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Information Signal and Medical Diagnosis: Audit Study Evidence from Georgia*

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Abstract

Evidence on how digital technologies, such as online health information platforms, affect the doctor-patient relationship in general, and the diagnosis and treatment of patients in particular, is still limited. In this study, we explore the effects of alternative information from an online source on the diagnosis and treatment behavior of doctors in Tbilisi, Georgia. We use data from standardized patient visits and assess quality of care on the basis of case management of diabetes type II – a disease which is on the rise in Georgia. We find that doctors do not respond to the information signal and that case management is unaffected by the information provided. This finding holds across a number of dimensions of clinical case management, including the number of symptoms checked, the number of clinical tests performed, the time spent with the patient and the costs charged for consultations and medical tests.

Keywords: Health Care, Standardized Patient, Diabetes

***JEL* Classification:** H42, I11, I18, O15

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1. Introduction

Rapid advances in data science and digital technologies have promoted the spread of health information platforms across the globe. The target group of these platforms varies. While some are targeted at health care providers, others aim to provide information to patients. The expansion of digital services is expected to fill a void and improve the quality and access to health services, particularly in remote areas (Adjekum et al. 2018; Mitchell and Kan 2019). Yet, they might also have fundamental consequences for clinical consultations and the way in which patients value and interact with the health care system and medical professionals. On the one hand, better informed patients might take a more active role in clinical consultations and thus contribute to better case management (see Kovacs et al. 2022).[1] On the other hand, medical professionals might reduce their effort in case management when presented with a second opinion from an online platform, which in turn could worsen case management (McMullan 2006). To date, we still have an incomplete understanding of the effects of digital health information platforms targeted at patients for case management (Rowland et al. 2020; Wood et al. 2019). *A priori* it is not clear if online health information is a complement or substitute to a physical doctor visit and how this interacts with other factors such as trust and perceived doctor quality, for example. At the same time, it is not clear if and to what extent the presence of alternative information will affect a doctors' diagnostic efforts and treatment recommendation. In this article we address this latter question by looking at how doctors respond when faced with a potential diagnosis provided by an online platform.

To do so, we employ an audit study approach, also referred to as standardized patient (SP) design in the public health and medical literature. Our study is conducted in Georgia, where digital health information platforms have become increasingly popular. One such example is the online counselling service MyDoc (www.mydoc.ge).[2] This platform used epidemiological data to provide users with probabilities of various diagnoses (based on self-reported symptoms) and gave specific advice for action as well as a list of relevant physicians and hospitals in their vicinity.

[1] More information can also increase the demand for health care and also result in unnecessary appointments and thus raising the pressure on the health system (Tan and Goonawardene 2017; Wald et al. 2007).

[2] The platform was active at the time when we designed the study. In the meantime, however it has been discontinued and only a Facebook page (https://www.facebook.com/mydocge) remains active.

In our study, standardized patients (SPs or actors) portray a clinical case of Type II diabetes – a disease that is gaining increasing importance in Georgia. Our study population are 100 randomly selected general practitioners (GPs) in Tbilisi, the capital of Georgia. Our experimental variation consists of an information signal, whereby the SPs indicates to the doctor that based on information entered on the mydoc-website they are at risk of having diabetes. Our SPs consist of both, females and males. In our study, each GP is visited four times, twice by a male patient and twice by a female patient. Hence, our analysis is based on 400 doctor visits. In addition to the data retrieved from the clinical consultations, we also collected information from the doctors in our sample using a phone survey. This data includes information on their socio-economic background, training and professional experience, knowledge, preferences and an assessment of the health infrastructure.

This article's main contribution is to provide direct evidence on clinical case management in the presence of a second opinion from an online health platform based on individual patient-doctor interactions. We look at clinical case management from different angels considering the diagnosis, the anamneses and clinical tests performed, the time spent with the patient and the costs for consultation. In our study, doctors gave a diabetes diagnosis in 64% of cases. The national guidelines for diabetes list 14 symptoms to be checked and tests to be performed. In our case, doctors implemented on average one third (4.85) of the recommended procedures.[3] The average time that a doctor spends with a patient is 16 minutes. A consultation costs on average GEL 46 (equivalent to USD 17). We find that the information or online second opinion nudge does not affect case management. It does neither affect diagnostic effort, nor the time spent with the patient or cost charged. When we include the information from the phone surveys, we find that doctor's effort is mediated by their level of training, knowledge and patience.

Our results are an interesting complement to the literature, in which standardized patients signal information – in different forms – to doctors. For example, Currie et al. (2014) show that when patients are signaling knowledge about inappropriate antibiotic use prescriptions of antibiotics reduce by 20 percentage points. This also mirrors results from an earlier study by Currie et al. (2011), which documents that patients with flu-like symptoms who display knowledge of appropriate antibiotics are less likely to receive unnecessary antibiotics.

[3] Since SPs are revealing symptoms as part of their case presentation (see Section 3 below), our outcomes of interest only consider the required procedures net of the information provided in the opening presentation. Hence, we only consider a total of twelve practices.

Promoting stronger patient involvement in case management, Kovacs et al. (2022) show that when patients are more actively involved in case management by volunteering more symptoms of their condition, providers are 27% more likely to correctly manage the patient. Likewise, also Kwan et al. (2018), find positive effects of information on case management in the case of tuberculosis (TB) in India. SPs which present themselves with a chest X-ray or positive sputum test obtained from an earlier interaction with a health care provider were more likely to be correctly managed compared to patients without this information and thus higher diagnostic uncertainty. Gottschalk et al. (2020) also use a second opinion signal when studying treatment recommendations of dentists in Switzerland. The information signal in this case consists of an X-ray which is been uploaded to an internet dentist platform together with the diagnosis that was provided by another dentist. Unlike the beforementioned studies, Gottschalk et al. (2020) find no effect of this information signal on diagnostic quality, suggesting that the effect of a patient's signal of further information might be highly sensitive to the nature of the signal, as well as, the context and complexity of the diagnosis.

Our results also speak to a large literature on doctor incentives and characteristics for case management. Studies have looked at the role of working conditions, knowledge, motivation, renumeration, and other financial incentives. Systematic reviews, by Eijkenaar et al. (2013) and Rowe at al. (2015), however, find little conclusive evidence emerging from this body of work from low- and middle-income countries (LMICs). Using an audit study approach, Kovacs et al. (2022), for example, find no evidence, that quality of care in rural Senegal is lower when workload increases. Meanwhile there is a nascent literature on cognitive biases for medical decision making in LMICs. Kovacs et al. (2020), for example, argue that cognitive biases of health care providers are likely contributors to poor quality care in in LMICs. For rural Senegal, they document that overconfident providers are 26% less likely to correctly manage their patients.

Finally, we also contribute to a small but growing literature on audit studies in health-care in LMICs (King et al, 2019; Kwan et al. 2019; Wiseman et al. 2019). Audit studies using standardized patients are considered the gold standard for quality-of-care measurements in health care settings. SPs are well-trained "fake patients" who arrive to a doctor appointment and present their symptoms and complaints of some specific illness, like a real patient. This allows researchers to evaluate the quality of care and case management by checking adherence to existing protocols (Das et al. 2016). Audit studies do have a number of advantages over other

approaches.[4] First, they allow us to objectively know the patient's illness and thus appropriate treatment. Second, we can control and vary patient's characteristics. Third, we can overcome Hawthorn and experimenter demand effects biasing the results because physicians do not know that their decisions are recorded. Fourth, if combined with a follow-up survey, it allows us to identify gaps between what providers know and what they do in practice (King et al. 2019; Kwan et al. 2019). Apart from the already mentioned variation in information, studies have also used this approach to study the extent to which physicians respond to financial incentives and the effects of the insurance status of patients (Currie et al. 2014; Lu 2014). Das et al. (2016) look at the institutional setup and compare physician effort and treatment between public and private health care providers in India. The authors find no difference in diagnostic and treatment quality of public and private providers, even though private providers have lower training and qualifications. The authors then outline that this due to the fact, that private providers compensate for the lower qualification with higher diagnostic effort.

