Impact of a mass media mental health campaign on psychiatric emergency department visits

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ABSTRACT

OBJECTIVE: Despite the high prevalence of mental illnesses and addictions, treatment rates remain low. In April 2010, a regional mass media campaign was implemented to increase awareness of mental health services in central Toronto, Canada. We studied the impact of this campaign on rates of psychiatric emergency department (PED) visits among all hospital emergency departments (EDs) located in Toronto.

DESIGN: Monthly PED visit totals were obtained for all Toronto EDs from April 1, 2007 to March 31, 2012 ($n = 148,704$). The campaign's impact on visit rates was measured using interrupted time series analysis and a difference-in-difference estimator. We conducted pre- and post-campaign analyses to examine whether volume increases were explained by specific diagnostic categories and/or new presentations (new patients with no prior PED visits), and to examine geographic trends.

RESULTS: The campaign was associated with an increased volume of PED visits at downtown hospitals (Centre for Addiction and Mental Health, an increase of 7.6 visits/month [$p < 0.0001$]; University Health Network, 5.8 visits/month [$p < 0.0001$]; St. Michael's Hospital, 4.2 visits/month [$p < 0.0001$]; and Mount Sinai Hospital, 3.2 visits/month [$p < 0.0001$]) but not in hospitals located outside of the downtown area. Neither new patient visits nor specific diagnostic categories disproportionately accounted for the overall observed increases. Following the campaign, patients travelled greater distances to receive ED services.

CONCLUSIONS: Mass media campaigns promoting mental health and psychiatric services can affect health care-seeking behaviour and utilization. Our findings have implications for system-level service planning, which should anticipate volume increases when public mental health campaigns are being considered.

KEY WORDS: Health campaign; psychiatry; mental health; addictions; emergency services; interrupted time series analysis

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One in four adults suffers from mental illness.^{1,2} Approximately two thirds of these individuals do not access psychiatric services because of perceived barriers, such as stigma.^{3,4} Stigma has been defined as referring to problems of knowledge (ignorance), attitudes (prejudice) and behaviour (discrimination).⁵ Stigmatizing attitudes toward the mentally ill can have major negative impacts on those living with mental health concerns.⁶ Anti-stigma mass media campaigns designed to normalize mental health concerns and encourage people to seek care have become increasingly common over the last two decades.^{7,8} Studies evaluating the effect of mass media interventions aimed at reducing stigma have focused on knowledge, attitude and behavioural intentions as outcome measures.^{6,8–13} These outcomes are assumed to be consistent with actual behaviour when the behaviour is not directly assessed.⁵ Destigmatization may lead to increased readiness to seek professional help; however, few studies have examined the impact of stigma on actual help-seeking behaviour.¹⁴ Even less is known about whether mass media interventions aimed at reducing stigma can inspire more people to seek help from mental health care services.¹⁴

In April 2010, the Centre for Addiction and Mental Health (CAMH), a tertiary psychiatric hospital in Toronto, Canada, implemented a 2-month long campaign entitled “Transforming

Lives”.^{15,16} The stated goals of the awareness campaign were “to educate the public about these [mental illness] challenges, break

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down stigma, and improve access to the information and services available at CAMH".¹⁵ The campaign used personal stories of local experiences with addiction and mental illness to highlight how CAMH services transformed lives. Advertisements were distributed through radio, web sites, newspapers, bus shelters, subways and public transport stations in downtown Toronto. The campaign provided a natural experiment that allowed the evaluation of its impact on mental health-seeking behaviour.

We evaluated the campaign's impact on health-seeking behaviour using changes to monthly volumes of psychiatric emergency department (PED) visits. We focused on PED visits as an indicator of help-seeking behaviour because individuals can refer themselves to these services without experiencing barriers related to access or availability; this would not be possible with visits to primary care physicians, for example. Accordingly, any observed change in PED volumes would reflect the impact of the campaign on the individual seeking care. We analyzed the change in monthly PED visits for seven hospital emergency departments (EDs) within the Toronto Central Local Health Integration Network (TC LHIN). We hypothesized that the campaign would increase help-seeking behaviour at CAMH and hospitals with EDs providing psychiatric services in close proximity, as measured by increased monthly PED visit volumes. In addition, we hypothesized that the campaign would preferentially influence the health behaviours of individuals not currently accessing psychiatric services (e.g., new users) compared with current users. Finally, we explored the impact of the campaign on the geographic range of patients visiting the CAMH ED.

