

Section 2: English Abstract

Full title of research project

Analyzing the utilization of second opinions as a function of the payment method

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Key Words

Second opinion; health seeking behaviors; inequalities; health policy.

Abstract

An abstract of up to **300 words** should include these headings: (1) Scientific Background (2) Objectives (3) Methodology (4) Findings (5) Conclusions (6) Policy Implications / recommendations

Scientific Background: Second opinion (SO) is a main expenditure of the health-funds' (HFs) supplementary insurance in Israel. It increases utilization of private health services. A new legislation has canceled the option of "reimbursement" for patients who paid for SO provided by independent surgeons and limits these services to surgeons who are under contract with the supplementary insurance by paying a "direct-co-payment". Analyzing and documenting the current situation will improve the ability to track consequences of this policy.

Objectives: To analyze SO utilization by payment method: "reimbursement" and "direct-co-payment" and to identify factors affecting utilization and provision, to examine demand and supply of physicians and to evaluate inequalities in accessibility by these payment methods.

Methodology: An electronic medical records analysis (years of 2011-2017) and a telephone survey with a representative sample of the general Israeli population asking people about their SO payment, willingness-to-pay etc.

Findings: 58% out of 316 patients having supplementary insurance in 2011 mentioned they would consider seeking a SO even if the direct-co-payment will increase from 100 to 200 NIS. In practice, although the direct-co-payment rate increased by 50% in the years of 2011-2016, there was an increase of 45% in the demand of patients for SO consultations via the supplementary insurance. Patients from the Arab sector, low socio-economic group, immigrants and from central geographical areas tended to seek SOs by paying a "direct-co-payment". Patients from periphery areas tended to seek SOs through the "reimbursement" method. In 2011 as well as 2017 consultants with the academic title "professor", physicians in a managerial position at a hospital and specialists with seniority of 26 years and above tended to provide SOs by the reimbursement method.

Conclusions: Patients from periphery areas tended to seek SOs by reimbursement method, despite the high co-payment. This may hint on inequality in the supply of physicians in the arrangement.

Implications: There is a need to improve access to SO consultants in periphery areas, in order to increase patients' freedom of choice among SO providers.

Section 3: Hebrew Abstract

כותרת מלאה של המחקר

ניתוח הקשר בין האופן בו ניתנת חוות דעת שנייה לבין דפוסי השימוש ונותני השירות בהסדר לעומת החזר כספי

חוקרים: שם מלא ושיוך מוסדי

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מילות מפתח

חוות דעת רפואית שנייה, נגישות, זמינות ופערים במערכת הבריאות, שיווניות, מדיניות בריאות, מימון.

תקציר

תקציר שאורכו עד **200 מילים**, אשר יכלול כותרים אלה: (1) רקע (2) מטרות (3) שיטה (4) ממצאים עיקריים (5) מסקנות (6) המלצות / השלכות לקובעי המדיניות

רקע: חוות דעת (חו"ד) רפואית שנייה מהווה מרכיב עיקרי בעלות של תוכניות השב"ן. לאחרונה עבר שינוי חקיקה לפיו מבטח בשב"ן לא יוכל לקבל החזר כספי על הוצאתו בגין חו"ד שנייה שניתנה באמצעות כירורגים במסלול 'החזר' אלא רק באמצעות כירורגים במסלול 'הסדר' (להוציא יועצים שאינם מנתחים). ניתוח המצב טרם החקיקה יאפשר לקבל מידע על מאפייני השימוש של שיטות אלו במטרה לשפר את היכולת לעקוב אחר השלכות המדיניות בתחום זה.

מטרות: להעריך הבדלים בפנייה לחו"ד רפואית שנייה במסגרת תוכניות השב"ן במסלול 'החזר' לעומת 'הסדר', בחינת מאפייני הפונים, עמדות ודפוסי שימוש, בחינת הבדלים במאפייני הרופאים בשני מסלולים אלו, ביקוש מול היצע ואי שוויון.

מתודולוגיה: ניתוח רשומות אלקטרוניות רפואיות של ביקורים אצל רופאים מומחים בקהילה ובשב"ן וחלק מסקר טלפוני של האוכלוסייה הבוגרת בישראל לגבי התשלום, רצון לשלם לחו"ד שנייה וכו'.

ממצאים: חלה עלייה של 45% בביקוש לחו"ד שנייה שבהסדר בשב"ן בין 2011 ל-2016, למרות שסכום ההשתתפות העצמית לחו"ד שנייה שבהסדר עלה ב-50%. מטופלים מהמגזר הערבי, ממעמד סוציו-אקונומי נמוך, עולים חדשים וממרכז הארץ נטו לפנות לחו"ד במסלול ההסדר. מטופלים מהפריפריה נטו לפנות לחו"ד במסלול ההחזר. ב-2011 בדומה ל-2017 יועצים בשב"ן במעמד פרופסור, בעמדה ניהולית בבי"ח ובעלי וותק בהתמחות למעלה מ-26 שנים נטו לספק יותר יעוצים במסלול ההחזר.

מסקנות: מטופלים מהפריפריה נטו לפנות לחו"ד בשיטת ההחזר, למרות ההשתתפות העצמית הגבוהה, מה שמרמז על אי שוויון באספקת שרותי חו"ד שנייה בשיטת ההסדר בפריפריה.

השלכות: יש צורך לשפר את הגישה לחו"ד שנייה בפריפריה, על מנת להגדיל את חופש הבחירה של נותני השירות.

Section 4: Executive Summary- Hebrew

רקע מדעי

חוות דעת (חו"ד) רפואית שנייה מהווה מרכיב עיקרי בעלות של תוכניות השב"ן ומעודדת שימוש ברפואה פרטית. לאחרונה עבר שינוי חקיקה לפיו מבוטח בשב"ן לא יוכל לקבל החזר כספי על הוצאתו בגין חו"ד שנייה שניתנה באמצעות כירורגים במסלול 'החזר' אלא רק באמצעות כירורגים במסלול 'הסדר' (בהשתתפות עצמית מוגבלת). אפשרות ההחזר עדיין קיימת עבור יועצים שאינם מנתחים. ניתוח ותיקוד המצב טרם החקיקה יאפשרו לקבל מידע על מאפייני השימוש של שיטות אלו במטרה לשפר את היכולת לעקוב אחר השלכות המדיניות בתחום זה.

מטרות המחקר

להעריך הבדלים בפנייה לחו"ד רפואית שנייה במסגרת תוכניות השב"ן במסלול 'החזר' לעומת 'הסדר', בחינת מאפייני הפונים לפי שיטות התשלום, עמדות ודפוסי שימוש, בחינת הביקוש וההיצע של רופאים מנתחים לפי שתי שיטות התשלום, כולל מאפיינים דמוגרפים ופרופסיונליים ולהעריך היבטים של אי שוויון בפריפריה מול מרכז הארץ.

שיטות המחקר

ניתוח רשומות אלקטרוניות רפואיות של ביקורי מטופלים על בסיס מאגרי מידע ממסדי הנתונים של הרפואה היועצת בקהילה ובנוסף ביקורי מטופלים ומאפייני רופאים בשב"ן של שרותי בריאות כללית בשנים 2011-2017. בנוסף, מספר שאלות מסקר לקוחות טלפוני בקרב האוכלוסייה הבוגרת בישראל שנערך בשנת 2011, בנוגע להעדפות תשלום לחו"ד שנייה, הבדלים בתפיסות לפי שיטת תשלום וכו'.

הממצאים

המדגם המייצג בסקר כלל 609 משיבים. 344 ציינו כי פנו לחו"ד שנייה בשנת 2011, מתוכם 177 (53%) ציינו ששילמו מעל 100 ש"ח לרופא עבור הייעוץ במסגרת השב"ן של הקופה: 68% (n=120) במסלול הסדר; 32% (n=57) במסלול החזר. 80% ממבוטחי כללית מושלם ציינו שישקלו פנייה דרך רופאים שבהסדר עם הקופה (n=316), מתוכם 58% (n=184) ישקלו פנייה במסגרת ההסדר גם במידה והעלות תעלה מ-100 ל-200 ש"ח.

לא נמצא הבדל מובהק בשביעות הרצון מחו"ד השנייה או בתחושת השיפור במצב הבריאותי בעקבות הייעוץ בחו"ד השנייה וגם לא במאפייני המשיבים בין מסלול הסדר לבין מסלול ההחזר.

ניתוח הרשומות הרפואיות מראה כי חלה עלייה של 45% בביקוש לחו"ד שנייה שבמסלול ההסדר בשב"ן בין 2011 ל-2016, למרות שסכום ההשתתפות העצמית לחו"ד שנייה שבהסדר עלה ב-50% (ל 150 ₪). מטופלים מהמגזר הערבי, ממעמד סוציו-אקונומי נמוך, עולים חדשים וממרכז הארץ נטו לפנות יותר לחו"ד במסלול ההסדר, לעומת זאת, מטופלים מהפריפריה נטו לפנות לחו"ד במסלול ההחזר. עולה כי שיעור היועצים ביחס למבקשי השירות בשיטת ההסדר ירד מ-2011 ל-2017 בפריפריה. ב-2011 בדומה ל-2017 יועצים בשב"ן במעמד פרופסור, בעמדה ניהולית בבי"ח ובעלי וותק בהתמחות למעלה מ-26 שנים נטו לספק יותר יועצים במסלול ההחזר. ב-2011 מנתחים שבהסדר נטו לספק יועצים במסלול ההסדר (עוד טרם הרגולציה).