The paper proceeds as follows. In the next section we describe the context and give an overview of the health care sector and diabetes in Georgia. Section 3 describes the audit study and Section 4 the data, primary outcomes and econometric specification. Section 5 presents the results. Section 6 concludes.

2. Background

2.1 Health Care in Georgia

This study was undertaken in Georgia, a former Soviet republic situated at the crossroads of Europe and Asia. The country started to decentralize as early as 1994 and has since gradually moved away from the *Semashko* influenced health system it inherited at independence (Natsvlishvili et al., 2022).[5] The system is now highly decentralized and privatized (Richardson and Berdzuli 2017). To date about 86% of the hospitals and clinics are private and only about 14% of the health care institutions in Georgia are in the public domain (Bochorishvili and Perandize 2020). To increase accessibility and quality of medical care, in 2013, the government

[4] Alternatives include interviewing patients after they receive services (exit interviews), interviewing providers to assess their knowledge (provider interviews and vignettes), analyzing data from claims or medical records (record abstraction), and observing patient–provider interactions (direct patient observation).

[5] The *Semashko* Model was a highly centralized model with almost complete public ownership. Health care was free at the point of delivery, but (illegal) out-of-pocket payment to health professionals also common.

introduced Universal Health Coverage (UHC) for socially disadvantaged groups. UHC pays for 41% of health expenses incurred in the country.[6] Yet, out-of-pocket spending remains high and accounts for 53% of the current health expenditure (Bochorishvili and Perandize, 2020).

The move away from a public and highly centralized health system to a private and decentralized one seems to have improved access to health care (Footman et al, 2013). However, trust in the health care system is low. Recent survey data from the Caucasus Barometer (2019) show that over 50% of Georgians do not trust the health system, despite the country having one of the highest rates of medical doctors per inhabitant. In 2021, the country had 54.05 doctors per 10,000 inhabitants.[7] This compares to 45.18 per 10,000 inhabitants in Germany and 35.55 in the United States. Yet, despite the high number of medical professionals, health care quality remains a concern. For example, Georgia scores only in 89th place in the Health Care Access and Quality (HAQ) index and thus also lower than its neighboring countries, Russia, Turkey and Armenia (GDB 2016 Healthcare Access and Quality Collaborators 2018).

In Georgia, the primary point of entry to medical care are the so-called family doctors. Based on the symptoms, they either diagnose and treat or refer the patient to a specialist. Fees for services vary from clinic to clinic.

2.2 Diabetes Type II in Georgia

Diabetes type II is an important public health concern in Georgia.[8] According to the International Diabetes Federation (IDF) the age-adjusted comparative prevalence of diabetes among adults in Georgia is 5.7% in 2021. Current diabetes related health expenditure amounts to 167.2 million USD. This is equivalent to a per person expenditure of USD 877.1 (Diabetes Atlas Database 2023). While diabetes prevalence rates have been on the rise, it is important to note that many cases remain undiagnosed. Flood et al. (2021), estimate that the proportion of adults (25-70 years) with undiagnosed diabetes is as high as 33.4%. According to the Global Burden of Disease data, diabetes is the 7th cause of death in Georgia, with an increase of 22.8% in 2019 compared to 2009. In terms of disability and death combined, diabetes takes 3rd place after ischemic heart

[6] 6% are paid through private insurance.
[7] Source: Global Health Worker Statistics database: https://www.who.int/data/gho/data/themes/topics/health-workforce (Accessed: 03.01.2024) Values for the United States refer to 2020, which is the last available data point recorded.
[8] Type 2 diabetes results from the body's ineffective use of insulin. More than 95% of people with diabetes have type 2 diabetes. This type of diabetes is largely the result of excess body weight and physical inactivity.

disease and stroke. Yet, unlike the former two, it has an increasing trend (Global Burden of Disease 2022).

Georgia has been strengthening diabetes care by integrating health service delivery for diabetes and other non-communicable diseases in primary health settings, i.e. through family doctors. Yet, care for people with diabetes in Georgia varies widely. In some areas, 87% are seen by family doctors, while in others, all are seen by endocrinologists (WHO 2022).

Diabetes type II was chosen as the focus of this study because it is a common and increasingly important condition in Georgia, with interesting variation by gender. Widespread information and medical protocols exist. Furthermore, it generally manifests itself through several clearly identifiable symptoms including increased thirst, increased hunger, frequent urination, fatigue, blurred vision, slow-healing sores and numbness or tingling in the hands or feet. Clinical guidelines in Georgia indicate that providers should screen for diabetes a patient that presents itself with these symptoms using a blood (plasma) glucose test. To date there is still little evidence on the quality of care provided to patients with symptoms of diabetes in Georgia (Flood et al. 2021).

3. Experimental Design

3.1 The Standardized Patient Case

This study builds on standardized patients. SPs are healthy individuals, that are trained to visit health care providers. SPs report on specific symptoms and answer to questions of health care providers in accordance with a pre-defined script. Following the visit, SPs complete a standardized checklist providing details on the institution, the questions asked, examinations performed, diagnoses given, and drugs and tests prescribed during the consultation. The choice of the SP case is limited by strong ethical and methodological requirements. First, health care providers have to be able to diagnose the patient's condition without painful or invasive procedures and side effects. Second, the condition does not require physical signs that cannot be simulated. Third, the condition has to remain stable over the time of the intervention such that each diagnosis is based on identical information. Fourth, treatment guidelines must be in place in order to have clear indication on appropriate case management (Gottschalk et al. 2020; Xu et al. 2019).

Based on previous work by Kwan et al. (2019) and in collaboration with local health professionals we developed a patient case of diabetes type II. We recruited a total of ten actors, five females and five males.[9] The actors were trained extensively in portraying the patient case following the defined script.[10] This included rehearsing the script on the patients personal and medical history, as well as, answering to an extensive list that providers might ask during the consultation. One of the concerns with the design used in this study is the safety of the SPs in terms of any medical procedures. In our study design we avoid the need for invasive tests. In case of diabetes type II, several indicators and risk factors, such as obesity and family history do not require invasive procedures. The required glucose and/or blood test were deferred by the SPs. We want to emphasize that as part of their extensive training, SPs were fully informed and trained on how to recognize and avoid harmful situations. This included strategies on the refusal of invasive tests and ensuring that the reasons given for refusals come across as normal behavior and do not raise suspicions and the risk of retaliation in any way.

3.2 Experimental Design

In our experiment we use a 2 X 2 cross-randomized design where, where we randomly vary information and patient gender (see Figure 1 below). More specifically, we randomly vary the amount of information disclosed by the patients at the start of the consultation. Specifically, each SP used either one of the following opening statements:

a) "I am coming for a check-up as I have been feeling exhausted for quite some time now. Recently, I have been experiencing visual disturbances. I am thirsty all the time and have strong desire to void. Is something wrong with my kidneys?", or
b) "I am coming for a check-up as I have been feeling exhausted for quite some time now. Recently, I have been experiencing visual disturbances. I am thirsty all the time and have strong desire to void. Is something the matter with my kidneys? **I got a diagnosis from the internet - mydoc, saying that I might have diabetes**."

While the opening information varies, all SPs were trained to respond to the provider in the same way and only volunteer on further symptoms, their medical or family history if actively asked

[9] The SPs were between 34 and 54 years of age.
[10] An excerpt of the script and exit questionnaire are available in the supplementary appendix.

for by the health professional. Doctors have not been notified in advance about potential SP visits so as to not influence their behavior.[11] Standardized patients paid for their consultation and related fees at the end of the visit so that treatment is unaffected by insurance status.

4. Data and Estimation

4.1 Sampling and Data

Our study was conducted with 100 general practitioners (GP) spread across 68 facilities (hospitals) in Tbilisi, the capital of Georgia. The GPs, respectively the institutions were randomly drawn from a list of clinics and doctors in Tbilisi covering 350 GPs and compiled by the researchers. For the purpose of this study each GP was visited four times. Twice by a male and twice by a female patient for which we randomly assigned if the information signal on the digital diagnosis was sent or not. Hence, our analysis is based on data from 400 consultations in total (Figure 1). Standardized patient visits took place between February and May 2022.