METHODS

Setting

There are seven EDs within the TC LHIN. CAMH is a stand-alone psychiatric ED, and the remaining six EDs (Sunnybrook Health Sciences Centre, St. Michael's Hospital, University Health Network [UHN], St. Joseph's Health Centre, Toronto East General Hospital and Mount Sinai Hospital) are general medicine EDs with psychiatric services.

Data

We used the administrative health databases held at the Institute for Clinical Evaluative Sciences (ICES). These datasets were linked using unique encoded identifiers. ED visit information was obtained through the Canadian Institute for Health Information's National Ambulatory Care Registration System, which included date of visit and the associated diagnostic category. Utilization of psychiatric services within the previous year was determined from the inpatient mental health services recorded by the Ontario Mental Health Reporting System, and mental health-related physician visits were obtained from the billing records in the Ontario Health Insurance Plan (OHIP) database.

Neighbourhood income quintiles were determined from 2006 Census income data. Demographic information, such as age and sex, was obtained from the Registered Persons Database. The study was approved by the ICES University of Toronto Research Ethics Board.

Measures

Our primary outcome was change in the monthly rate of PED visits post-campaign. A PED visit was defined using the Mental Health and Addictions Acute Care Alliance's impact indicator for a mental health and addiction ED visit.¹⁷ The indicator includes all ED visits with a mental health and addictions main diagnosis code (all ICD-10 F codes in F00–F99) and codes that fall within four mental health and addictions-related groups in the Comprehensive Ambulatory Care Classification System (See Appendix A). We designated data captured from April 1, 2007, to March 31, 2010, as "pre-campaign" and from April 1, 2010, to March 31, 2012, as "post-campaign".

We included all PED visits by individuals 18 years of age and older during the study period. We excluded ED visits involving individuals less than 18 years old because the delivery of child and adolescence emergency psychiatric care is limited to specific TC LHIN hospitals only and to community agencies that do not provide data to ICES. We also excluded patients with no valid OHIP number and those presenting with self-harm problems without an accompanying primary mental health diagnosis. CAMH's ED serves a consultation service to the Mount Sinai Hospital ED; therefore, all transfers from Mount Sinai Hospital to CAMH within a 24-hour period were assigned as CAMH visits. If patients were not transferred to CAMH, the PED visits were assigned to Mount Sinai Hospital. PED visits to the remaining hospitals were assigned to the respective institution.

Descriptive variables

We collected patient demographic information, including age, sex, neighbourhood income quintile, postal code and prior mental health services utilization during the pre-campaign and post-campaign periods. We measured psychiatric inpatient admissions, psychiatrist visits and mental health-related primary care physician visits. A mental health-related primary care physician visit was defined on the basis of a validated algorithm.¹⁸

We examined two different categories of "new patient" PED visits – a site-specific definition of new and a TC LHIN-level definition of new. For the site-specific definition, the patient had had no prior PED visits to that PED. For the TC LHIN-level definition, the patient had had no prior PED visits to *any* of the TC LHIN PEDs included in the study.

The documented main diagnosis for each PED visit was categorized according to ICD-10 diagnostic codes: schizophrenia-related disorders (all F2 codes); mood-related disorders (all F3 codes); anxiety-related disorders (all F4 codes); substance-related disorders (all F1 codes); and other disorders (all F0, F5-9 and the Mental Health and Addictions Acute Care Alliance codes; see Appendix A).

We used average monthly rates of PED visits based on patient postal codes to calculate geographic patient density.

Data analysis

We used interrupted time series analysis (ITSA) to measure the impact of the media campaign on monthly PED visit volumes among hospitals in the TC LHIN. ITSA is a quasi-experimental statistical technique that allows for reliable causal inference under weak assumptions.^{19–21} For our study, we assumed that observations immediately before and after the campaign were

similar in all aspects except the occurrence of the campaign.^{15,16} This assumption was based on the CAMH promotional campaign being the only public mental health campaign in the Greater Toronto Area in 2010.