מסקנות

זהו ניסיון ראשון מסוגו להעריך פניה לחו"ד שנייה לפי שיטת תשלום על ידי איחוד נדיר של שני מסדי נתונים- ביקורים ברפואה יועצת בקהילה ונתוני תביעות של הביטוחים המשלימים. המחקר מנתח למעשה מאפיינים והשפעות אפשריות של ההיקף ואופן התשלום של השתתפות עצמית של כיסוי ביטוחי ספציפי (חו"ד שנייה) על הביקוש לשירותים אלה, על ההיצע של נותני השירות ועל מידת השוויון (בהיבטים של נגישות כלכלית, זמינות השירות). בנוסף, טרם מחקר זה לא נעשתה הערכת היקף הביקוש לחו"ד שנייה לפי שיטת תשלום אל מול היצע הרופאים נותני שירות זה לפי שיטת התשלום בשב"ן.

מעניין לראות כי מטופלים ממרכז הארץ נטו לפנות לחו"ד במסלול ההסדר יותר מאשר החזר ולעומתם מטופלים מהפריפריה שנטו לפנות לחו"ד בשיטת ההחזר, למרות ההשתתפות העצמית הגבוהה, מה שמרמז על אי שוויון באספקת שירותי חו"ד שנייה בשיטת ההסדר בפריפריה. בנוסף עולה כי שיעור היועצים ביחס למבקשי השירות בשיטת ההסדר ירד מ-2011 ל-2017 בפריפריה מאחר ומספר היועצים במסלול ההסדר לא גדל באותו קצב כמו גידול האוכלוסייה, כלומר הביקוש גדל הרבה יותר מההיצע.

מעבר לכך, על פי ניתוח מאפייני נותני השירותים ב-2011 בדומה ל-2017 עולה כי יועצים בשב"ן במעמד פרופסור, בעמדה ניהולית בבי"ח ובעלי וותק בהתמחות למעלה מ-26 שנים נטו לספק יותר יועצים במסלול

ההחזר. (יש לציין שב2017 שיטת ההחזר רלוונטית רק לרופאים שאינם כירורגיים מאחר ובשנת 2017 מניתוח הרשומות עולה כל הרופאים הכירורגיים הנם במסלול הסדר בלבד).

השלכות למדיניות והמלצות למקבל ההחלטות

- במסגרת המחקר בוצע מיפוי וניתוח ההיצע של נותני שירותי חו"ד שנייה וכן של מאפייני הביקוש לשירות זה. מצע נתונים זה יכול להוות נקודת ייחוס בשנים מאוחרות יותר כדי לוודא אם צעדי מדיניות אלה אכן משיגים את היעדים הרצויים, תוך התמודדות עם אתגרים בשני תחומים עיקריים: הזמינות והנגישות לשירותי חו"ד שנייה, והשני שמירה על איכות השירות בהתבסס על תמהיל של נותני שירות ברמה גבוהה.
- יש צורך לשפר את הגישה לחו"ד שנייה עבור אוכלוסיות חלשות (אלה המתגוררות באזורי פריפריה) כדי להתגבר על מחסומים גיאוגרפיים וכלכליים.
- מסלול הסדר בתעריפים אחידים וקבועים לעומת מסלול החזר יסייע במימוש ההתייחסות בחוק לשוויוניות בשירותי בריאות, בהנחה של היצע הרופאים וחופש בחירה בנותני שירות, שהוא בעצם מהות חו"ד השנייה.
- מוצע לערוך מחקר נוסף ולבחון את היקף השימושים במסלול הסדר מול החזר לאחר יישום הרגולציה, תוך בחינה של היצע הרופאים אל מול היקף ביקושי המבוטחים בשני המסלולים אחרי השינוי ובייחוד בהשוואה שבין פריפריה למרכז הארץ. בנוסף, מוצע לבחון את הביקוש של המטופלים מהפריפריה ליועצים ממרכז הארץ.

מקורות (לא יותר מ-4)

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Section 5: Comprehensive scientific report - English

Scientific background

Patient's seek second opinions (SOs) when they want to obtain the best and appropriate medical treatment, usually before surgery. Studies on SO focused mainly on the following issues: reasons for seeking a SO as patients may seek a SO from another physician for various reasons: to ensure the best diagnosis, appropriate treatment, or prognosis offered to them and to obtain additional information. Some other reasons originate from patient-physician communication or lack of trust, etc.¹⁻¹⁴; the characteristics of patients who tend to seek a SO^{11,12,14-17}; and diagnostic discrepancies between independent first and SOs^{4,18-23}.

We are not aware of any studies that are related to utilization of SOs by different payment methods or examined the effect of co-payments on the demand for SOs. Only few studies Indirectly addressed to patients characteristics by their insurance type and coverage policy¹⁴.

SO payment mechanisms vary across countries and are affected by the health insurance design among other things. In the US, most health insurance plans will pay part of the cost, Medicare will pay 80% of the cost of SO before surgery and the patients will pay a co-payment of 20%. The health insurance may require a referral from a primary care physician and seeing an in-network physician²⁴. Conversely, in Canada, that has National Health Insurance (NHI), there is no mandatory SO requirement before surgery and the patient has to pay a co-payment²⁵.

Physician payment: in the network and out-of-network providers and their effect on out of pocket payment and moral hazard

Physician payment rates for private consultations depend on whether the physician is in-the-network or out-of-network of the insurance company. When the physician participates in the network of the health insurance company, the insurers quote their fee, and the patients pay a flat rate. When the physician does not participate in the network, patients pay the full price, and ask for a partial reimbursement from the insurance company. In both cases, patients are required to pay out of pocket: in-the-network co-payments are usually predictable and affordable, whereas out-of-network payments are usually higher, leading to unexpected and sometimes burdensome financial charges²⁶.

Physicians may also effect prices especially when they are out of network, as a previous study found that prices increased more rapidly when there is less competition ²⁷. Moreover, co-payments affect people's demand for health care ²⁸ and the majority of the reviewed studies found that co-payment reduces the use of consultations with specialists ²⁹.

Consequently, out-of-network payments have double barriers in comparison with in-network: first, the patient is required to pay higher out of pocket payments at the point of service. Second, the out of pocket payment after reimbursement in many cases is higher than the co-payment in-the-network. Clearly, reducing the deductible, will increase the likelihood for moral hazard ³⁰.

An interesting question is whether the demands for a service with co-payments are higher than those with full price payments with reimbursement? In this context, one of the famous studies, "the RAND Health Insurance Experiment", is still held to be a "gold standard" ³¹. Many studies have explored the role of consumer co-payments for health care and the tradeoff between co-payment amounts and the utilization of medical care according to the RAND Experiment. The conclusions from this experiment are still relevant for today's health care debate, raising the question whether cost sharing reduces waste without damaging quality of health care ³².

SO utilization and payment system in the Israeli healthcare system

In Israel, patients are legally entitled to obtain SOs according to the Patient Rights Law (1996), but there is no government coverage for this entitlement in the National Health Insurance Law (NHI) (1995) or in any other laws. The Israeli healthcare system consists of four Health Funds (HFs) providing primary and secondary care. The HFs also provide ¹supplementary health insurance schemes that provide partial reimbursement for out-of-pocket SO consultations, among other benefits such as choice of provider ^{33,34}.

Until 2016 there were two kinds of payment methods for SO surgeons: the first one, most commonly used by Clalit's supplementary health insurance ("shaban"), according to which patients were allowed to consult with specialists who work under contract with the health fund for SO visits up to 3 times during a calendar year and pay a direct-co-payment of 120 NIS directly to the consultant (As of today the direct-

¹ The use of the term "supplementary health insurance" in the context of Israel expresses a general name commonly called "Voluntary Health insurance" by international definition and is not designed to display a specific set of covers.

co-payment is 150 NIS). The second payment method, is the reimbursement payment method for consultation expenses given by providers that are not under contract with the HFs' supplementary insurance. The patients pay the consultant, and the HFs' supplementary insurance compensates the patient approximately 80% of actual expenditure and up to a limit of approximately 600 NIS.

The demand for SOs in Israel is on an extreme rise: the total net expenditure of the Israeli HFs' supplementary insurances on SOs dramatically increased by 78.7% from 2006 to 2010 (Israeli Ministry of Health, 2015). The net expenditure on SOs in 2016 across HFs (after reducing income from co-payments) was equivalent to \$92 million, accounting for about 9% of the total expenditure of the supplementary health programs provided by the HFs. Co-payments for SOs are pricey, especially for lower socio-economic classes. Hence, SOs are costly both to patients and to the system and it is important to understand who those patients are ³⁵.