The Information we use for analysis in this study is based on a structured questionnaire, which SPs had to fill directly after the visit. The questionnaire captures details on the consultation including the questions asked by the GP, the diagnostic assessments performed, the diagnosis given, the treatment and recommendations given, the medication and tests prescribed, and the costs charged.[12]

[11] Overall, there is an ongoing debate on the ethics of SP research (see e.g. King et al. 2019; Kwan et al 2019; Wiseman et al. 2019). The SP method, by its very nature, requires that providers do not have full information on when or how data collection occurs. Several approaches to provider consent have been used in studies applying the SP method. These include waivers of consent, consent from over-arching entities such as the Ministry of Health, consent from the facilities in charge and consent from individual providers prior to the SP visit. Given that in the Georgian context informing hospitals might result in spreading this information to the separate doctors, potentially affecting their treatment behavior and thus, the validity of the research, we have requested ethical clearance to waive consent. Certificates of ethical clearance for our study design have been obtained, from the institutional review boards of the host organizations of the authors.

[12] A copy of the exit questionnaire is provided in the Supplementary Appendix (S2).

Figure 1: Sample composition (N=400)

	Control group	**Treatment group (Online diagnosis)**
Female	100 observations	100 observations
Male	100 observations	100 observations

In this study we aim to study case management of GPs in response to an information signal. In order to do so, we look at three different aspects of case management. These include the diagnostic quality, the time spent with the patient and costs. Our primary outcome of interest is the quality of services received by the patient. For this, we look at the number of diagnostic procedures performed in line with national treatment guidelines. This is captured by a count measure of the number of symptoms and the number of clinical tests performed in line with the national guidelines. The recommended examinations include checking the pulse rate, the blood pressure, the height and weight, the temperature, an eye examination, a feed examination, test of nerves, a urine test, and an inquiry into the family history, the duration of tiredness, and if vision impairment and numbness in limbs occurred - a total of 12 aspects for inquiry. Further symptoms to be verified include visual disturbances, thirst and frequency of urination. We do not count these latter symptom checks because this information was provided by the SPs in their opening statements. Hence, our count measure is net of the information used for the presentation of the case. In addition to the anamnesis, we also review, the diagnosis provided by the GP. We measure this with a binary variable equal to one if the doctor mentioned that the patient is at risk of diabetes. Since diabetes can only be diagnosed with testing blood glucose levels, we also consider a refined measure where, in addition to the suspected diabetes diagnosis, the doctor also prescribed a blood glucose test for confirmation. Furthermore, we measure the time of the consultation in minutes. This is based on the record of the start and end time of the consultation by the SP. Finally, we also look at costs for consultation in GEL based on the record of the fees the SP had to pay.

Since each GP is visited four times, twice under the treatment and twice under the control condition, our sample is balanced mechanically. Table 1 presents summary statistics of the consultations. Over 94% of the doctors in our sample are female. 42% practice as family doctors, the remaining 58% are classified as therapists. Consultations were not subject to long waiting times with less than one other patient present at the time of consultation.

Table 1: Summary statistics of consultations

	Mean	SD	Min	Max	N
Family doctor (=1)	0.42	0.49	0	1	400
Male doctor (=1)	0.06	0.24	0	1	400
Nbr. of patients at arrival	0.87	1.56	0	15	400
Nbr of patients at departure	0.63	0.99	0	7	400
Provider given a diagnosis (=1)	0.84	0.37	0	1	400
Of those with a diagnosis					
Provider mentioned (potential) diabetes diagnosis (=1)	0.88	0.33	0	1	336
Diabetes diagnosis with glucose test prescribed (=1)	0.75	0.43	0	1	336
Nbr. of recommended checks performed (total)	4.85	2.34	0	11	400
Nbr. of recommended symptoms checked	2.23	1.17	0	5	400
Nbr. of recommended physical checks performed	2.62	1.76	0	7	400
Length of visit (min.)	15.80	7.98	1	57	400
Consultation fee (GEL)	46.04	17.30	0	95	400
Costs for tests (GEL)	146.32	96.16	0	831	400

In addition to the data collected as part of the SP visits, we also conducted a phone survey with the GPs after the SP visits. The phone survey took place in June and July 2022 and April 2023. This survey collects complementary information on the socio-economic background and experience, knowledge and social preferences of the GPs, as well as, perceptions on their practice and equipment. We use this information to investigate the extent to which our results are subject to doctor characteristics and infrastructure. Furthermore, during the phone survey, we also inquired if GPs think that they have received SPs in the past. This information is valuable for assessing the quality of our study design. The response rate to the phone survey was 78%. Only two out of the 78 providers (2.6%) reported a suspicion. This detection rate is lower than reported in other studies in LMICs (see e.g. Das et al. 2012; Kovacs et al. 2022, Sylvia et al. 2015).

Detailed characteristics of the GPs included in our phone survey are presented in Table A1 in the Appendix. 96% of our respondents are female. The average GP in our sample is almost 60 years old and has been practicing for 33 years in total and for 15.5 years in the same clinic.

Income levels of doctors are low, with over three quarter of the doctors earning less than GEL 1,000 (USD 380) net per month. 82% earned their qualification from Tbilisi State Medical University (TSUM), the leading medical university in Georgia. Doctors see on average 19 patients per day. Using a vignette question asking for the symptoms that should be checked in case of suspected diabetes, GPs list 6 out of 12 symptoms on average. Concerning recommended physical exams and tests they state less than half on average (4 out of 10). The vignette responses lead to suggest that doctor's knowledge of recommended practices is limited. Yet, the procedures mentioned in the vignette exercise are very much in line with the procedures conducted in the consultations. Hence, our data does not suggest that doctors are subject to a "know-do gap" which is often mentioned the literature on health service provision and quality (see e.g. Kovacs et al. 2022). In terms of health facility equipment and infrastructure, almost all institutions have lab facilities at their disposal and are equipped to perform standard tests (blood, TCL/DLC, blood smear, urine). Less than 60% of the facilities keep electronic patient records. Nevertheless, doctor's perceptions of their facilities and the quality of services provided in their facilities is high with 9 out of 10 points on average.

4.2 Estimation Strategy

The randomized design allows us to identify the causal effect of an information signal from an online source by simply estimating OLS regressions:

$$Y_{isfp} = \beta_0 + \beta_1 Info_i + \beta_3 M_s + \beta_4 Info_i \times M_s + X'_{is}\beta_5 + \gamma_f + \delta_p + \varepsilon_{isfp} \qquad (1)$$

where Y_{isfp} is the outcome of interest for consultation *i* of SP *s* at facility *f* and provider *p*. Info$_i$ is a binary variable if the SP disclosed that she has obtained an online diagnosis. The coefficient β_1 can be interpreted as the effect of patients providing information about online consultations on the quality of case management. We account for heterogeneous effects by gender, our second variation, with an interaction term ($Info_i \times M_s$). X_{is} refers to a vector of consultation and SP characteristics, namely the number of patients present at the start of the consultation accounting for prior conditions that are likely going to influence consultation quality (and length), as well as, the order number of the SP visit, accounting for potential learning effects. We also account for facility and doctor fixed effects. Standard errors are clustered at the facility level.

We also use a variation of Equation (1) to investigate the extent to which GP characteristics influence case management (Section 5.4)

5. Results

In the following we present the results of our study. We begin with a discussion of the effects on diagnostic quality, followed by time spent with the patient and finally looking at costs.

5.1 Diagnostics

A key dimension in determining the quality of case management is the quality of effort exerted by the health professional. This can be exemplified by the quality of the anamneses performed. We approximate this with a count measure on the number of diagnostics performed. Table 2 shows the results. The count measure presented in Table 2 combines the count of the number of symptoms and the number of clinical tests that should be performed following the national guidelines (Ministry of Health of Georgia 2010). We also look at the symptoms and tests separately. Detailed results are included in the Appendix Tables A2 and A3 respectively.