We used an autoregressive integrated moving average (ARIMA) method to model the autocorrelation structure of the series for each TC LHIN hospital.^{19–21} We specified a ramp function to estimate the campaign's effect starting from April 2010 to best reflect the observed data trend. The campaign parameter in the model measured the slope change following the campaign. A significant positive value ($p < 0.05$) would suggest that the campaign was associated with an average monthly increase in PED visits. Each model series was centred to 0. The residuals of the models were analyzed to ensure that these were an adequate fit to the observed data, adjusted for seasonal trends, and autocorrelation. Analyses were conducted using SAS version 9.2 Proc ARIMA.²¹

In addition, we used a difference-in-difference (DID) estimator to evaluate the impact of the campaign on emergency department visits among hospitals in the TC LHIN. The DID estimator is defined as the difference in average outcome in the treatment group before and after treatment, minus the difference in average outcome in the control group before and after treatment.²² We categorized ED visit data from downtown hospitals in the region where the campaign occurred as the treatment group and non-downtown hospitals as the control group, and we compared these groups before and after the implementation of the campaign. The effect of the campaign on PED visit rates was provided by the magnitude of the coefficient associated with the DID statistical significance ($p < 0.05$). We conducted pre- and post-campaign analyses among hospitals that showed an increase in PED visits. We used t tests and chi-square tests to examine the age, sex, neighbourhood income quintile and previous mental health

service utilization of the patients before and after. Using the chi-square test, we analyzed the proportion of new patients and the diagnostic category of visits. Statistical significance was set to $p < 0.005$, based on a Bonferroni correction to account for multiple testing. All p -values were two-sided, and analyses were conducted using SAS version 9.2.

We restricted the geographic analysis of patient distribution to the CAMH PED, the ED that had the largest increase in visits. ESRI ArcGIS software was used to map patient forward sortation areas, the first three digits of a postal code, onto Ontario regions to evaluate regional patient density pre- and post-campaign.²³

RESULTS

Patient demographic information

From April 1, 2007 to March 31, 2012, there were 148,704 PED visits to hospitals located in Toronto. Patient demographic information and previous mental health service utilization pre- and post-campaign among hospitals affected by the campaign are provided in Table 1.

Impact of the campaign on monthly PED visits

Monthly PED visit volumes at TC LHIN hospitals increased post-campaign and increased linearly to the end of the observation period (see Figure 1). Table 2 shows the campaign parameter estimates for each hospital time series model, indicating the change in slope after the campaign (See Appendix B for full model output). The average monthly increase is the campaign parameter estimate divided by the post-campaign period. CAMH experienced the largest total and proportional increase in monthly PED volumes of all the hospitals, with an average monthly increase of 7.6 PED visits post-campaign ($p < 0.0001$). UHN had the second

Table 1. Pre- and post-campaign patient demographic and health service utilization characteristics*