A legislation passed on Nov. 30th, 2015, starting July 1st, 2016 ³⁶, states that the reimbursement method in the cases of SOs provided by surgeons not associated with the HFs is canceled and only the direct payment method will be allowed.

The reimbursement method in the cases of SOs provided by not surgeons specialists is still possible.

Analyzing and documenting the current situation (i.e., before the change in policy) will later help to better understand the outcomes of this policy change.

The proposed change in the payment policy for SOs is assumed to make this tool more accessible and efficient for the benefit of patients, physicians and healthcare organizations. Previous studies conducted by authors of the current study examined the estimation of SO utilization in Israel, patient reasons and characteristics ¹⁶. We are not aware of any studies that are related to different payment methods or aspects of demand and supply affected by co-payments for SOs, or neither SO provider characteristics in Israel.

Research objectives

The current study aims to characterize and analyze the situation of supply and demand and utilization patterns of SOs by payment method prior and during to the new policy regulation. These data may serve later as a reference point in order to monitor and analyze the implications of the policy changes.

The study has three objectives:

- I. **To analyze the utilization patterns of second medical opinions by payment method.** We aim to explore the prevalence of patients obtaining SOs within the two payment methods (“reimbursement” and “direct co-payment”) and to identify demographic and clinic predictors of SO utilization in both payment methods.
- II. **To examine the demand and supply of consultants and surgeons** in these payment methods, taking into account the characteristics of service providers, including the geographic location and specialization.
- III. **To evaluate inequalities in accessibility to second-opinion by payment method across Israel.** We aim to explore whether SOs by those two payment methods are delivered in an equal manner.

Comment: We originally aimed to examine the extent of expenditures in these payment methods, both to the patients and HFs. We did not receive confirmation to access these data by the supplementary health insurance scheme.

Methodology

The following paragraphs detail the study design and methodology. We used two research tools: electronic medical records analysis and patient survey⁹. The electronic medical records analysis based on several data sources: (1) Secondary care visits at the HMO; (2) Compensations for private specialist consultations from the HMO’s supplementary insurances; (3) Patient demographics and clinical characteristics and (4) Physician demographics and professional characteristics.

Analysis of electronic medical records of patients

Data sources: “Clalit Health Services” is the largest health-fund in Israel, covering 52% of the Israeli population (more than 4.5 million) and providing primary, secondary and tertiary care. We used two datasets which were linked by a unique patient identifier: (1) Secondary care visits of patients at the health fund clinics including their demographics and clinical characteristics; (2) Compensations for private specialist consultations from the health-fund’s supplementary insurance.

All data were extracted by authorized personnel in the health fund and in the supplementary health insurance. The extracted data were anonymized by removal of

patient and physician identifying data. The study was approved by the Ethics and Research Committees of the health fund. All the data files were analyzed by the researchers at Clalit's Research Institute following the ethics rules of the research institute.

Study population: The target population included Clalit Health Services members aged 21 and above, who visited consultants, either those supplied directly by the consultant network of the supplementary insurance (paid a direct co-payment) or in the private sector through Clalit's supplementary insurance and received reimbursement during the years 2011-2017. The inclusion criteria for each retrieval year (2011-2017) required the following conditions: (1) being an active member of the health fund in each retrieval year (e.g., for 2015 active from 1.10.2014 until 30.3.2016); (2) age 21 and above; (3) visited at least one specialist during the retrieval year and including 3 months before and after that year, either in the secondary care in the community, or a private consultation claimed from the supplementary insurance, in one of the following specialties: orthopedics, ophthalmology, dermatology, ear, nose and throat (ENT), cardiology, general surgery, urology, gastroenterology and neurology.

We excluded members who only visited a family physician and did not consult with a specialist in the above list; had indication of treatment or medical procedure visits (i.e., non-clinical consultations); died during the study period and did not include invalid patient id numbers (999999).

Variables and measurements

The dependent variable: the dependent binary variable “**payment method**” (direct co-payment or reimbursement) of patients who utilized SOs via the supplementary insurance: “direct co-payment” method whether the patients paid direct co-payment for consulting a specialist physician in the consultant network; “reimbursement” method whether the patient consulted with a specialty physician who was entitled for reimbursement.

The covariates included patient demographics: (1) age; (2) gender; (3) being an immigrant (defined as immigration to Israel after 1989, the years of mass immigration mainly from the former USSR); (4) socioeconomic level (according to the Israeli Central Bureau of Statistics); (5) Charlson comorbidity score (without age)³⁷; (6) ‘Periphery’ level (based on a periphery index according to the Israeli Central Bureau of Statistics. The value of the periphery index is a weighted sum of two components:

potential accessibility (weighing 2/3) and proximity of the local authority to the boundary of the Tel Aviv district (weighing 1/3) ³⁸. (7) Religion and (8) Supplementary insurance layer.

Second medical opinion was measured and defined in our previous study.

We defined a 'second medical opinion' instance as 'consulting with another specialist, in the same specialty, within 3 months of the first consultation in order to obtain a SO for the same medical problem'. An operative algorithm for identification of SO visits: we developed an algorithm that identified potential SOs by matching patient consultations with specialists (the 'first opinion') with consultations with another physician (the 'SO'). A detailed description of this algorithm appears elsewhere ¹⁶. Each 'pair' of a first and a SO could take place in four possible combinations, two of them are relevant to the current study: (1) Both first and SOs provided via a supplementary insurance; (2) First opinion provided via the health-fund in the public system and SO via the supplementary insurance.

Statistical analyses: After combining the two datasets (supplementary and health fund) into a unified table of SO visits by payment method, we calculated and examined the distribution of patients who sought SO by payment method during the years 2011-2017. We decided to examine the characteristics of patients who had consultations by 2015 (before the regulatory change).

We produced descriptive statistics of the independent variables for the overall population of members who had a supplementary insurance and sought one SO during the year of 2015 to describe SO utilization by payment method. We checked correlations between the covariates. We compared demographic and clinical characteristics of patients who sought a SO through the supplementary insurance and compared the payment methods: reimbursement vs. direct co-payment using univariate χ^2 tests.

A multivariate logistic regression model was examined as an adjusted full model to assess the association between SO utilization by payment method and the covariates. We entered into the multivariate logistic regression only variables that were significant ($p < 0.05$) in the univariate tests. We used the backward stepwise elimination method using the Wald test for variable selection elimination method for model selection. The

threshold for elimination was 0.05. We used SPSS Version 23 for the statistical analyses.

Analysis of electronic medical records of physicians

Study population of physicians: The target population included providers of consultations via Clalit supplementary health insurance for the years 2011 and 2017.

The inclusion criteria were: (1) active physicians in the supplementary health insurance ("shaban") at the retrieval year; (2) specialties as described in the table of variables (see Appendix A1, the SO chains include only codes which overlap between the secondary care and the supplementary insurance, not including specialty codes 13,14,16,51,52,22); (3) physicians who were defined in the supplementary insurance system by their payment method as private (reimbursement) or in-network (direct co-payment consultant and (4) physicians who supplied at list one SO by the SO algorithm. **The exclusion criteria were:** (1) Physicians in the supplementary health insurance list who did not provide consultations during the retrieval year; (2) Professions in pediatrics (of patients aged 21 and below); the SO chains do not include the specialty codes 13,14,16,51,52,22 (see Appendix A1).

Variables and measurements

The dependent variable: The dependent binary variable is **payment method** which has indication in the databases: reimbursement payment vs. direct-co-payment.

The independent variables related to physicians: demographics and professional characteristics: age, gender, academic status, a hospital managerial position, specialty, specialist seniority, surgeon and 'periphery' level.

Comments: specialty and specialist seniority: the variable was chronologically based on the latest physician's expertise, as many physicians have more than one specialty. This was done in order to avoid duplication, assuming that the physician is working in his latest specialty.

"Shaban" surgeon is a surgeon under contract with Clalit supplementary health insurance. The surgery may be performed at private hospitals and members may choose a surgeon.

The periphery variable was classified by the providers' clinic location as follows:

In cases where the physician had clinics in more than one locality, we relied on the first locality as the main periphery cluster after we examined that only 28% (464 out of 1,647) of the physicians who provided consultations in 2017 (based on the specialists included in our research) had clinics in more than one locality. 70% of their clinics were in the same periphery cluster, and of the remaining 30% only 9 physicians had a second clinic in which its periphery cluster was lower than the first one. Hence, we decided to rely on the provider's first clinic location in order to classify the periphery variable.

The periphery index³⁸ included local authorities that were classified into 10 clusters. We grouped those clusters based on their periphery distribution scale into 3 groups: periphery (clusters 1-4), intermediate (clusters 5-6) and central (clusters 7-10).