Table 2. Regression on a count measure of the number of diagnostics performed

	(1)	(2)	(3)	(4)
Information (=1)	-0.200	-0.390	-0.419	-0.330
	(0.195)	(0.257)	(0.278)	(0.243)
Male (=1)		-0.120	-0.122	0.011
		(0.210)	(0.279)	(0.247)
Information X Male		0.380	0.422	0.284
		(0.354)	(0.395)	(0.347)
Nbr. of patients at arrival			0.110	0.158**
			(0.080)	(0.079)
Number of SP visit				0.027**
				(0.011)
Constant	4.950***	5.010***	4.919***	4.212***
	(0.210)	(0.230)	(0.207)	(0.319)
Facility fixed effects	No	No	Yes	Yes
Doctor fixed effects	No	No	No	Yes
Observations	400	400	400	400
R-squared		0.004	0.422	0.616

Notes: Robust standard errors clustered at the facility level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Doctors in our sample perform on average 4.85 of the 12 recommended checks. In the most parsimonious model (column (1)), we estimate that the information signal reduces the number of diagnostic procedures by 0.2. However, this effect is not statistically significant. Accounting for the gender of the SP, the number of patients in the waiting room and the number of visits already conducted by the SPs as well as hospital and doctor fixed effects we estimate that the information signal reduces the number of procedures by 0.33. Yet, this effect remains statistically insignificant. Hence, despite a consistent negative coefficient, results suggest, that the information signal has no effect on the number of checks performed. We also do not find any significant difference by patient gender. Our results do suggest that there are learning effects, yet these are negligible with a coefficient size of 0.07. Interestingly though, we also obtain a statistically significant coefficient accounting for the number of patients waiting. The positive coefficient suggests that GPs exert more effort with more patients present. This could simply be the result of doctors spending more time with patients, and resulting in longer waiting times for the others. However, our results might also be a signal of more efficiency in diagnosing under constraints.

Taking a more detailed look at the diagnostic procedures by looking at symptoms inquired and physical checks performed separately (Appendix A2 and A3), our main conclusion holds and we find no effect of the information nudge, neither on symptoms checked (Appendix A2), nor on the number of physical exams (Appendix A3).

Our summary statistics (Table 1) already indicated, that GPs do not implement the complete set of diagnostics outlined in the national guidelines. Nevertheless, there is the possibility that doctors still "correctly" diagnose diabetes, despite omissions in the anamneses. A necessary requirement for the diagnosis of diabetes is a blood test though. In our design we have refrained from invasive procedures (see Section 3). Yet, in the exit questionnaire we have collected information if the doctor provided a diagnosis, the type of diagnosis provided and if the SP has been prescribed with blood glucose testing. In case where the SP received a suspected diabetes diagnosis and prescription for blood testing, we consider this as appropriate case management. As shown in Table 1 above, in 16% of the consultations, SPs have not received a diagnosis from their GP, or the diagnosis has not been communicated to them. Of those that have received a diagnosis, GPs have diagnosed suspected diabetes in 88% of the cases (295 cases,

74% of the full sample).[13] In the majority of suspected diabetes cases (75%), GPs have prescribed glucose testing (252 cases, 63% of the full sample).

We have investigated if the suspected diagnosis issued by the GPs is influenced by the information signal. The results are presented in Tables 3 and 4 below. Table 3 shows the results of a binary outcome of a suspected diabetes diagnosis. Table 4 shows results of a binary outcome where we also consider if glucose testing has been ordered in addition. In both cases results have been estimated using a linear probability model (LPM).[14] The results suggest that the doctors suspected diagnosis are independent of the information signal. If anything, the negative coefficient would suggest that the information signal lowers the likelihood of diagnosing the SP with diabetes. Again, we also do not find differences by gender of the SP across our different specifications.

Table 3. Regression on a binary measure indicating a suspected diabetes diagnosis (LPM)

	(1)	(2)	(3)	(4)
Information (=1)	-0.005	-0.070	-0.074	-0.057
	(0.042)	(0.054)	(0.060)	(0.060)
Male (=1)		-0.020	-0.014	0.003
		(0.057)	(0.060)	(0.061)
Information X Male		0.130*	0.113	0.097
		(0.074)	(0.085)	(0.086)
Nbr. of patients at arrival			0.005	0.006
			(0.017)	(0.019)
Number of SP visit				0.005**
				(0.003)
Constant	0.740***	0.750***	0.749***	0.617***
	(0.034)	(0.047)	(0.045)	(0.079)
Facility fixed effects	No	No	Yes	Yes
Doctor fixed effects	No	No	No	Yes
Observations	400	400	400	400
R-squared	0.000	0.008	0.233	0.337

Notes: Robust standard errors clustered at the facility level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

[13] There is considerable variation in the stated medical outcome. Conditions included, chronic fatigue syndrome, urinary tract infection, anemia, iron deficiency, hyperlipidemia, vitamin D deficiency, and heart problem. In 16% of the visits, doctors did not state a medical outcome.

[14] We have also estimated the model using a probit specification. The results are qualitatively similar to the ones presented here. Detailed results of the probit specification can be obtained from the authors upon request.

Table 4. Regression on a binary measure indicating a diabetes diagnosis with glucose testing (LPM)

	(1)	(2)	(3)	(4)
Information (=1)	-0.030	-0.060	-0.065	-0.056
	(0.046)	(0.064)	(0.066)	(0.065)
Male (=1)		-0.010	-0.011	-0.005
		(0.061)	(0.066)	(0.066)
Information X Male		0.060	0.052	0.044
		(0.087)	(0.093)	(0.093)
Nbr. of patients at arrival			-0.013	-0.006
			(0.019)	(0.021)
Number of SP visit				0.005
				(0.003)
Constant	0.645***	0.650***	0.666***	0.558***
	(0.040)	(0.052)	(0.049)	(0.086)
Facility fixed effects	No	No	Yes	Yes
Doctor fixed effects	No	No	No	Yes
Observations	400	400	400	400
R-squared	0.001	0.002	0.241	0.348

Notes: Robust standard errors clustered at the facility level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

5.2 Time

Table 5 shows the results of the time spent with the doctor as another dimension of case management. The SPs spent on average 15.8 minutes with the doctor (Table 1). Our estimation results indicate that the information signal has a positive, yet, not statistically significant effect on the time spent with the doctor. Nevertheless, we do observe differential treatment by gender with male patients spending about two more minutes with the doctor. Yet, when they send an information signal, the time is reduced as indicated by the negative coefficient. However, we cannot confirm that this effect is different from zero.

Table 5. Regression on the number of minutes spent with the GP

	(1)	(2)	(3)	(4)
Information (=1)	0.310	0.560	0.597	0.704
	(0.760)	(1.058)	(0.963)	(0.871)
Male (=1)		1.550**	1.441	1.703*
		(0.766)	(0.963)	(0.886)
Information X Male		-0.500	-0.525	-0.799
		(1.111)	(1.364)	(1.244)
Nbr. of patients at arrival			-0.317	-0.189
			(0.277)	(0.282)
Number of SP visit				-0.000
				(0.039)
Constant	15.645***	14.870***	15.188***	14.966***
	(0.565)	(0.715)	(0.717)	(1.146)
Facility fixed effects	No	No	Yes	Yes
Doctor fixed effects	No	No	No	Yes
Observations	400	400	400	400
R-squared	0.000	0.007	0.404	0.574

Notes: Robust standard errors clustered at the facility level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

5.3 Costs

Finally, we also look at the fees for service. We look at the costs for consultation and the cost for clinical tests prescribed. The results are shown in Table 6. Our SPs were charged GEL 46 (USD 16.91) on average for a consultation (Table 1). The cost for consultation follows a normal distribution with a maximum fee of GEL 95 (USD 34.92). The cost for clinical tests shows much more variance. The average cost amounts to GEL 146 (USD 53.68) and is almost three times as high as the average consultation fee. The fees charged go up to GEL 831 (USD 305.55). We do not find evidence that the information signal has an effect on the costs for services. The coefficients are statistically not different from zero for both outcomes, the cost of consultations, as well as, the cost of clinical tests ordered. In addition, we also do not find evidence of a gender bias in the fees for service.

