

Israeli COVID lockdowns mildly reduced overall use of preventive health services, but exacerbated some disparities

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Abstract

Background: During 2020, Israel experienced two COVID-19-related lockdowns that impacted the provision of primary and secondary preventive care.

Methods: We examined the month-by-month performance of selected preventive care services using data from Israel's national Quality Indicators in Community Healthcare program. Process of care measures included hemoglobin A1c (HbA1c) testing, cholesterol testing, colon cancer screening and mammography. Intermediate outcome measures included low-density lipoprotein control and HbA1c control. Measures were stratified by sex and by area-level socioeconomic position (SEP). Diabetes and mammography are presented in this abstract due to space limitations.

Results: Annual HbA1c testing among persons with diabetes decreased from 90.9% in 2019 to 88.0% in 2020. Performance of HbA1c tests during lockdown months was as low as half the usual amount. There were compensatory increases in testing during post-lockdown months that did not quite make up for the missed tests. In 2019, 9.0% of Israelis with diabetes had poor glycemic control (HbA1c ≥ 9.0); in 2020, it was 8.8%. In total, 4.5% fewer mammograms were performed in 2020 compared with 2019. Women in the lowest SEP level performed 10.4% fewer mammograms in 2020 than in 2019, while women in the highest SEP level performed 3.1% more mammograms.

Conclusions: Prolonged COVID lockdowns in 2020 were associated with marked decreases in the performance of preventive health services during those months. Compensatory spikes following the end of lockdowns partly, but did not completely, make up for the missed care. COVID lockdowns may have exacerbated socioeconomic disparities in some preventive health services.

Key words: quality of health care, healthcare disparities, COVID-19

Introduction

Measuring processes of care rests on the assumption that the provider has at least some degree of control over the process [1]. For example, some patients may be less able or motivated to follow through on certain kinds of care. During the first months of the COVID-19 (COVID) pandemic, many people avoided hospitals even when they were experiencing an obvious acute coronary event [2]—so it is likely that they would be even more likely to omit routine preventive care. During such a time, the measures that usually function as quality measures may be measuring something else.

Since its inception in 2002 and adoption as a national program in 2004, the Quality Indicators in Community

Healthcare (QICH) program has monitored community-based healthcare using electronic health records for the entire Israeli population [3]. The mission of QICH is to provide information on the quality of community healthcare in Israel to both policy makers and the public, to promote healthcare monitoring and guideline-based care and to improve health.

We present here the pattern of these measures during the year 2020, when Israel experienced two COVID surges with lockdowns. As other nations and healthcare managers attempt to interpret signals from similar periods, our experience can be instructive in understanding what part of the signal reflects quality of care, and what part may simply reflect lockdowns and foregone care.

Methods

Data source

In Israel, all permanent residents are members of one of the four health maintenance organizations (HMOs) that supply health services in the community [4]. All HMOs support and cooperate with QICH program, in development, assessment, providing the national data and publication of the quality indicators. Some Israelis are not represented in these data, including: prisoners, soldiers, and those living outside Israel for prolonged periods of time. In addition, those who switched HMO during a year are not included in that year's measures. Within these limitations, the data represent the entire Israeli civilian population. Because the data are de-identified and the work is conducted for quality assurance purposes, this study was exempted from ethical review.

Israel's COVID lockdowns in 2020

Israel experienced two COVID-related lockdowns during 2020 [5]. The first lockdown encompassed March and April. Restrictions included limiting mobility to within 100 meters of home, limits on numbers of people who could gather, and closure of schools and workplaces. This first lockdown ended on April 26, when most businesses were allowed to reopen. A second lockdown, with somewhat more permissive rules, included September and October. It should be noted that leaving home to receive medical care was explicitly allowed during all the lockdowns. In addition, healthcare remained open and accessible, including the offices of primary care physicians and facilities performing medical testing. Indeed, many primary care physicians and HMOs made a special effort to continue to see patients virtually, which would have allowed preventive care to continue. However, while doctors could continue to order tests for patients, the actual performance of some tests was interrupted by the first closure (March–April), especially mammography and colonoscopy. Blood tests, including tests for cholesterol and hemoglobin A1c, remained available and open. Therefore, for some of our measures (those related to blood tests), reduced use of these services reflects personal choices by patients and their families in light of perceived risk from COVID, and not reduced availability [5]. However, during the second lockdown (September–October), all medical services were open and operational, including colonoscopy and mammography [6].