Statistical analyses: We produced descriptive statistics to describe physician characteristics by payment method. First, we compared the characteristics of physicians who provided consultations and SO (first opinion was provided via secondary care/supplementary insurance) instances via the supplementary insurance by their **payment method** (direct or reimbursement) using univariate χ^2 tests. We then predicted the binary dependent variable (**payment method**) by the covariates using a multivariate logistic regression model.

We also compared the characteristics of surgeons in the supplementary insurance compared to non-surgeons. We categorized percentiles according to surgeon volume of activity/number of consultation and compared the characteristics of surgeon quartiles in the supplementary insurance.

Since our analysis included multiple explanatory variables, we have applied the backward stepwise elimination method using the Wald test for variable selection. The threshold for elimination was 0.05.

Measuring SO utilization by payment method using patient self-report:

The survey data were collected by a professional research company (B. I. and Lucile Cohen Institute for Public Opinion Research, a professional academic survey institute located at Tel Aviv University). The survey includes 848 members of all the HMOs of the general population above the age of 21. A detailed description of the survey appears elsewhere ⁹.

Study population: In the current study we focused on the 344 respondents who sought a SO, we analyzed two groups by their payment methods: reimbursement and direct payment.

Variables and measurement

The dependent variable: The dependent binary variable is payment method which was measured by the question: “Did you pay for the visit?” Direct method (yes, 100 NIS payment within the Consultants Network/payment to a private doctor in the arrangement of the HMO) or Reimbursement method: (yes, payment to a private doctor which is not in the arrangement of the HMO and receiving reimbursement).

Independent variables related to patients: Patient demographics in common with the electronic medical dataset: age; gender; being an immigrant (defined as immigration to Israel after 1989, years of mass immigration mainly from the former USSR); socio-economic level (according to the Israel Central Bureau of Statistics); “periphery” level. The periphery level is based on a periphery index (cbs.gov.il) and clinical characteristics based on the Charlson score (without age) ³⁷. More variables relevant only to the survey: educational level, personal status, religion, self-reported income group and perceived health status.

The SO visits were measured in our previous study by the patient self-report in a patient survey: “A ‘SO’ was defined and explained to the respondents as ‘consulting with another specialist, in the same specialty, in order to obtain a SO on the same medical concern during the past 12 months (excluding consultations with family physicians)’.

Statistical analyses: The study population included 177 respondents which obtained a SO via the supplementary insurance. We produced descriptive statistics to describe the SO utilization by payment method (direct co-payment vs. reimbursement). We compared the characteristics of patients who obtained SOs by payment method, using univariate χ^2 tests. We did not produce a multivariate logistic regression model as the univariate analyses did not show significant differences by payment method (see Appendix A3).

Findings

National telephone survey

344 respondents in the national telephone survey sought a SO in 2011. The study population included 177 respondents who sought a SO via the supplementary insurance of all four health funds in Israel: 68% (n=120) of them paid a direct co-payment for a SO; 32% (n=57) of them received a reimbursement for a SO (see Appendix A2).

Who sought a SO by payment method?

In order to predict patient characteristics and utilization by payment method we chose only those having a supplementary insurance in addition to their basic public insurance (n=177). The univariate analyses did not show significant differences by payment method (see Appendix A3).

Perceived outcomes of SO by payment method

There is no significant difference in any of the perceived outcomes questions of SO by payment method. Respondents who obtained a SO and received reimbursement were neither more satisfied, nor felt more improvement in their perceived outcomes after the SO compared to direct-co-payment (Table 1).

Table 1: Perceived outcomes of SO by payment method

Outcomes	Direct co-payment		Reimbursement		p-value ¹
	N=yes	% yes	N=yes	% yes	
There was a difference between the diagnosis or treatment between the first and the SO	67	(63%)	35	(70%)	0.473
*I was satisfied with the SO	103	(90%)	53	(93%)	0.584
*I felt improvement after getting the SO	86	(81%)	41	(84%)	0.824

¹ Fisher's Exact Test

58% (n=184) out of 316 patients having supplementary insurance would consider seeking a SO even if the co-payment will increase from 100 to 200 NIS.

Electronic medical records

Distribution of patients seeking a SO by payment method

In total, 29,093 patients sought a SO in 2011 compare with 38,518 patients in 2017. There is a decline in the rate of patients seeking SO consultations via the reimbursement method from 2011 to 2015 (28% to 20%). We thought to examine the characteristics of patients in 2015 (before the regulatory change), Since the following years illustrate a sharper decline (from 20% to 8%) (Figure 1).

Figure 1: Distribution of patients with supplementary insurance who sought a single second-opinion by payment method (2011-2017)

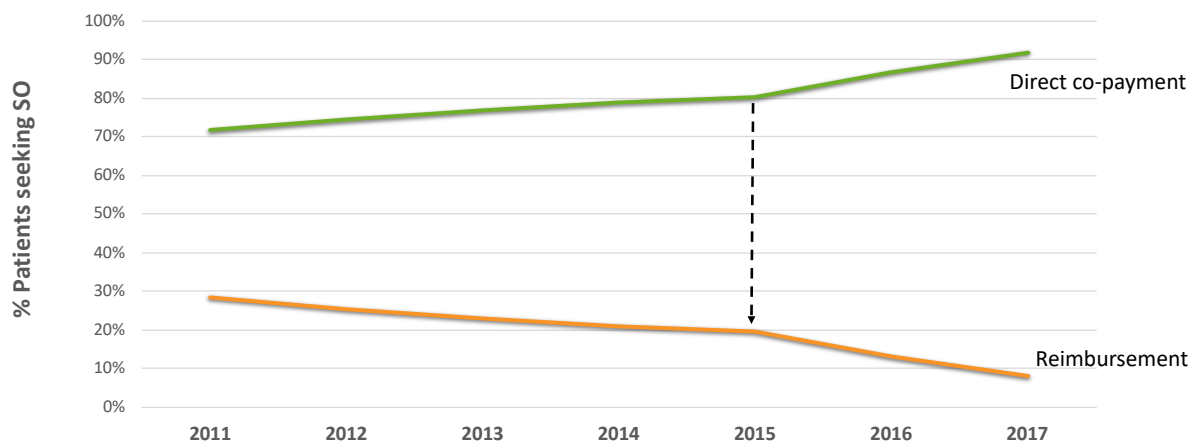
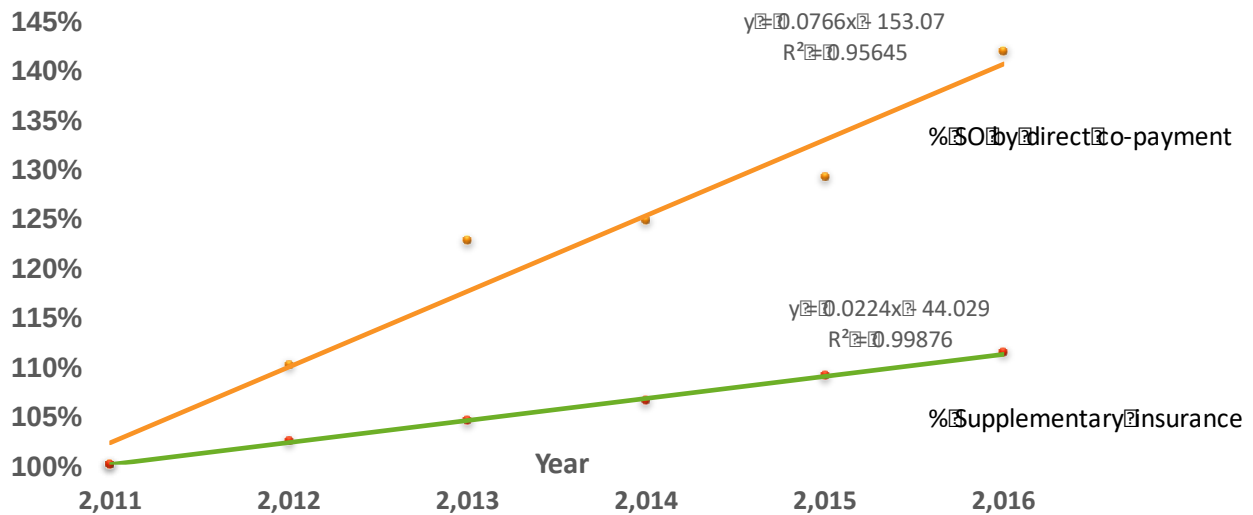


Figure 2 shows an increase in the demand for SO consultations by direct-co-payment in parallel to an increase in the number of supplementary insurance members in the years 2011-2016. In practice, although the direct-co-payment prices increased by 50% (from 100 to 150 NIS) during 2011-2016, there was an increase of 45% in the demand of patients seeking SO consultations via the supplementary insurance and paid a direct co-payment. During this time period, the total growth of new policyholders in the supplementary insurance during 2011-2016 was only 11%.

Figure 2: Increase in demand for SO consultations via direct co-payment vs. the increase in number of supplementary insurance members (2011-2016)



Who sought a SO by payment method: “reimbursement” vs. “direct-co-payment”?