Table 6. Regression on the fees for service

	Cost of consultation (GEL)		Cost of tests (GEL)	
	(1)	(2)	(1)	(2)
Information (=1)	0.415	0.834	0.073	-2.581
	(1.294)	(1.437)	(8.073)	(10.314)
Male (=1)		-0.705		-5.584
		(1.462)		(10.493)
Information X Male		-0.160		6.413
		(2.051)		(14.721)
Nbr. of patients at arrival		0.865*		-0.909
		(0.465)		(3.336)
Number of SP visit		0.105		-0.191
		(0.064)		(0.457)
Constant	45.830***	43.004***	146.282***	153.709***
	(2.096)	(1.890)	(9.687)	(13.565)
Facility fixed effects	No	Yes	No	Yes
Doctor fixed effects	No	Yes	No	Yes
Observations	400	400	400	400
R-squared	0.000	0.753	0.000	0.589

Notes: Robust standard errors clustered at the hospital level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

5.4 Doctor Characteristics

In order to better understand what could be driving the observed effects or absence thereof, we make use of the complementary data collected from the GPs involved in this study. As already mentioned, we collected additional information on doctors using a phone survey. Our response rate to the survey was 75%. Hence, the following results and investigation is based on a reduced sample for which we could match the GP data with data from our exit questionnaires. Our estimations are based on a variant of Equation (1), in which we introduce a number of doctor characteristics covering the socio-economic background, social preferences, as well as, training, practice and knowledge. The results are shown in Table 7. Our main conclusions also hold in this reduced sample. We do not find any effect of the information signal on diagnostic quality. Furthermore, we do also not find any differential treatment by gender. However, our results do reveal some interesting features. For example, doctors who have obtained their degree from TSMU do perform more diagnostic checks. Specifically, they are checking for more symptoms than doctors with degrees issued by other institutions. Furthermore, doctors that obtain a higher score on the vignette exercise also perform more careful anamneses. This applies to both the number of

Table 7. Regressions including doctor characteristics

	Nbr. of checks performed (1)	Nbr. of symptoms checked (2)	Nbr. of physical checks (3)	Diabetes diagnosis (4)
Information (=1)	-0.451	-0.201	-0.249	-0.110
	(0.328)	(0.186)	(0.230)	(0.067)
Male (=1)	-0.389	-0.010	-0.379*	-0.033
	(0.259)	(0.164)	(0.208)	(0.065)
Information X Male	0.680	0.326	0.354	0.117
	(0.424)	(0.256)	(0.309)	(0.088)
Nbr. of patients at arrival	-0.010	-0.037	0.028	0.013
	(0.063)	(0.027)	(0.053)	(0.018)
Age (yrs.)	-0.068	-0.042	-0.026	0.005
	(0.053)	(0.029)	(0.040)	(0.008)
Degree TSMU (=1)	1.045*	0.541**	0.504	0.085
	(0.555)	(0.265)	(0.439)	(0.095)
Years practicing	0.028	0.011	0.018	-0.002
	(0.049)	(0.026)	(0.036)	(0.008)
Years in this clinic	-0.032	-0.008	-0.024	0.001
	(0.019)	(0.008)	(0.015)	(0.002)
Patients/day	0.012	-0.003	0.015	0.000
	(0.013)	(0.006)	(0.011)	(0.002)
Symptoms asked for when diabetes (0-12)	0.157**	0.068*	0.089**	0.005
	(0.065)	(0.037)	(0.044)	(0.011)
Tests to do when diabetes (0-9)	-0.082	0.005	-0.087	0.026
	(0.095)	(0.048)	(0.070)	(0.017)
Risk aversion (0-10)	0.032	0.061	-0.029	-0.011
	(0.113)	(0.050)	(0.085)	(0.011)
Patience (0-10)	0.407*	0.030	0.377*	0.003
	(0.234)	(0.068)	(0.195)	(0.019)
Altruism (0-10)	-0.000	-0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	3.647	3.447**	0.201	0.378
	(2.326)	(1.318)	(1.768)	(0.328)
Facility fixed effects	Yes	Yes	Yes	Yes
Observations	258	258	258	258
R-squared	0.178	0.157	0.147	0.058

Notes: Robust standard errors clustered at the hospital level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 7. Regressions including doctor characteristics (cont.)

	Diabetes diagnosis w. glucose test	Length of visit	Consultation fee (GEL)	Costs for tests (GEL)
	(5)	(6)	(7)	(8)
Information (=1)	-0.091	0.117	-0.203	1.706
	(0.087)	(1.306)	(1.072)	(8.089)
Male (=1)	0.001	0.635	-1.349	-3.882
	(0.073)	(0.867)	(1.408)	(10.444)
Information X Male	-0.007	1.104	-0.357	-1.116
	(0.111)	(1.304)	(2.248)	(14.537)
Nbr. of patients at arrival	-0.004	-0.262	-0.464	-0.554
	(0.026)	(0.311)	(0.714)	(2.755)
Age (yrs.)	0.004	-0.068	-0.489	-4.505**
	(0.010)	(0.194)	(0.650)	(2.038)
Degree TSMU (=1)	-0.020	0.346	3.151	17.396
	(0.090)	(1.251)	(4.310)	(17.558)
Years practicing	-0.000	0.253	0.258	2.207
	(0.009)	(0.177)	(0.616)	(1.855)
Years in this clinic	0.004	0.014	-0.153	0.155
	(0.003)	(0.070)	(0.211)	(0.668)
Patients/day	-0.000	-0.094**	0.150	-0.531
	(0.002)	(0.036)	(0.122)	(0.509)
Symptoms asked for when diabetes (0-12)	0.015	0.222	0.028	3.585
	(0.015)	(0.224)	(0.697)	(2.568)
Tests to do when diabetes (0-9)	0.012	0.448	0.742	5.811
	(0.021)	(0.330)	(0.843)	(4.179)
Risk aversion (0-10)	0.004	0.713**	-0.864	5.044
	(0.016)	(0.340)	(0.699)	(4.187)
Patience (0-10)	-0.003	0.844	-0.430	-15.584**
	(0.021)	(0.565)	(1.160)	(6.574)
Altruism (0-10)	0.000	-0.001	-0.004***	-0.015**
	(0.000)	(0.001)	(0.001)	(0.007)
Constant	0.331	0.407	75.980***	424.285***
	(0.406)	(6.553)	(22.461)	(85.205)
Facility fixed effects	Yes	Yes	Yes	Yes
Observations	258	258	258	258
R-squared	0.031	0.184	0.227	0.215

Notes: Robust standard errors clustered at the facility level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

symptoms checked and to the number of physical checks performed (Columns 2 and 3). These results do indicate that doctors with more or better knowledge also do perform more thorough anamneses. Such a pattern would speak to the usefulness of additional training in order to improve outcomes. While we find little influence of GP characteristics with respect to age or experience, we do see that doctors that are more patient also exert more effort with respect to the diagnostics they perform. Hence, we also find evidence of social preferences shaping diagnostic behavior. With respect to providing a suspected diabetes diagnosis however, our models perform poorly (explanatory power below 6%). This leads to suggest that personal characteristics and knowledge have little influence on "correctly" diagnosing a patient.

6. Conclusion

In this paper we study the diagnosis and treatment behavior of GPs for the clinical case of diabetes type II in Georgia. Our investigation is based on 400 SP consultations where we randomly vary the information provided by standardized patients and their gender. More specifically we are interested in examining, if GPs do respond to information from the internet retrieved by the patient. In addition, we also study if there is a gender dimension in relation to the clinical case management provided by the doctor.

Our data and results show that the information signal does not push doctors to exert more effort in the clinical case management for diabetes. If anything, the negative coefficients of our estimates would lead to suggest that doctors exert less effort when they receive information of an alternative diagnosis provided by an internet platform. Yet, our coefficient estimates are not statistically significant and thus do not substantiate this view.

We complement the data from the standardized patient visits with data on doctor characteristics. When taking doctors characteristics into account we see that the that doctors obtained and the that knowledge score obtained from a vignette exercise have a positive influence on the number of tests performed. Yet, they do not lead to a higher likelihood of suspecting diabetes in our case.

While our information signal was likely to weak to be even recognized and acknowledged by the GPs, the results of our study do lend support to further training of doctors in this context. The fact that doctors perform less than half of the checks outlined in the national clinical guidelines illustrates the need for additional training and sensitization. Training of health

care providers could take a multitude of forms and the effectiveness of various measures and approaches is still a subject of considerable debate (Rowe et al 2021). Hence designing a sustainable training intervention in this context is subject to further research.