Quality measures

While there are many quality measures in the QICH program, the 2020 measures were selected to provide a snapshot of the community health services in the context of the COVID crisis. Measures for 2020 included diabetes care, cardiovascular health and cancer screening. The indicators we used for the present analysis are presented in Table 1, and are similar to quality measures that are used in many places.

Many analyses were stratified by socioeconomic position (SEP), which was classified based on residential address. For simplicity, the 10-level SEP categorization was collapsed into four levels: SEP 1 (19% of the population with lowest SEP); SEP 2 (31%); SEP 3 (34%) and SEP 4 (17% of the population with highest SEP) [3].

Analyses

Each measure was calculated for 2020 and was compared with 2019. Performance of relevant tests (HbA1c, cholesterol

Table 1 Annual and monthly quality indicators included in this study

Clinical condition	Annual indicator	Monthly indicator
Diabetes (ages 18 years or older)	Documentation of hemoglobin A1c (HbA1c) levels in individuals with diabetes mellitus Uncontrolled diabetes: HbA1c >9% in individuals with diabetes mellitus	
Cardiovascular health (ages 35–80 years)	Use of high-potency statins or LDL-cholesterol level control in individuals after CABG and/or angioplasty	Monthly performance of cholesterol panel in individuals after CABG and/or angioplasty
Cancer screening (ages 50–74)		Monthly breast cancer screening Monthly number of fecal occult blood tests Monthly number of colonoscopies

panel, screening mammography and colon cancer screening) is also reported by month during 2020, with comparison to similar months from 2019. Measures were also stratified by sex and by area-level SEP. Analyses were descriptive and did not include statistical hypothesis testing.

Results

Hemoglobin A1c testing and control for persons with diabetes

The overall proportion of adults with diabetes who met the quality measure for glycemic testing (had HbA1c tested at least once during 2020) decreased somewhat from 2019 to 2020 (from 90.9% to 88.0%). This decrease of approximately 3% in testing was similar between sexes and across levels of SEP (Tables 2 and 3). The monthly performance of HbA1c tests (Figure 1) was lower than 2019 during the two lockdown periods (March–April and September–October), with a 'rebound' phenomenon of extra tests in the following months. Despite the rebound, the total number of tests conducted was lower in 2020 compared to 2019 by 5.6% (Figure 1).

Despite the small decrement in the proportion of patients who underwent HbA1c testing, performance did not appear to be adversely impacted on the related measure of uncontrolled diabetes (HbA1c $\geq 9\%$). The proportion with uncontrolled diabetes decreased from 9.0% in 2019 to 8.8% in 2020. Greater year-upon-year improvement on this measure was observed among males, although their baseline performance was poorer (Table 2). Greater improvement was also observed among people with higher SEP, while the rate of uncontrolled diabetes actually increased in the poorest SEP group, from 13.6% in 2019 to 14.3% in 2020 (Table 3).

Table 2 Rates and number of tests performed for various indicators in diabetes, cardiovascular health and cancer screening in 2019 and 2020, stratified by sex

	Males		Females		Total	
	2019	2020	2019	2020	2019	2020
Diabetes						
Documentation of hemoglobin A1c (HbA1c) levels in individuals with diabetes mellitus % (denominator)	90.1% (271 231)	87.1% (281 907)	91.8% (254 712)	88.9% (263 176)	90.9% (525 943)	88.0% (545 083)
Uncontrolled diabetes: HbA1c >9% in individuals with diabetes mellitus (ages 18 years or older) % (denominator)	9.7% (244 363)	9.3% (245 442)	8.3% (233 724)	8.2% (234 083)	9.0% (478 087)	8.8% (479 525)
Cardiovascular health						
Monthly performance of cholesterol panel in individuals after CABG and/or angioplasty (ages 35–80 years) Annual number of tests	151 055	141 080	39 381	36 404	190 386	177 484
Use of LDL-lowering drug therapy or LDL-cholesterol level control in individuals after CABG and/or angioplasty (ages 35 years or older) % (denominator)	71.8% (81 160)	74.3% (79 134)	62.9% (19 508)	66.6% (18 970)	70.1% (100 668)	72.8% (98 104)
Cancer screening						
Monthly breast cancer screening (ages 50–74) Annual number of tests			363 569	380 596		
Monthly number of fecal occult blood tests (ages 50–74) Annual number of tests	215 384	196 505	260 746	238 191	476 130	434 696
Monthly number of colonoscopies (ages 50–74) Annual number of tests	71 683	67 301	73 673	68 960	145 356	136 261