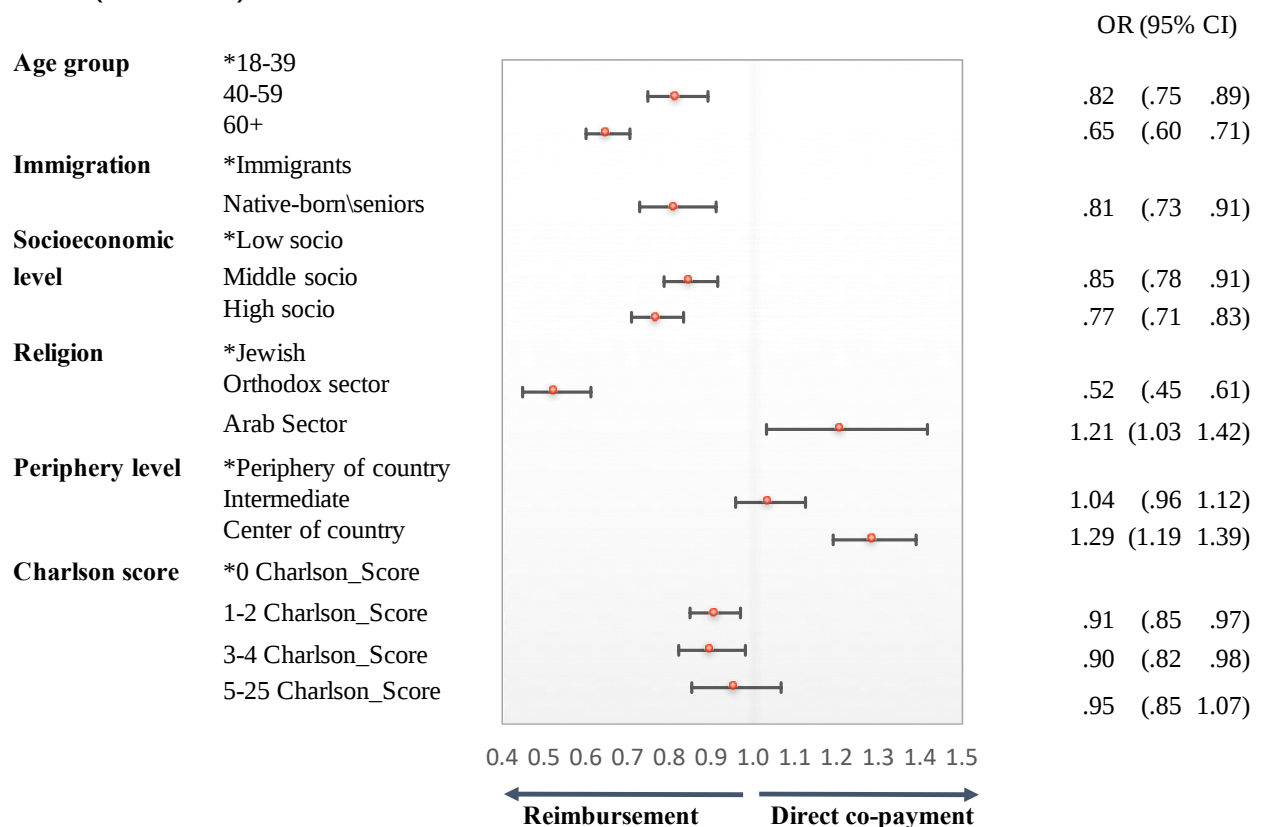
The entire sample of 2015 included 1,426,618 patients (see Appendix A4), 82% of them had a supplementary insurance. 13% (n=152,836) of the patients who had supplementary insurance sought at least one SO during the study period. To distinguish between SO visits provided by the health-fund or by the supplementary insurance, we focused on 135,227 patients with supplementary insurance who sought a single SO. Then, our statistical analyses focused on 34,288 patients who sought a SO by their payment method: reimbursement vs. direct co-payment.

The univariate analyses showed significant differences between patients who sought a SO via the reimbursement method vs. those who sought a SO via direct-co-payment, by age group, immigration, socioeconomic level, periphery level, religion, and Charlson Score (See Appendix A5). The significant covariates from the univariate analyses that remained significant in the multivariate logistic regression are: age group, immigration, socioeconomic level, religion, periphery level (except Intermediate level) and Charlson Score (except 5-25 Charlson Scores) (Figure 3).

More specifically, patients from the Arab sector (OR=1.21, 95% CI 1.03–1.42) and from central geographical areas (OR=1.29, 95% CI 1.19–1.39) tended to seek SOs

by paying a direct co-payment rather than reimbursement. Native-born patients (OR=0.81, 95% CI 0.73–0.91), middle (OR=0.85, 95% CI 0.78–0.91) and high (OR=0.77, 95% CI 0.71–0.83) socio-economic levels, orthodox (OR=0.52, 95% CI 0.45–0.61) and Charlson score levels 3-4 (OR=0.90, 95% CI 0.82–0.98) tended to seek SOs by reimbursement method rather than by direct co-payment.

Figure 3: A forest plot of patient characteristics associated with seeking a second opinion by payment method “reimbursement” vs. “direct co-payment” for 2015 (n=34,288)



Factors affecting seeking a SO by payment method (“reimbursement” vs. “direct co-payment”), described by ORs and 95% CIs of the estimated regression coefficients in a multivariate logistic regression model.

Predictors which did not enter the final model were: gender and supplementary insurance layer.

(*) Reference category

Demographics and professional characteristics of physicians who provided a SO by payment method

The final sample in 2011 included 875 physicians who met the inclusion criteria and provided SOs to 29,093 members of the supplementary insurance either by reimbursement or by direct-co-payment. The final sample in 2017 included 1,007 physicians who met the inclusion criteria and provided SOs to 38,518 members.

Most of the physicians in our final samples in 2011 and 2017 were males, aged 51-65, in a managerial position in a hospital, had 16-25 years of board certification in 2011 compared to having more than 26 years certification in 2017, half of them surgeons and their clinics were based in central residential areas. It is worth noting that only 6-7% of the physician clinics were based in periphery areas and only 14% of the consultants were females.

The covariates from the univariate analyses that were found to have a statistically significant effect ($p < 0.05$) on supplying SOs by payment method were quite similar in 2011 compared to 2017 and included: age, hospital managerial position, academic status, specialist seniority and surgeon (shaban), except for the 'periphery' level variable which was not significant in 2017 (see Appendix A6).

The significant covariates from the univariate analyses that remained significant in the multivariate logistic regression were quite similar in 2011 compared to 2017 and included: hospital managerial position, academic status and specialist seniority, except for surgeons (shaban) who were not included in the logistic regression in 2017 as all of the surgeons are in network agreement since July 2016 following the new regulation (see Table 2).

More specifically, consultants with the academic title "Professor" tended to provide SOs by the reimbursement method (compared to direct-co-payment) more than consultants with who were not "professors" (OR=0.3, 95% CI 0.21-0.42 in 2011, OR=0.37, 95% CI 0.26-0.52 in 2017). Physicians in a managerial position at a hospital tended to provide SOs by the reimbursement method (compared to direct-co-payment) more than those who are not in managerial positions in hospitals (OR=0.42, 95% CI 0.29-0.60 in 2011, OR=0.45, 95% CI 0.29-0.70 in 2017). Specialists with seniority of 26 years and above tended to provide SOs by reimbursement (compared to direct-co-payment) more than specialists with seniority of less than 15 years (OR=0.45, 95% CI 0.29-0.70 in 2011, OR=0.12, 95% CI 0.07-

0.21 in 2017). In 2011 (before the regulatory change), surgeons in arrangement with the supplementary insurance tended to provide SOs by direct-co-payment (compared to reimbursement) (OR=1.68, 95% CI 1.24-2.28) more than consultants who were not surgeons.

Table 2: Characteristics associated with providers of a second opinion by payment method in 2011 vs. 2017

Covariates		2011				2017			
		Exp (B)* (95% C.I.)		P-values		Exp (B)* (95% C.I.)		P-values	
Academic status	*Doctor	Reference				Reference			
	Professor	.30	(0.21	0.42)	<0.001	.37	(.26	.52)	<0.001
Hospital managerial position	*Not managerial position	Reference				Reference			
	Managerial position	.42	(0.29	0.60)	<0.001	.45	(.29	.70)	<0.001
	Not working in hospital	1.15	(0.59	2.27)	.681	1.15	(.67	1.95)	.61
Specialist seniority	*1-15	Reference				Reference			
	16-25	.55	(0.37	0.81)	<0.001	.38	(.21	.68)	<0.001
	26+	.45	(0.29	0.70)	<0.001	.12	(.07	.21)	<0.001
Surgeon (shaban)	*No	Reference				NA			
	Yes	1.68	(1.24	2.28)	<0.001				

Factors affecting provision of a second opinion by payment method, described by ORs and 95% CIs of the estimated regression coefficients in a multivariate logistic regression model.