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Appendix

Table A1. GP summary statistics

	Mean	SD	Min	Max	N
GP characteristics					
Female (=1)	0.96	0.19	0	1	78
Age (yrs.)	59.21	8.35	40	74	77
Married (=1)	0.75	0.43	0	1	77
Average monthly income					
< 500 GEL (=1)	0.34	0.48	0	1	61
501-1,000 GEL (=1)	0.43	0.50	0	1	61
1,501-2,500 GEL (=1)	0.16	0.37	0	1	61
2,501-3,500 GEL (=1)	0.03	0.18	0	1	61
3,501-5,000 GEL (=1)	0.03	0.18	0	1	61
Degree TSMU (=1)	0.82	0.39	0	1	78
Years practicing	32.86	10.10	10	49	77
Years in this clinic	15.51	11.41	0	44	75
Lack of incentives (=1)	0.44	0.50	0	1	63
Symptoms asked for in case of diabetes (0-12)	6.72	2.95	0	12	74
Tests to do in case of diabetes (0-10)	3.61	2.37	0	10	74
Patients/day	18.51	15.33	3	120	73
Facility characteristics					
Facility has lab (=1)	0.95	0.23	0	1	75
Blood test (=1)	1.00	0.00	1	1	73
TLC/DLC (=1)	0.95	0.23	0	1	73
Blood smear (=1)	0.95	0.23	0	1	73
Urine test (=1)	0.96	0.20	0	1	73
Stool test (=1)	0.68	0.47	0	1	73
Electronic record	0.57	0.50	0	1	75
Nbr. of doctors	48.33	61.85	1	400	69
Nbr. of nurses	15.72	47.84	0	320	46
Nbr. of admin staff	8.87	8.59	3	50	38
Rate infrastructure (1-10)	8.28	1.90	2	10	72
Rate service (1-10)	8.96	1.44	2	10	72
Rate professionalism at clinic (1-10)	9.36	1.13	3	10	72
Rate clinic overall (1-10)	8.81	1.37	2	10	72

Table A2. Regression on a count measure of the number of symptoms

	(1)	(2)	(3)	(4)
Information (=1)	-0.025	-0.130	-0.136	-0.107
	(0.107)	(0.149)	(0.147)	(0.136)
Male (=1)		0.070	0.068	0.112
		(0.132)	(0.148)	(0.138)
Information X Male		0.210	0.209	0.164
		(0.203)	(0.209)	(0.194)
Nbr. of patients at arrival			0.042	0.029
			(0.042)	(0.044)
Number of SP visit				0.006
				(0.006)
Constant	2.245***	2.210***	2.178***	2.029***
	(0.095)	(0.110)	(0.110)	(0.178)
Clinic fixed effects	No	No	Yes	Yes
Doctor fixed effects	No	No	No	Yes
Observations	400	400	400	400
R-squared	0.000	0.008	0.351	0.521

Notes: Robust standard errors clustered at the hospital level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A3. Regression on a count measure of the number of physical exams

	(1)	(2)	(3)	(4)
Information (=1)	-0.175	-0.260	-0.282	-0.222
	(0.138)	(0.182)	(0.207)	(0.184)
Male (=1)		-0.190	-0.191	-0.101
		(0.179)	(0.207)	(0.187)
Information X Male		0.170	0.213	0.120
		(0.268)	(0.293)	(0.262)
Nbr. of patients at arrival			0.068	0.129**
			(0.059)	(0.059)
Number of SP visit				0.021**
				(0.008)
Constant	2.705***	2.800***	2.741***	2.183***
	(0.160)	(0.183)	(0.154)	(0.242)
Clinic fixed effects	No	No	Yes	Yes
Doctor fixed effects	No	No	No	Yes
Observations	400	400	400	400
R-squared	0.002	0.004	0.439	0.613

Notes: Robust standard errors clustered at the hospital level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Supplementary Material

Information Signal and Medical Diagnosis: Audit Study Evidence from Georgia

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S1. SP Narrative

Example Person description - Davit (Male):
Davit is a 45-year-old male with a university degree (business studies). He is the owner of a car dealership in Tbilisi. He is tall and a man of sturdy build. He enjoys smoking, drinking and traditional Georgian food. His work and social engagements leave him no time to exercise. Furthermore, after the recent death of his father due to a heart attack, his mother just moved in with him. She is 74, and has been diagnosed with diabetes last year. He is an outgoing person yet today he appears tense as he visits the doctor for a check-up since he has been feeling tired, extremely thirsty and a strong desire to void for quite a while now.

Opening statement for GP visit:
Control group: I am coming for a check-up as I have been feeling exhausted for quite some time now. Recently, I have been experiencing visual disturbances. I am thirsty all the time and have strong desire to void. Is something the matter with my kidneys?

Treatment group: I am coming for a check-up as I have been feeling exhausted for quite some time now. Recently, I have been experiencing visual disturbances. I am thirsty all the time and have strong desire to void. Is something the matter with my kidneys? **I got a diagnosis from the internet - mydoc, saying that I might have diabetes**.

Questions asked by the provider and their answers:

- How long are you feeling tired?
  Answer: Quite some time now. Can't really say.

- Do you have any pain urinating?
  Answer: No. Just a frequent urge.

- Have you been sick recently?
  Answer: A cold a few weeks ago and itchy skin from time to time.

- Are you taking any medicines/have you taken any medicines?
  Answer: No.

- Do you smoke?
  Answer: Yes. 5/6 cigarettes a day, depending on the stress.

- How long have you been smoking?
  Answer: Over thirty years.

- Do you drink?
  Answer: Yes.
  How often?
  Answer: Every day, at least a glass or two, sometimes more.

- Do you have diabetes?

Answer: I don’t know.

- Have you been tested for diabetes?
  Answer: No

- Any weight loss?
  Answer: No. I very much enjoy eating as you can see.

- Do you have hypertension?
  Answer: Not that I know of.

- Any family history of diabetes, hypertension, heart disease, mental illnesses etc.?
  Answer: My mother has been diagnosed with diabetes last year.

- What is your lifestyle, are you exercising or does your job include being physically active?
  No, mostly sedentary, no exercise

- Having any chronic disease?
  I don’t know

- High blood pressure?
  No

- Blurred vision?
  Yes

- Mouth dryness?
  Yes, all the time thirsty

- Any surgeries recently?
  No

- Headache?
  No

- Dizziness?
  No

- Any other symptomatic question
  Answer should be NO

Instructions to be remembered by SP

	SP should refuse any injections/invasive tests performed by the provider during his encounter but note down details of what was offered/suggested. Pulse rate, blood pressure, height, weight, temperature and urine sample are ok. For blood samples refer to aversion of needles and/or show recent blood test results.
	SP should remember any analysis/investigations offered
	SP must remember if the provider gave any diagnosis and if so which.
	SP must collect prescription and/or any medicines given by the provider.
	SP must remember if the provider recorded any of the information, he gave to him/her.
	SP must remember if follow-up visit was recommended and note that date of appointment.
	SP must record and provide proof of consultation fee.
	SP must remember if any other payments were requested and if so how and how much.
	SP should familiarize himself/herself with the exit questionnaire

S2. Exit Questionnaire

Questionnaire #

Standardized Patient (SP)
Visit questionnaire

(To be completed after the visit)

For the SP

	From the card	
	Code	Name
Clinic name		
Object		
Clinic Address		
Name and surname of the doctor		
SP		
Scenario number		

Details of the visit		
Date of the visit		
Day of the visit		
Start time of the visit	– *Hour*	*Minute*
End time of the visit	– *Hour*	*Minute*
Length of the visit (minutes)	– *Minutes* ____	

U	Waiting room	Yes	No	N/A
U1.1	Number of patients in the waiting room at arrival	_____		
U1.2	Number of patients in the waiting room at departure	_____		
U1.3	Email / Mobile number of the doctor	_____		

A	Patient History

A1	History information asked by the provider	Yes	No	N/A
A1.1	Did the doctor ask anything about age	1	2	
A1.2	Did the doctor ask anything about height (If measured on the spot, mark 99)	1	2	99
A1.3	Did the doctor ask anything about weight (If measured on the spot, mark 99)	1	2	99