	Centre for Addiction and Mental Health		University Health Network		St. Michael's Hospital		Mount Sinai Hospital	
	Pre <i>n</i> = 3297	Post <i>n</i> = 4313	Pre <i>n</i> = 3104	Post <i>n</i> = 3784	Pre <i>n</i> = 3058	Post <i>n</i> = 3480	Pre <i>n</i> = 1940	Post <i>n</i> = 2333
<i>Demographic characteristics</i>								
Age								
Mean (SD)	38.6 (14.34)	37.7 (14.08)	41.7 (17.24)	41.1 (17.30)	41.2 (15.15)	41.2 (15.60)	42.2 (17.77)	41.2 (18.41)
Median (interquartile range)	36 (27–49)	35 (26–48)	40 (27–52)	39 (26–52)	40 (29–51)	40 (28–51)	40 (28–52)	39 (26–53)
Sex, <i>n</i> (%)								
Females	1465 (44.4)	2006 (46.5)	1412 (45.5)	1712 (45.2)	1198 (39.2)	1295 (37.2)	930 (47.9)	1108 (47.5)
Males	1832 (55.6)	2307 (53.5)	1692 (54.5)	2072 (54.8)	1860 (60.8)	2185 (62.8)	1010 (52.1)	1225 (52.5)
Neighbourhood income quintile, <i>n</i> (%)								
Missing	60 (1.8)	74 (1.7)	66 (2.1)	93 (2.5)	109 (3.6)	122 (3.5)	44 (2.3)	75 (3.2)
1 (low)	951 (28.8)	1212 (28.1)	923 (29.7)	1111 (29.4)	918 (30.0)	1134 (32.6)	524 (27.0)	659 (28.2)
2 (medium-low)	602 (18.3)	863 (20.0)	686 (22.1)	810 (21.4)	526 (17.2)	671 (19.3)	354 (18.2)	440 (18.9)
3 (medium)	496 (15.0)	638 (14.8)	522 (16.8)	553 (14.6)	601 (19.7)	520 (14.9)	302 (15.6)	327 (14.0)
4 (medium-high)	510 (15.5)	690 (16.0)	401 (12.9)	521 (13.8)	428 (14.0)	496 (14.3)	276 (14.2)	332 (14.2)
5 (high)	678 (20.6)	836 (19.4)	506 (16.3)	696 (18.4)	476 (15.6)	537 (15.4)	440 (22.7)	500 (21.4)
<i>Mental health service utilization in the previous year, <i>n</i> (%)</i>								
Hospitalizations	805 (24.4)	1082 (25.1)	411 (13.2)	439 (11.6)	564 (18.4)	589 (16.9)	293 (15.1)	341 (14.6)
Physician visits								
Psychiatrist	1904 (57.8)	2378 (55.1)	1000 (32.2)	1177 (31.1)	1188 (38.9)	1310 (37.6)	624 (32.2)	752 (32.2)
Primary care†	2127 (64.5)	2816 (65.3)	1610 (51.9)	1787 (47.2)	1735 (56.7)	1903 (54.7)	1012 (52.2)	1163 (49.9)

Note: A Bonferroni corrected p -value of < 0.005 was considered statistically significant to account for multiple testing. Tests within each hospital were not statistically significant, with the exception of UHN previous mental health primary care ($p = 0.0001$) and St. Michael's Hospital neighbourhood income quintile ($p < 0.0001$).

* Pre-campaign period = April 2009 to March 2010; post-campaign period = April 2011 to March 2012.

† For mental health reasons.

Figure 1. Time series plot of psychiatric emergency department visits from April 2007 to March 2012

Table 2. Interrupted time series campaign parameter estimates by hospital

	Campaign parameter estimate*	Standard error	p-value
Downtown hospitals			
Centre for Addiction and Mental Health	182.5	17.05	<0.0001
University Health Network	140.1	30.79	<0.0001
St. Michael's Hospital	101.3	18.11	<0.0001
Mount Sinai Hospital	77.3	14.50	<0.0001
Non-downtown hospitals			
St. Joseph's Health Centre	-26.4	17.06	0.1221
Sunnybrook Health Sciences Centre	21.8	9.69	0.0246
Toronto East General Hospital	39.6	14.46	0.0061

* Hospitals were modelled separately using monthly psychiatric emergency department visits from April 2007 to March 2012. The campaign parameter estimate measures the change in visits from April 2010 to March 2012.

largest increase (5.8 visits/month, $p < 0.0001$), followed by St. Michael's Hospital (4.2 visits/month, $p < 0.0001$) and Mount Sinai Hospital (3.2 visits/month, $p < 0.0001$).

For hospitals outside of the central downtown area, there was no observed change in PED visit volumes post-campaign. St. Joseph's Hospital (-1.1 visits/month, $p = 0.1221$), Sunnybrook Health Sciences Centre (0.9 visits/month, $p = 0.0246$) and Toronto East General Hospital (1.7 visits/month, $p = 0.0061$) showed little or no increase in PED monthly visits. The difference-in-difference model also showed that monthly PED visit volumes increased overall by 68.4 visits ($p = 0.009$) post-campaign among the central downtown Toronto hospitals (see Appendix C).