(*) Reference category

NA- not applicable

NS- no significance

Demographics and professional characteristics of consultants who provided a SO via the supplementary health insurance by surgeon status

The covariates from the univariate analyses that were found to have a statistically significant effect ($p < 0.05$) on supplying SOs by surgeons were quite similar in 2011 compared to 2017 and included: gender, consultant type, academic status and specialist seniority, except for the age group and hospital managerial position variables which were only significant in 2017 but not in 2011 (see Appendix A7).

The significant covariates from the univariate analyses that remained significant in the multivariate logistic regression in 2011 included: gender, consultant type and academic status (see Table 3). More specifically in 2011, male consultants provided SO consultation via the supplementary insurance tended to be surgeons of the shaban more than females (OR=0.46, 95% CI 0.29-0.72). In network (direct-co-payment) consultants who provided SO consultation via the supplementary insurance tended to be surgeons of the shaban more than private consultants (reimbursement) (OR=0.59, 95% CI 0.44-0.79). Consultants with a “Doctor” academic status who provided SO consultation via the supplementary insurance tended to be surgeons of the shaban (compared to non-surgeons of the shaban) more than those having a professorial academic status (OR=0.67, 95% CI 0.48-0.92).

The significant covariate from the univariate analyses that remained significant in the multivariate logistic regression in 2017 was only gender. We did not include in the logistic regression in 2017 the variable “consultant type” as all of the surgeons are in network agreement since July 2016 following the new regulation. More specifically in 2017, male consultants who provided SO consultations via the supplementary insurance tended to be surgeons of the shaban more than females (OR=0.34, 95% CI 0.22-0.51).

Table 3: Characteristics associated with providers of a second opinion by surgeons in 2011 vs. 2017

Covariates		2011		2017	
		Exp (B)* (95% C.I.)	P-values	Exp (B)* (95% C.I.)	P-values
Gender	*Male	Reference		Reference	
	Female	.46 (.29 .72)	<0.001	.34 (.22 .51)	<0.001
Consultant type	In network (Direct co-payment)	Reference		NA	
	Private (Reimbursement)	.59 (.44 .79)	<0.001		
Academic status	*Doctor	Reference		Reference	
	Professor	.67 (.48 .92)	<0.001	.77 (.52 1.16)	0.21
Specialist seniority	*1-15	NS		Reference	
	16-25			.84 (.58 1.22)	.36
	26+			.84 (.57 1.25)	.40

Factors affecting provision of a second opinion by surgeons and by payment method, described by ORs and 95% CIs of the estimated regression coefficients in a multivariate logistic regression model.

(*) Reference category

NA- not applicable

NS- no significance

Percent change of specialists who provided SOs via the supplementary health insurance and percent change of patients who sought SO by payment method and specialty from 2011 to 2017

Table 4 illustrates the percent change of specialists who provided SOs via the supplementary health insurance and the percent change of patients who sought SO by payment method for each specialty from 2011 to 2017. There is substantial variation in the percent change of specialists and patients across specialties and by payment method. In orthopedics, which has the highest demand for SO consultations according to this study, the supply number of 'in-network' physicians increased significantly from 2011 to 2017 (growth of 63%), whereas the demand for that period rose at a faster pace (growth of 82%).

Table 5 illustrates the percent change of specialists who provided SOs via the supplementary health insurance and the percent change of patients who sought SO by payment method for each periphery level from 2011 to 2017. In the periphery of the country, the number of specialists by direct-co-payment increased by only 14%, whereas the demand increased by 117%. However, in the center of the country the number of specialists by direct-co-payment increased by 55%, and the demand increased by 53%, the number of active specialists increased at nearly the same pace as the population size.

Table 4: Percent change of specialists who provided SOs via the supplementary health insurance and percent change of patients who sought SO by payment method and specialty from 2011 to 2017

Specialty	Direct co-payment						Reimbursement					
	2011	2017	% change of specialist	2011	2017	% change of patients	2011	2017	% change of specialist	2011	2017	% change of patients
	n =number of specialist	n =number of specialist		n= number of patients	n= number of patients		n =number of specialist	n =number of specialist		n= number of patients	n= number of patients	
Cardiology	68	70	3%	785	976	24%	59	50	-15%	563	383	-32%
Gastroenterology	31	47	52%	255	402	58%	19	12	-37%	117	43	-63%
Neurology	19	25	32%	256	349	36%	43	39	-9%	353	239	-32%
General surgery	82	119	45%	1,395	2,320	66%	48	13	-73%	427	70	-84%
Orthopedics	112	183	63%	7,734	14,081	82%	84	44	-48%	2,980	1,079	-64%
Urology	45	69	53%	1,365	2,143	57%	29	11	-62%	695	131	-81%
Dermatology	31	34	10%	1,964	2,801	43%	17	17	0%	459	236	-48%
Ear, Nose and Throat	64	87	36%	1,855	3,152	70%	26	13	-50%	625	155	-75%
Ophthalmology	94	144	53%	5,291	9,176	73%	51	30	-41%	2,000	782	-61%

Table 5: Percent change of specialists who provided SOs via the supplementary health insurance and percent change of patients who sought SO by payment method and periphery level from 2011 to 2017

Periphery level	Direct co-payment						Reimbursement					
	2011	2017	% change of specialis	2011	2017	% change of patients	2011	2017	% change of specialist	2011	2017	% change of patients
	n =number of specialist	n =numberr of specialist		n= number of patients	n= number of patients		n =number of specialist	n =number of specialist		n= number of patients	n= number of patients	
Periphery of country	44	50	14%	2,734	5,944	117%	14	13	-7%	1,351	674	-50%
Intermediate	149	201	35%	5,929	10,711	81%	82	65	-21%	2,597	1,031	-60%
Center of country	335	518	55%	12,179	18,661	53%	250	148	-41%	4,242	1,406	-67%

Conclusions

- This is an ambitious attempt to estimate SO utilization by payment method by merging two datasets of community care consultations and supplementary claims data. The study analyzes the characteristics and possible effects of payment method of specific insurance coverage (SO) on the demand for these services, on the supply of service providers and on the degree of equality (in terms of economic accessibility and service availability). We are not aware of other studies that estimated utilization of SO by different payment methods nor studies that evaluated aspects of demand and supply regarding SO by payment method.
- 58% out of 316 patients having supplementary insurance in 2011 mentioned they would consider seeking the SO even if the co-payment would increase from 100 to 200 NIS. In practice, although the direct-co-payment rate increased by 50% in the years of 2011-2016, there was an increase of 45% in the number of patients seeking SO services via the supplementary insurance. The highest demand for SO consultations were sought from orthopedic surgeons, by both payment methods.
- Particular patient profiles tended to seek SOs by paying direct-co-payment rather than reimbursement: patients from the Arab sector, low socio-economic group, immigrants and from central geographical areas. An aspect that may affect demand (and also equality in accessibility).
- In 2011, as well as in 2017, consultants with the academic title "professor", physicians in a managerial position at a hospital and specialists with seniority of 26 years and above, tended to provide SOs by the reimbursement method (in 2017 the reimbursement method is relevant only for non-surgeon consultants, as surgeon consultants are only in the arrangement of direct co-payment).
- Patients from periphery areas tended to seek SOs via the reimbursement method, despite the high co-payment, in contrast to patients from central geographical areas who tended to seek SOs by direct-co-payment. This may hint on inequality in the supply of physicians by direct co-payment in periphery areas.
- In the periphery of the country, the number of specialists by direct-co-payment increased by only 14%, whereas the demand increased by 117%. However, in the center of the country the number of specialists by direct-co-payment increased by 55%, and the demand increased by 53%, the number of active specialists increased at nearly the same pace as the population size.

Policy Implications and recommendations

The proposed change in the payment policy for SO is assumed to make this tool more accessible and efficient for the benefit of patients, physicians and healthcare organizations. However, it is still relatively early to consider the implications of these regulations. Nevertheless, providing pre-regulation data on SO utilization by payment method is important for health policy makers and healthcare providers in order to allocate resources more efficiently and reduce disparities in access to health services and health consumption. The current study aims to characterize and analyze the current situation of supply and demand and utilization patterns of SOs by payment method prior to the new policy regulation. These data may serve later on as a reference point in order to monitor and analyze the implications of the policy changes.

The rate of growth in demand for SO using the direct-co-payment increased between 2011-2016 at a much faster pace than the rate of growth in the number of members of the “shaban”. This can be explained by the fact that already in the years 2011-2015, there has been a downward trend in the rate of “reimbursement” seekers. The current policy may reduce expenditure for SO service, both for the HMO and for households and may reduce national expenditure on health in general and on private expenditure in particular.

There is a need to improve access to SO for weaker populations (from periphery areas), in order to increase patient freedom of choice among SO providers. Several potential solutions have been proposed for this issue. First, subsidize access to SO within the public services and provide patients freedom of choice in order to strengthen the public system, without creating superfluous SO consultations with limited value. Health policy regarding SOs by payment method should consider balancing the benefits and costs. Certain patient profiles could have benefited from SOs, but do not have the access in terms of costs they can afford, or specialists are unavailable in their residential area. On the other hand, the policy should create the right balance to prevent overuse of SOs for those who can afford it for any co-payment, as the terms of use should be equal to all of the HMO members. Second, given that the number of specialists by direct-co-payment increased by only 14%, whereas the demand increased by 117% in the periphery, illuminate the need to allocate resources, to increase the supply of direct-co-payment specialties by incentives in order to increase access and availability in those areas.