A2	Patient symptoms		Yes	No	N/A
A2.1	Did the doctor ask anything about:		1	2	
	A2.1.1	How long are you feeling tired?	1	2	
	A2.1.2	Having a headache?	1	2	
	A2.1.3	Having cough?	1	2	
	A2.1.4	Having problems with breathing?	1	2	
	A2.1.5	Having heart ache?	1	2	
	A2.1.6	Having dizziness?	1	2	
	A2.1.7	Having any pain urinating?	1	2	
	A2.1.8	Frequent urination?	1	2	
	A2.9	Having mouth dryness?	1	2	
	A2.1.10	Having thirstiness?	1	2	
	A2.1.11	Having blurred vision?	1	2	
	A2.1.12	Numbness or tingling in the hands or feet?	1	2	

A3	Family history		Yes	No	N/A
A3.1	Doctor asked whether any family member (e,g, mother, father etc.) has history of diabetes, hypertension, heart disease, mental illnesses etc.?		1	2	
	A3.1.1	Diabetes	1	2	
	A3.1.2	Hypertension (High blood pressure)	1	2	
	A3.1.3	Heart disease	1	2	
	A3.1.4	Mental illness	1	2	
	A3.1.5.	Doctor generally asked, whether family members have any chronic diseases, without specifying an illness.	1	2	

A4	Personal history		Yes	No	N/A
A4.1	Doctor asked general questions on the disease / treatment history:		1	2	
	A4.1.1	Being sick recently?	1	2	
	A4.1.2	Having any chronic diseases?	1	2	

A4.1.3	Having any recent surgeries?	1	2	
A4.1.4	Having any allergies?	1	2	
A4.1.5	Having polycystic ovary syndrome? (for females only)	1	2	
A4.1.6	Taking any medicines?	1	2	
A4.1.7	Having any weight loss?	1	2	
A4.1.8	Having any weight gain?	1	2	
A4.1.9	Having hypertension? (High blood pressure)	1	2	
A4.1.10	Having diabetes?	1	2	
A4.1.11	Being tested for diabetes?	1	2	
A4.1.12	Lifestyle (sedentary, active etc..)	1	2	
A4.1.13	Smoking	1	2	
A4.1.14	Frequency of getting alcohol	1	2	
A4.1.15	Did the provider record (digitally or paper based) information he/she took from the patient?	1	2	
A4.1.16	Other questions (please carefully list all of them)			
	_____ _____ _____			

A5	Clinical or physical examinations attempted		Yes	No	N/A
A5.1	During the visit doctor /assistant examined:		1	2	
	A5.1.1	Pulse rate	1	2	
	A5.1.2	Blood pressure	1	2	
	A5.1.3	Height (not asked – measured)	1	2	
	A5.1.4	Weight (not asked – measured)	1	2	
	A5.1.5	Temperature	1	2	
	A5.1.6	Asked Urine test	1	2	
	A5.1.7	Eye examination (directed to ophthalmologist or visual examination)	1	2	
	A5.1.8	Test of nerves	1	2	
	A5.1.9	Feet examination (Visual examination)	1	2	

A5.1.10	List any other physical / clinical test / analysis:	
	_____ _____ ___ _____ ____	

A6	Diagnosis		Yes	No	N/A
A6.1	Did the provider give a diagnosis? If yes, what was the (potential) diagnosis (if one or more, list all of them)		1	2	
Potential diagnosis / diagnosis: _____ _____ _____					
A6.2	Did the provider give a prescription? If yes, continue, if not, move to the next block		1	2	
A6.3	Was the prescription for medicines? (If yes, list them all)		1	2	
	A6.3.1	Medicine 1			
	A6.3.2	Medicine 2			
	A6.3.3	Medicine 3			
A6.4	Was the prescription for diagnostic tests? (If yes, list them all)		1	2	
	A6.4.1	Blood test (general)	1	2	
	A6.4.2	Glucose test	1	2	
	A6.4.3	Other (please give details)	1	2	
		_____ _____			

Name (brand)	Type of medicine (tablet, capsule, syrup, injectable, powder)	Dose	Frequency during the day	Duration	How many days a week	How many weeks

A7	Information about an additional visit		Yes	No	N/A
A7.1	Did the provider ask to come back? If yes, choose the reason		1	2	
	A7.1.1	If the symptoms persist	1	2	
	A7.1.2	If the symptoms become worse	1	2	
	A7.1.3	To get medicines	1	2	
	A7.1.4	To get the test result	1	2	
	A7.1.5	Other (list below)	1	2	
		_____			
A7.2	Did the provider ask the patient to go anywhere for further management? If yes, give the reason:		1	2	
	A7.2.1	Other doctor at the same hospital	1	2	
	A7.2.2	Other private / state provider	1	2	
	A7.2.3	Give details below	1	2	
		_____			

S1	Subjective assessment	Do not agree	Rather egree	Rather do not agree	Agree
S1.1	I liked the doctor	1	2	3	4
S1.2	If needed, I would really visit this doctor	1	2	3	4
S1.3	Doctor created an environment in which I could convey my symptoms and concerns easily	1	2	3	4
S1.4	Doctor appeared to be knowledgeable about the illness.	1	2	3	4
S1.5	Doctor addressed my worries seriously	1	2	3	4
S1.6	Doctor explained anything about the illness	1	2	3	4
S1.7	Doctor explained my treatment plan	1	2	3	4

S2	Global assessment	For evaluation use 1-10 points scale, where 0 means you are completely unsatisfied and 10 means you are fully satisfied
S1.1	Give the overall assessment of the visit (including doctor, clinic, room and general service)	_____ (Points)

Service fees (GEL)

P1.0 **Fee of the consultation with the doctor**	**P1.1(P1.2_P1.3)** **Fee of the laboratorial tests**	**P2.1** **Fee of the medicines**

S3. Phone Survey Questionnaire

Section 0

Question	Answer options
City you work in	---------
Clinic name	---------
Clinic address	---------
Name and surname of the doctor	---------
Sex	0=Female, 1=Male
Year of birth	---------
Age	---------
Marital status	1=Single 2=Married 3=Divorced 4=Widowed

Section 1. Education and background

Question	Answer options
University where you obtained degree	---------
Faculty/Specialization	---------
When you obtained your degree	---------
How many years have you been practicing?	---------
How many years have you been practicing in current clinic?	---------

Section 2. Current practice

Question	Answer options
1. How many patients do you see on average each day in your practice?	---------
2. What is the average waiting time for the patient? (time from the call to reserve the visit until the visit?)	---------
3. Counting medicines and consulting fees, how much would you say that you charge for an average patient?	---------
4. How much you charge for consultation only?	---------
5. What are the 5 most common illnesses in your practice before the COVID pandemic?	Cough/cold 1 Diarrhea 2 Dysentery 3 Fever 4 Tuberculosis 5 Pneumonia 6 Typhoid 7 Cardiovascular disease (heart attack, stroke) 8 Sexually transmitted disease (including HIV/AIDS) 9 Gynecological problems 10 Diabetes 11 Cirrhosis12

	COPD (Chronic obstructive pulmonary disease) 13 Low back pain 14 Cancer 15 Other (specify) 95
6. What are the 5 most common illnesses in your practice now?	Cough/cold 1 Diarrhea 2 Dysentery 3 Fever 4 Tuberculosis 5 Pneumonia 6 Typhoid 7 Cardiovascular disease (heart attack, stroke) 8 Sexually transmitted disease (including HIV/AIDS) 9 Gynecological problems 10 Diabetes 11 Cirrhosis 12 COPD (Chronic obstructive pulmonary disease) 13 Low back pain 14 Cancer 15 Other (Specify) 95
7. Where do the majority of your patients come from?	1=Tbilisi; 0=Other cities; don't know
8. How well do you think that your patients are able to convey their illness and symptoms?	1=Very well; 2=well; 3=poorly; 4=very poorly
9. Net monthly income range, GEL	Below 500 1 501-1000 2 1001 – 1500 3 1501 – 2500 4 2501 – 3500 5 3501 – 5000 6 More than 5000 7

Section 3. Characteristics of facility

Question	**Answer options**
1. Does this facility have a lab?	1=Yes, 0=No
2. Can you run the following tests at this facility's lab?	Blood test/ESR 1=Yes, 0=No, TLC/DLC 1=Yes, 0=No,

	Blood smear/Urine analysis/Stool analysis 1=Yes, 0=No)?
3. Does the facility perform tests on the spot or collect samples from patients on the spot and send to another location?	On the spot 1; Partly 2, Sends to other location 3
4. Is patient history kept online or paper-based?	Electronic 1, mixed 2, paper based 3
5. What is the overall number of doctors in the clinic?	----------
6. What is the number of doctors of your profile in the clinic?	----------
7. Number of nurses in the clinic?	----------
8. Number of administrative staff in the clinic?	----------

Please rate the following on the scale from 1 (poorest) to 10 (best).