Table 3 Rates and number of tests performed for various indicator in diabetes, cardiovascular health and cancer screening in 2019 and 2020, stratified by area-level socioeconomic position (SEP)

	SEP 1 (lowest)		SEP 2		SEP 3		SEP 4 (highest)	
	2019	2020	2019	2020	2019	2020	2019	2020
Diabetes								
Documentation of hemoglobin A1c (HbA1c) levels in individuals with diabetes mellitus % (denominator)	90.7% (95 309)	87.0% (99 622)	90.8% (172 797)	87.6% (173 780)	91.0% (164 600)	88.5% (171 865)	91.2% (71 238)	88.8% (76 840)
Uncontrolled diabetes: HbA1c >9% in individuals with diabetes mellitus (ages 18 years or older) % (denominator)	13.6% (86 431)	14.3% (86 655)	9.4% (156 864)	9.3% (152 290)	7.1% (149 765)	6.5% (152 015)	5.4% (64 981)	4.7% (68 207)
Cardiovascular health								
Monthly performance of cholesterol panel in individuals after CABG and/or angioplasty (ages 35–80 years) Annual number of tests	26 998	24 924	59 196	53 521	64 403	60 485	32 337	31 727
Use of LDL-lowering drug therapy or LDL-cholesterol level control in individuals after CABG and/or angioplasty (ages 35 years or older) % (denominator)	67.0% (14 298)	69.2% (14 126)	67.9% (31 447)	70.7% (29 437)	71.2% (34 074)	74.0% (33 351)	74.6% (17 101)	77.3% (17 508)
Cancer screening								
Monthly breast cancer screening (ages 50–74) Annual number of tests	44 235	39 620	109 992	100 395	136 333	131 854	78 305	80 701
Monthly number of fecal occult blood tests (ages 50–74) Annual number of tests	84 199	76 065	155 248	138 739	150 318	138 741	68 908	64 721
Monthly number of colonoscopies (ages 50–74) Annual number of tests	13 697	13 374	39 465	36 354	54 302	50 118	33 869	32 420

Cholesterol testing and LDL control in individuals after CABG and/or angioplasty (ages 35–80 years)

The monthly performance of cholesterol tests in this population followed a similar pattern to HbA1c testing in persons with diabetes, with decreased performance of tests during lockdowns followed by compensatory increases in the months following the lockdown. As with HbA1c tests, the

compensatory increases did not completely make up for the measured shortfall, as there was an overall decrease of 6.8%, or 12 902 tests, compared to 2019 (figure not shown).

Despite this pattern of reduced testing of cholesterol, achievement of controlled low-density lipoprotein (LDL) did not seem to be adversely impacted. The proportion of patients with LDL of 70 mg/dL or lower, or who were on a high

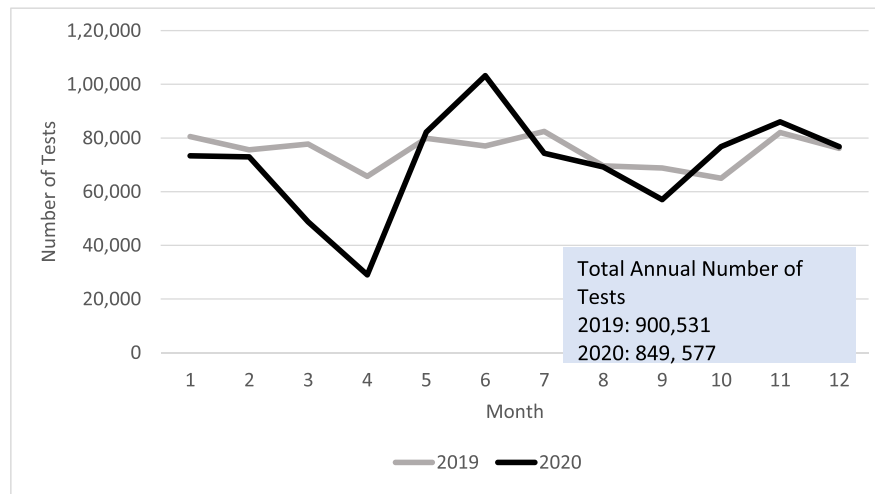


Figure 1 Monthly hemoglobin A1c testing among persons with diabetes, 2019 vs. 2020.