Further studies should track consequences of this policy due to their implications on expenditure, policy, clinical outcomes, and patient satisfaction. A further study is proposed to examine the demand of patients from the periphery for consultants from the center of the country. Also, to examine whether the patient was operated on by the same consultant before and after the regulation.

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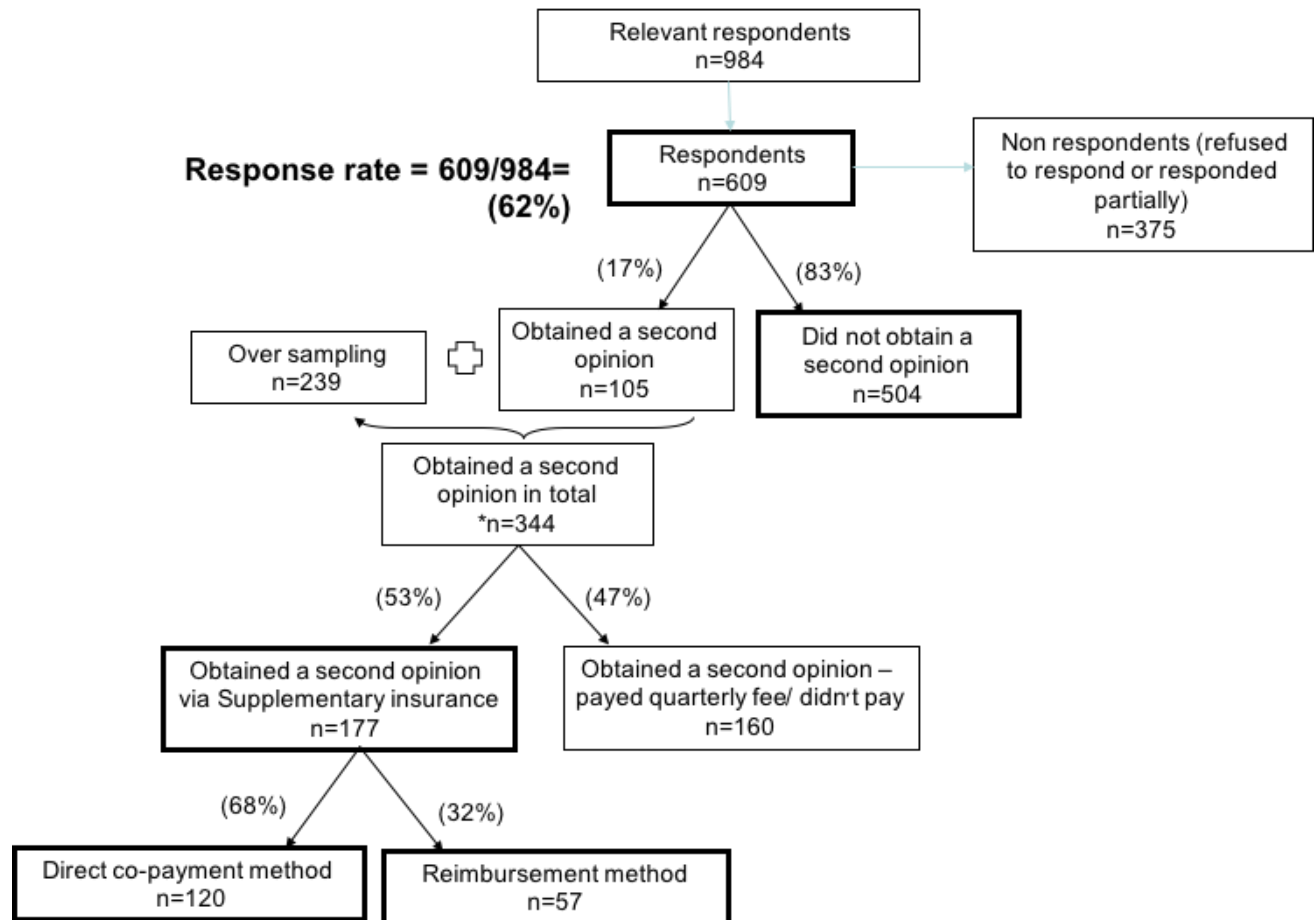
Appendix

Appendix A1: Description of the independent variables of physician characteristics by electronic medical data (2011, 2017)

Variable	Variable type	Scale/categories
(1) Age group	Ordinal	(1) 50-35 (2) 65-51 (3) 66+
(2) Gender	Nominal dichotomy	(1) Male (2) Female
(3) Academic status	Nominal dichotomy	(1) Doctor ('Doctor', 'Instructor', 'Lecturer', 'Senior lecturer') (2) Professor ('Professor', 'Associate professor', 'Full professor').
(4) Hospital managerial position	Nominal	(1) No managerial position in hospital (2) Managerial position in hospital (3) Not working in hospital
(5) Specialist seniority (Years certificate)	Ordinal	(1) 1-15 (2) 25-16 (3) 26+
(6) Surgeon (shaban)	Nominal dichotomy	(1) Yes (2) No

(7) Specialty	Nominal	2.Cardiology 6.Gastroenterology 10.Neurology 12.General surgery 13.Neurosurgery 14.Heart surgery 15.Orthopedics 16.Plastic surgery 17.Urology 18.Dermatology 19.Ear, Nose and Throat 20.Ophthalmology 22.Gynecology 51.Vascular surgery 52.Hand surgery
(8) 'Periphery' level	Ordinal	(1) Periphery of country (2) Intermediate (3) Center of country

Appendix A2: Distribution of study population- patients survey (2011)



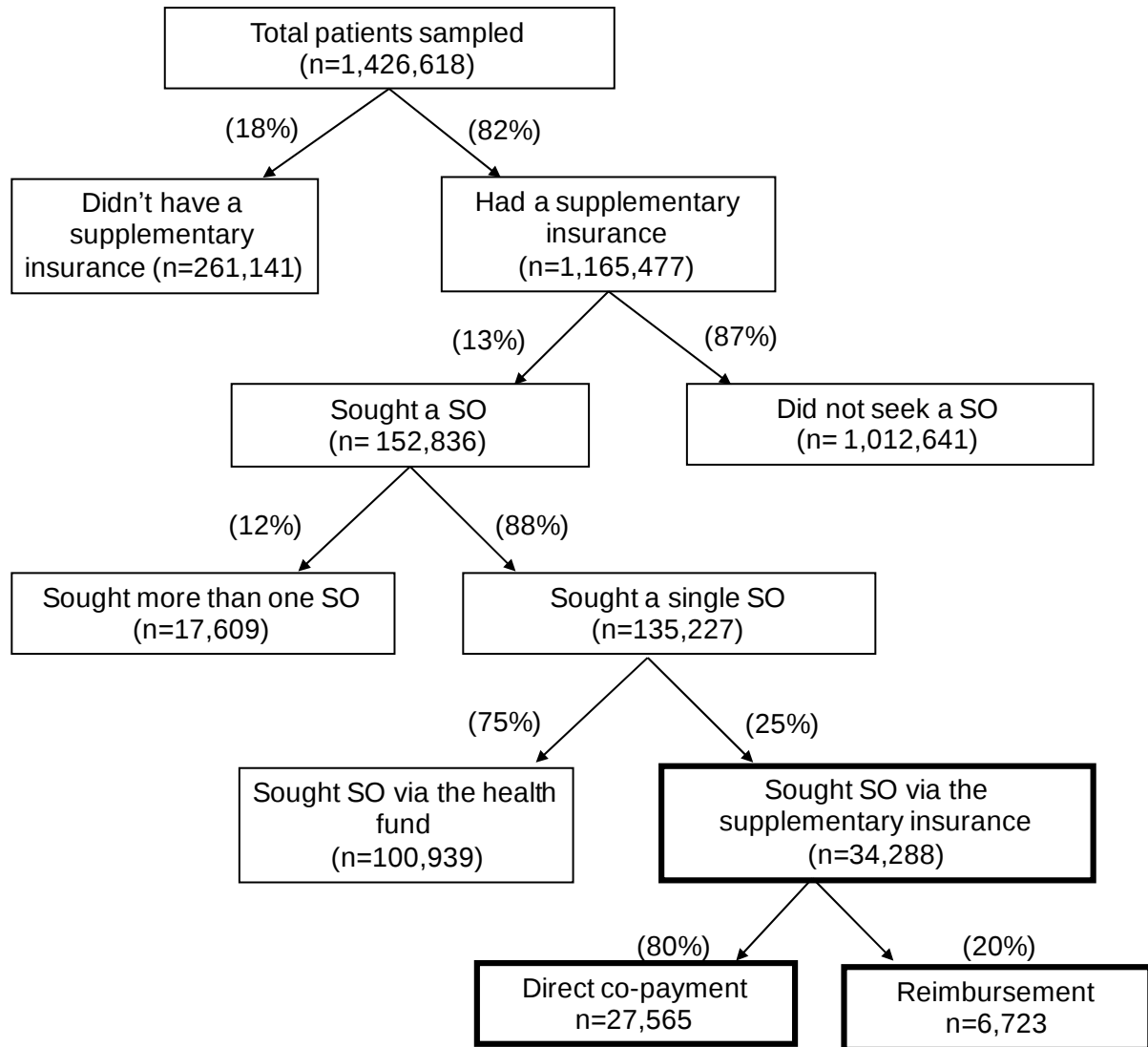
*Note: 7 participants who didn't answer the payment methods questions were removed from the sample.

