**

# Thanks