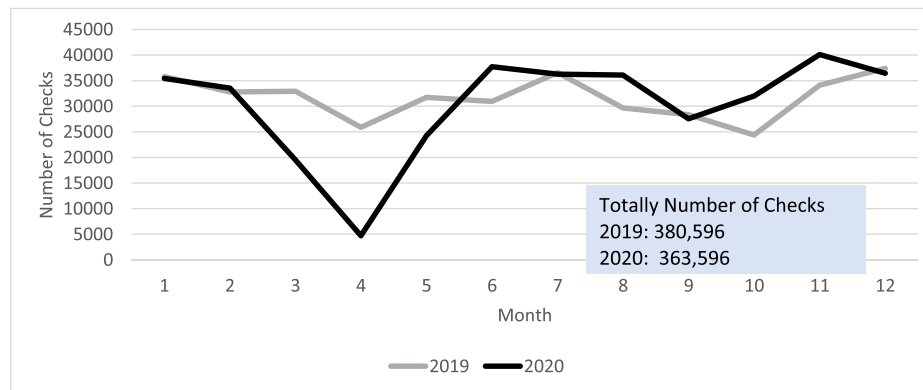


Figure 2 Monthly number of mammograms among women, ages 50–75, 2020 vs. 2019.

potency cholesterol-lowering medication, increased to 72.8%, compared to 70.1% in 2019. Improvement on this measure was generally similar by sex and by SEP (Tables 2 and 3).

Breast and colon cancers screening

The proportion of women age 50–74 with a mammogram in the past 24 months decreased from 72.0% in 2019 to 69.8% in 2020. Because this is a 2-year measure, changes in test performance during a single year would only impact it half as much. Similar to HbA1c and cholesterol panel testing, we saw a marked decrease in mammograms performed during the two lockdowns, with almost no screening mammograms performed during the month of April and a smaller decrease during the second lockdown. In total, 4.5% fewer mammograms were performed in 2020 compared with 2019 (Figure 2). Women in the lowest SEP performed 10.4% less testing in 2020 than in 2019, while women in the highest SEP level performed 3.1% more testing in 2020 than in 2019 (Table 3).

Fecal occult blood testing and screening colonoscopies also followed a similar pattern, with reduced test performance during both lockdowns—which was much more marked during the first lockdown (figure not shown). Similar to other measures discussed above, the total number of tests performed in 2020 was lower than 2019. Overall, there was 8.7% less fecal

occult blood testing and 6% fewer colonoscopies compared to 2019 (Table 2). These decreases did not differ markedly based on sex or SEP (Tables 2 and 3).

Online appendix

Our ability to compare results month-by-month for some measures, between 2019 and 2020, was the result of QICH having monthly data for some measures. We did not have monthly data for earlier years; they had been requested specifically to compare those two years in light of the COVID emergency. However, we also present, in an Online [Supplementary Appendix](#), results for the same measures across 4 years (2017–2020). These results, which are generally similar to our main results, offer additional context on which measures had a trend of improvement during the years prior to COVID, and which were merely stable.

Discussion

Statement of principal findings

This report is based on Israel's national program of quality measurement in community health care. The two most important findings of our study are: (i) overall, the decrease in provision of primary and secondary preventive health services in 2020 was only slightly lower than the preceding year

and (ii) while overall utilization of preventive care was only slightly impacted, 2020 saw increased gaps in performance for some measures, especially when examined by SEP.

Interpretation within the context of the wider literature

During the lockdowns of March–April and September–October, we saw marked decreases in performance of lab tests and cancer screening tests. The months following these lockdowns saw a compensatory increase in testing, which almost made up for the tests that had been missed. As a consequence, overall levels of testing (e.g. proportion of persons with diabetes with at least one HbA1c test) only fell slightly during 2020 compared to 2019. We did not observe any negative consequences for the control of chronic conditions during 2020 compared to 2019 when the data for the entire program were examined together. However, in subgroup analyses by sex and especially by SEP, we did see important changes. Regarding mammography, for example, the overall performance of mammograms by the wealthiest women was actually 3.1% ‘higher’ in 2020 than the preceding year. Among the poorest women, it was 10.4% lower than the preceding year. This finding highlights the disparate impact of COVID lockdowns on vulnerable populations—a disparity that has been documented across multiple domains and in multiple settings [7].