Hospitals showed an increase in repeat visits and both categories of new patients pre- and post-campaign (Table 3). Although the increase did not demonstrate a consistent preferential impact on a particular diagnostic subgroup at all hospitals, there was an increase in substance use-related visits following the campaign at CAMH ($p = 0.0007$) and UHN ($p < 0.0001$).

Impact of the campaign on patient distance from CAMH PED

We evaluated the impact of the campaign on patient distance from the CAMH PED, the ED with the largest increase in patient visits. The campaign resulted in a dramatic increase in patient density in the regions surrounding CAMH and in the distance patients travelled (Figure 2).

DISCUSSION

In 2010, CAMH implemented the "Transforming Lives" media campaign aimed to increase awareness of mental illness and decrease stigma to eliminate barriers to psychiatric care. Our study observed increased PED monthly visit volumes within Toronto following this campaign. The increase affected hospitals in close proximity to CAMH. The PED increase in the affected hospitals involved both new and existing users of emergency psychiatric services and was not preferentially accounted for by any diagnostic subgroup, although in some hospitals there was an increase in the proportion of substance use-related visits. The campaign also resulted in an increase in the distance patients travelled to CAMH. To our knowledge, ours is the first study to have demonstrated the effect of a mental health campaign on psychiatric emergency department visits.

Our findings make a valuable contribution, showing that help-seeking behaviour can increase following a mass media campaign. Previous work on mass media interventions aimed at reducing stigma have focused on changes in knowledge, attitudes and behaviour intentions of discrimination using survey measures.^{6,8} Systematic reviews have reported that anti-stigma interventions were effective in changing attitudes. In addition, intervention groups experienced a decrease in prejudice outcomes compared with control groups immediately and months after the intervention.^{6,8} However, discrimination outcomes were mixed. Effects ranged from an increase to a decrease or to no difference in effect, which may have been a result of heterogeneity in study design.^{6,8} For example, discrimination outcomes included the distance between chairs arranged by participants anticipating meeting people with

Table 3. Pre- and post-campaign psychiatric emergency department (PED) visit characteristics*

Total visits	Centre for Addiction and Mental Health			University Health Network			St. Michael's Hospital			Mount Sinai Hospital		
	Pre	Post	p-value†	Pre	Post	p-value†	Pre	Post	p-value†	Pre	Post	p-value†
	4661	6316		4454	5695		5131	5847		2663	3272	
New visits, n (%)												
No prior PED visits to same hospital	2569 (55.1)	3384 (53.6)	0.1097	2591 (58.2)	3173 (55.7)	0.0132	2376 (46.3)	2700 (46.2)	0.8922	1600 (60.1)	1923 (58.8)	0.3064
No prior PED visits to any TC LHIN hospital	2020 (43.3)	2709 (42.9)	0.6400	1972 (44.3)	2436 (42.8)	0.1302	1744 (34.0)	1993 (34.1)	0.9153	1140 (42.8)	1369 (41.8)	0.4523
Main diagnosis‡, n (%)												
Schizophrenia-related disorders	1263 (27.1)	1632 (25.8)	0.1393	315 (7.1)	356 (6.3)	0.0985	598 (11.7)	528 (9.0)	<0.0001	156 (5.9)	132 (4.0)	0.0011
Mood-related disorders	1578 (33.9)	2108 (33.4)	0.5988	478 (10.7)	461 (8.1)	<0.0001	522 (10.2)	503 (8.6)	0.0048	177 (6.7)	190 (5.8)	0.1816
Anxiety-related disorders	503 (10.8)	743 (11.8)	0.1125	963 (21.6)	1125 (19.8)	0.021	901 (17.6)	1068 (18.3)	0.3362	559 (21.0)	674 (20.6)	0.7110
Substance-related disorders	731 (15.7)	1147 (18.2)	0.0007	2082 (46.7)	2975 (52.2)	<0.0001	2069 (40.3)	2377 (40.7)	0.7254	1361 (51.1)	1785 (54.6)	0.0082
Other disorders	586 (12.6)	686 (10.9)	0.0056	616 (13.8)	778 (13.7)	0.8059	1041 (20.3)	1371 (23.5)	<0.0001	410 (15.4)	491 (15.0)	0.6770

* Pre-campaign period = April 2009 to March 2010; post-campaign period = April 2011 to March 2012.