Question	**Answer options**
9. How would you rate the technical infrastructure of the current clinic?	from 1 (poorest) to 10 (best)
10. How would you rate quality of services provided at the clinic?	from 1 (poorest) to 10 (best)
11. How would you rate professionalism level of doctors at the clinic?	from 1 (poorest) to 10 (best)
12. Overall, how would you rate the current clinic you are working for?	from 1 (poorest) to 10 (best)
13. Overall, how would you rate yourself as a professional?	from 1 (poorest) to 10 (best)
14. The biggest challenge/obstacle you face in delivering good services?	Lack of education, lack of practice, lack of incentives due to low remuneration, poor medical equipment, poor laboratory facility, poor building, lack of space , other (specify)
15. What would you change in the clinic in order to achieve better performance?	Improve quality of doctors, improve working conditions including remuneration, improve medical equipment, improve laboratory facility, improve building, get more space, other (specify)
16. What would you change in yourself in order to achieve better performance?	Would attend trainings in the relevant field, would attend conferences where doctors share their own experience with each other, would inform yourself on the latest trend of treatment certain diseases, other (specify))

Section 4. Recognition of the standardized patient

Introduction: Do you think that you can detect a "simulating" patient? Do you think that in the past xxx weeks you have received a patient that was carefully trained to portray an actual patient?

Question	**Answer options**
Do you think you received any such patient in your practice in the last 10 weeks?	1=Yes, 0=No
If yes,	
Approximate date of visit	----------
Gender of SP	Male, Female
Approximate age of SP	Child, young adult, middle-aged, old
Symptoms presenting with	----------
What was your diagnosis for this patient's condition?	----------
What were the main signs that made you think that this was an SP?	"Textbook case", refused to take injection, did not look like a real patient

Section 5. Health Vignette (Diabetes)

We would like to understand the process by which you examine an adult person suffering from diabetes. We would like to know everything you do, beginning with the arrival of the patient, the anamnesis and tests, and ending when he/she goes home.

Question	**Answer options**
1. When do you suspect diabetes in patient/What questions do you ask for that? (Multiple answers possible) [15]	**Have family history of diabetes** **Have weight loss** **Frequent urination** **Feeling tired** **Is middle-aged or older** **Is overweight** **Blurred vision** **Has a sedentary lifestyle** **Numbness or tingling in the hands or feet** **History of high cholesterol** **Questions about nutrition/lifestyle habits** **Has high blood pressure** Wound that stays/Slow-healing sores or cuts Edema or weight retention Are drinking Are smoking

[15] The first 12 criteria marked in bold is the minimum requirement expected in the treatment process, based on the Clinical Practice National Recommendation (Guideline) for Managing Diabetes in the General Medical Practice, Approved by the Ministry of Labor, Health and Social Security of Georgia

	Have pain urinating Have mouth dryness Having heart ache Having headache Anxiety or heart palpitation Having dizziness Having problems with breathing Is young Is underweight Is sweating frequently Sudden hunger Confusion Pale skin Numbness in mouth or tongue Irritability, nervousness Nightmares, bad dreams, restless sleep Having polycystic ovary syndrome Have ulcer Feel weary Current treatment for hypertension History or hypertension Co-existing or prior heart condition Prior eye examination Prior hospitalization Prior diabetic coma Prior renal failure Regular smoking Alcohol use Immunization history Other (specify)
2. What diagnostic tests/examinations do you do or order for persons suspected of diabetes? [16]	**Fasting glucose test** **Random glucose test (anytime)** **Oral glucose tolerance test** **Urine test** **Weight, height** **Feet examination** **Eye diagnostics** **Blood pressure** **HDL and LDL test** **Test for triglycerides** **Creatinine** Peripheral vascular system

[16] Criteria marked in bold is the minimum requirement expected in the treatment process, based on the Clinical Practice National Recommendation (Guideline) for Managing Diabetes in the General Medical Practice, Approved by the Ministry of Labor, Health and Social Security of Georgia

	Blood test Pulse Listen to chest/heart Listen to abdomen Check for edema Examine prostate Respiration Chest X-ray Sputum exam Ultrasound Liver function Hepatic enzymes Other (specify)
3. In case you are only allowed to do one test/examination on a patient where you suspect diabetes. Which test/exam would you do?	Fasting glucose test Random glucose test (anytime) Oral glucose tolerance test Blood test Eye diagnostics Urine test HDL and LDL test Blood pressure Pulse Weight, height Listen to chest/heart Listen to abdomen Feet examination Peripheral vascular system Check for edema Examine prostate Respiration Chest X-ray Sputum exam Test for triglycerides Ultrasound Liver function Hepatic enzymes Other (specify)
4. In the last 1 month, how many diabetic patients have been diagnosed with diabetes in the clinic?	----------
5. In the last 1 month, how many diabetic patients have you yourself diagnosed with diabetes?	----------
6. If you diagnose a diabetic patient, do you notify public health authorities?	Yes=1 No=2

Section 6. Treatment practices

Question	Answer options
7. Do you treat diabetic patients yourself?	Yes No Maybe
8. If no, where do you send/refer patients?	(other doctor in the same clinic, send to other clinic, other (specify))
9. For how long do you treat a patient for diabetes?	(options: up to 1 week, 1-4 weeks, 4-12 weeks, 6 moths, 1 year, more than a year)
10. Did you offer lifestyle advice to the patients?	Give a lifestyle advice Treat with a medicine Other
11. What lifestyle advice would you offer for the patient	Recommend stop smoking Nutritional advice Advice about exercise
12. Please describe what medicine do you offer and what other ways do you use to treat diabetic patients.	----------
13. Have you ever participated in trainings/meetings/ CME on diabetes diagnosis and treatment?	Yes No
14. If yes, then who organized them?	Government; NGOs; other
15. When was it organized? (Year)	----------

Section 7. Social Preferences

Question	Answer options
In general, how willing or unwilling you are to take risks. Please use a scale from 0 to 10, where 0 means you are "completely unwilling to take risks" and a 10 means you are "very willing to take risks". You can also use any numbers between 0 and 10 to indicate where you fall on the scale, like 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Are you generally an impatient person, or someone who always shows great patience?". Answers are coded on an 10-point scale, with "0" referring to "very impatient" and "10" to "very patient.	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
In comparison to others, are you a person who is generally willing to give up something today in order to benefit from that in the future or are you not willing to do so? Please use a scale from 0 to 10, where a 0 means you are completely unwilling to give up something today" and a 10 means you are very willing to give up something today". You can also use the values in-between to indicate where you fall on the scale.	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Imagine the following situation: Today you unexpectedly received 5 thousand GEL. How much of this amount would you	0 to 5,000

donate to a good cause? (Values between 0 and 5,000 are allowed).	
Please think about what you would do in the following situation. You are in an area you are not familiar with, and you realize that you lost your way. You ask a stranger for directions. The stranger offers to take you to your destination. Helping you costs the stranger about 100 GEL in total. However, the stranger says he or she does not want any money from you. You have 6 presents with you. The cheapest present costs 5 GEL, the most expensive one costs 100 GEL. Do you give one of the presents to the stranger as a "thank-you"-gift? If so, which present do you give to the stranger?	GEL 5, 15, 30, 50, 75, 100
How well does the following statement describe you as a person? As long as I am not convinced otherwise, I assume that people have only the best intentions. Please use a scale from 0 to 10, where 0 means does not describe me at all" and a 10 means describes me perfectly". You can also use the values in-between to indicate where you fall on the scale.	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10