Appendix A3: Characteristics of SO seekers having supplementary insurance by payment method (n=177) by patients survey (2011)

Characteristics	Direct co-payment n=120 (68%)		Reimbursement n=57 (32%)		p-value
	N	Row N %	N	Row N %	
Gender					
Male	44	69.80%	19	30.20%	0.665
Female	76	66.70%	38	33.30%	
Age group					
18-39	31	70.50%	13	29.50%	0.145
40- 59	37	58.70%	26	41.30%	
60+	52	74.30%	18	25.70%	
Educational level					
Basic	6	66.70%	3	33.30%	0.944
High school	58	69.00%	26	31.00%	
Academic	56	66.70%	28	33.30%	
Personal status					
Living with a partner	98	68.50%	45	31.50%	0.588
Not living with a partner	21	63.60%	12	36.40%	
* Religion					
Jewish	107	66.90%	53	33.10%	0.393
Arabic	12	80.00%	3	20.00%	
Religiosity level					
Religious	37	77.10%	11	22.90%	0.113
Secular	82	64.60%	45	35.40%	
Self-reported income group					
Well below the average	25	73.50%	9	26.50%	0.581
Around the average	67	65.00%	36	35.00%	
Well above average	11	61.10%	7	38.90%	
* Immigration					
Immigrant	5	50.00%	5	50.00%	0.295
Native-born	115	68.90%	52	31.10%	
Socioeconomic level (by residential area)					
Low status	17	68.00%	8	32.00%	1
Middle status (+3 people from high class)	102	68.00%	48	32.00%	
“Periphery” level					
Periphery	12	63.20%	7	36.80%	0.713
Intermediate	49	66.20%	25	33.80%	
Central	59	71.10%	24	28.90%	
Perceived health status					
Not so good	32	74.40%	11	25.60%	0.354
Good	40	61.50%	25	38.50%	
Very good	47	69.10%	21	30.90%	

Fisher's Exact Test *

Appendix A4: Study population: patients sought a SO by payment method:
“reimbursement” vs. “direct co-payment” by electronic medical data (2015).



Appendix A5: characteristics of patients who sought a SO by payment method: “reimbursement” vs. “direct co-payment” by the year of 2015 (n= 34,288).

Characteristic		Reimbursement n=6,723		Direct co-payment n=27,564		p-value
Age group	18-39	1,039	(14.9%)	5,956	(85.1%)	<0.001
	40-59	1,570	(18.0%)	7,135	(82.0%)	
	60+	4,114	(22.1%)	14,473	(77.9%)	
Gender	Male	3,200	(19.6%)	13,122	(80.4%)	.993
	Female	3,523	(19.6%)	14,443	(80.4%)	
Immigration	Recent Immigrants	394	(16.2%)	2,045	(83.8%)	<0.001
	Native-born and established immigrants	6,329	(19.9%)	25,520	(80.1%)	
Socioeconomic level	Low	1,375	(17.5%)	6,492	(82.5%)	<0.001
	Middle	2,965	(19.9%)	11,941	(80.1%)	
	High	2,374	(20.7%)	9,104	(79.3%)	
Religion	Jewish	6,253	(19.6%)	25,675	(80.4%)	<0.001
	Orthodox sector	254	(28.0%)	652	(72.0%)	
	Arab Sector	216	(14.9%)	1,237	(85.1%)	
Charlson score	0	2,358	(17.4%)	11,187	(82.6%)	<0.001
	1-2	2,770	(20.7%)	10,626	(79.3%)	
	3-4	1,056	(21.9%)	3,756	(78.1%)	
	5-25	539	(21.3%)	1,996	(78.7%)	
supplementary insurance layer	Mushlam gold	3,797	(19.7%)	15,477	(80.3%)	.624
	Platinum	2,926	(19.5%)	12,088	(80.5%)	
Periphery level	Periphery of country	1,184	(20.5%)	4,590	(79.5%)	<0.001
	Intermediate	2,164	(20.8%)	8,264	(79.2%)	
	Centre of country	3,362	(18.7%)	14,636	(81.3%)	
Total		6,723		27,564		

Appendix A6: Demographics and professional characteristics of physicians who supplied a second opinion via the supplementary health insurance by payment method in 2011 vs. 2017

Characteristics		2011 (n=875 physicians)				2017 (n=1,007 physician)			
		Direct-co-payment method		Reimbursement method		P-value	Direct-co-payment method		P-value
		Count	Row N %	Count	Row N %		Count	Row N %	
Age group	35-50	137	(78%)	39	(22%)	<0.001	180	(95%)	<0.001
	51-65	319	(57%)	240	(43%)		417	(81%)	
	66+	58	(47%)	65	(53%)		181	(60%)	
Gender	Male	466	(60%)	316	(40%)	0.187	675	(78%)	0.339
	Female	62	(67%)	31	(33%)		103	(74%)	
Hospital managerial position	Not manager	217	(77%)	65	(23%)	<0.001	276	(88%)	<0.001
	Manager	272	(51%)	258	(49%)		352	(72%)	
	Not working in hospital	39	(65%)	21	(35%)		143	(73%)	
Academic status	Doctor	446	(70%)	191	(30%)	<0.001	632	(84%)	<0.001
	Professor	82	(34%)	156	(66%)		145	(57%)	
Specialist seniority*	1-15	206	(78%)	57	(22%)	<0.001	262	(94%)	<0.001
	16-25	197	(58%)	144	(42%)		276	(82%)	
	26+	123	(48%)	135	(52%)		237	(61%)	
Surgeon (shaban)	No	223	(52%)	203	(48%)	<0.001	238	(51%)	<0.001
	Yes	305	(68%)	144	(32%)		540	(100%)	
'Periphery' level	Periphery of country	44	(76%)	14	(24%)	.007*	50	(79%)	0.706
	Intermediate	149	(65%)	82	(35%)		201	(76%)	
	Centre of country	335	(57%)	250	(43%)		518	(78%)	

Appendix A7: Demographics and professional characteristics of surgeon consultants vs. non-surgeon consultants who supplied a second opinion via the supplementary in 2011 vs. 2017

Characteristics		2011 (n=875)					2017 (n=1,007)				
		Surgeon shaban		Non-surgeon shaban		P-value	Surgeon shaban		Non-surgeon shaban		P-value
		Count	Row N %	Count	Row N %		Count	Row N %	Count	Row N %	
Age group	35-50	100	(57%)	76	(43%)	0.144	127	(63%)	74	(37%)	<0.001
	51-65	283	(51%)	276	(49%)		312	(57%)	231	(43%)	
	66+	56	(46%)	67	(54%)		126	(40%)	189	(60%)	
Gender	Male	415	(53%)	367	(47%)	<0.001	512	(56%)	399	(44%)	<0.001
	Female	34	(37%)	59	(63%)		53	(36%)	95	(64%)	
Hospital managerial position	Not managerial position in hospital	159	(56%)	123	(44%)	0.092	200	(60%)	132	(40%)	<0.001
	Managerial position in hospital	261	(49%)	269	(51%)		270	(52%)	246	(48%)	
	Not working in hospital	27	(45%)	33	(55%)		90	(44%)	113	(56%)	
Consultant type	In network (Direct co-payment)	299	(58%)	220	(42%)	<0.001	565	(69%)	251	(31%)	<0.001
	Private (Reimbursement)	150	(42%)	206	(58%)		0	(0%)	243	(100%)	
Academic status	Doctor	352	(55%)	285	(45%)	<0.001	467	(59%)	322	(41%)	<0.001
	Professor	97	(41%)	141	(59%)		98	(36%)	171	(64%)	
Specialist seniority*	1-15	153	(58%)	110	(42%)	<0.001	198	(68%)	95	(32%)	<0.001
	16-25	168	(49%)	173	(51%)		197	(55%)	158	(45%)	
	26+	124	(48%)	134	(52%)		168	(41%)	237	(59%)	
'Periphery' level	Periphery of country	25	(43%)	33	(57%)	0.098	29	(43%)	38	(57%)	0.098
	Intermediate	109	(47%)	122	(53%)		143	(51%)	136	(49%)	
	Centre of country	315	(54%)	270	(46%)		390	(56%)	311	(44%)	