There have been previous reports regarding impacts on preventive care from COVID lockdowns [8]. Authors in Britain documented reductions in testing for and detection of colon cancer during this period [9]. Authors in the Netherlands documented reduced diagnoses of cancer during COVID lockdowns in 2020 [10], which would eventually be expected to lead to more late-stage diagnoses in the future. Another study estimated the impact on colon cancer deaths from the observed decrements in colon cancer screening in several nations [11]. A report from the United States documented COVID-related decreases in screening for colon, breast, or prostate cancer [12]. Data from Ontario Province, Canada, indicated that at the start of the pandemic, the weekly incidence of diagnosed cancer decreased by 34%, and then increased by 1% each week thereafter. This reduced diagnosis of cancer amounted to a backlog of approximately 450 patients per week, who would presumably be diagnosed at a later stage of disease sometime in the future [13].

Another report documented decreases in cholesterol testing during COVID lockdowns [14]—similar to our findings. And, the World Health Organization published a report about the impact of COVID on care for noncommunicable diseases—which includes, but is not limited to, cancer screening [15]. A noteworthy difference between our findings and these previous reports is that the overall level of services delivered in 2020 in Israel only decreased slightly, at least in the aggregate, while some other countries reported much larger decreases. Decreases of the magnitude reported in the Netherlands [10] and the UK [9] would be expected to lead to an excess of late-stage cancer diagnoses in the future [11]. For whatever reason, the number of ‘missing’ tests in Israel was considerably smaller, and so we can hope that the long-term impact on population health will also be smaller.

Implications for policy, practice and research

As stated above, quality measures are meant to be at least somewhat within the control of the provider [1]. Here, forces

beyond the control of the health system induced many patients to stay home and delay important preventive care. Much of this care was eventually performed, but not all of it. It would be unreasonable to expect the health system to have a ready response to how best to deliver preventive care during an unexpected and sometimes scary pandemic. Thus, the findings presented here do not necessarily imply a failing on the part of the health system. They do imply, however, that ‘quality measure’ signals from 2020 may not be easily comparable with the previous year.

Strengths and limitations

This study had important strengths, including data that reflects the population of an entire country and data regarding performance by month. However, there are also limitations. While we can speculate about why these process measures changed from 2019 to 2020, and why fewer tests were performed during certain months of 2020, we cannot be sure of the causes. However, the association with the lockdown periods certainly seems the most reasonable explanation.

Our results are most comparable to quality measures from countries that collect data on the entire population and that provide care to all residents. The sort of data collection that we report here is more characteristic of wealthier nations, such as those in the OECD. However, low- and middle-income countries are also increasingly moving toward universal healthcare and universal data collection [16, 17]. Therefore, while our results may be most comparable to OECD nations presently, it is likely that within a decade they can be compared with almost any country.

Conclusions

In conclusion, we observed certain characteristic patterns of reduced performance of preventive tests, including HbA1c testing, cholesterol testing and cancer screening, that coincided with Israel’s two major lockdowns of 2020. We also observed a slight improvement in HbA1c and LDL control in 2020, continuing the trend from previous years. Subgroup analyses revealed some concerning findings about potential widening of already-existing disparities, especially based on SEP. It remains a priority to find patients who omitted important preventive care services, and to attempt to re-engage them in care. Our results also suggest that relying only on overall averages may hide important differences based on SEP, and that while the impact on the overall population may have been limited, COVID lockdowns still may have contributed to widened disparities by SEP.

Supplementary material

[Supplementary material](#) is available at *INTQHC* Journal online.

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Author contributions

Study design: RCM.

Analysis and interpretation: all authors.

Data manipulation and curation, statistical programming: EEM.

Drafted the manuscript: AJR.

Revised the manuscript for important intellectual content: all authors.

Approved the final manuscript: all authors.

Study supervision: RCM.

Ethics and other permissions

This study was exempted from ethics approval because it relied upon deidentified data that are used for ongoing quality measurement purposes.

Data availability statement

The Israel Quality Indicators in Community Healthcare Program is open to working with outside parties upon request, and will provide data access. Those interested should contact Ronit Calderon-Margalit at ronitcm@gmail.com.

List of abbreviations

COVID severe acute respiratory syndrome coronavirus 2, or COVID-19

HbA1c hemoglobin A1c

HMO health maintenance organization

LDL low-density lipoprotein

QICH The Israel Quality Indicators in Community Healthcare Program

SEP socioeconomic position

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