† A Bonferroni corrected p-value of <0.005 was considered statistically significant to account for multiple testing.

‡ Based on ICD-10 diagnostic codes: schizophrenia-related disorders (all F2 codes); mood-related disorders (all F3 codes); anxiety-related disorders (all F4 codes); substance-related disorders (all F1 codes); and other disorders (all F0, F5-9, and the Mental Health and Addictions Acute Care Alliance impact indicator codes, see Appendix A).

TC LHIN = Toronto Central Local Health Integration Network.

Tourette's syndrome, and expressions of interest in attending a focus group with people with schizophrenia.⁶ Previous studies on mental health awareness campaigns for issues of suicide and depression showed modest effects on attitudes and knowledge of causes and treatments, and slight or no detectable effects on behavioural outcomes.⁹⁻¹³ The studies showed high subject attrition rates, low response rates and small samples, and/or were based on statistical techniques that were unable to adjust for underlying trends, such as uncontrolled before-and-after evaluation or time series data with too few observations.⁹⁻¹³ Our study findings were based on time series data with a 24-month post-campaign study period and adjustment for secular trends and data seasonality.¹⁹⁻²¹ We incorporated a "self-referable" behavioural indicator (PED visit volumes) and a comparison group of hospitals within the catchment areas not exposed to the campaign into our study design to control for potential bias.

Our findings showed a sustained increase in PED visits following the campaign. One possible explanation for this was the use of the testimonies of service users in the campaign, which has been identified as the "active ingredient" in anti-stigma interventions.⁷ The campaign also noted the available services. This may have influenced an individual's perception that seeking help for a mental health problem could be helpful, a core belief of help-seeking intentions.¹⁴ We found that individuals were travelling greater distances following the campaign, which may be a result of advertisement placement in public transit areas. Many people who travel long distances and use the subway to commute to work in downtown Toronto would have been exposed to the subway and bus shelter media, despite living outside of Toronto.

Although our findings showed that the campaign increased psychiatric emergency service utilization, there are important health care implications that should be noted. First, the highly localized effect of the PED visit increases observed at CAMH and neighbouring EDs may suggest a role for coordinated planning among multiple providers to anticipate increases in service use when implementing campaigns. Second, the campaign did not preferentially attract new patients over existing patients, contrary to our original hypothesis. New PED patients would be more likely to be affected by the campaign if existing patients with prior PED visits had received services that met their needs. This may not be a reasonable assumption, and the persistent need for services among patients with prior PED visits may explain why we observed no difference between the visit rates of prior and new PED patients following the campaign. Third, the increases that were observed in patients travelling long distances to seek care may not be entirely beneficial but, rather, may create problems for continuity of care. Fourth, there are many entry points into the mental health care system, and the ED may not always be the most appropriate or cost-effective. The prevalence of inappropriate ED use, if appropriate use is defined as presenting with a medical condition that could only be assessed in the ED, varies from 20% to 40%.^{24,25} Reasons for choosing to visit the ED are lack of awareness of other facilities, perceived seriousness of the condition, trust in the ED staff and proximity to the ED.²⁵ Patients with inappropriate PED visits due to the lack of

Panel A

Panel B

GTA= Greater Toronto Area

CAMH = Centre for Addiction and Mental Health

LHIN= Local Health Integration Network

FSA= Forward Sortation Area

Figure 2. Pre- (panel A) and post-campaign (panel B) geographic distribution of psychiatric emergency department visits to the Centre for Addiction and Mental Health

awareness of other facilities may be better managed at other levels of the health care system without causing burden to the system.

Our study has several limitations. First, we only evaluated PED visits among adult patients with a primary psychiatric diagnosis. This excluded children and adolescents, as well as patients presenting with self-harm without a primary psychiatric diagnosis. Second, our study uses a retrospective observational study design. Causal inferences regarding the campaign's impact on PED visit volumes were based on the assumption that there were no other relevant concurrent events during the time of the campaign. Other possible explanatory factors for visit volume changes that were not explored could be budget cuts to psychiatric services (e.g., outpatient programs) or reduced staffing within the city and surrounding area, leading to increased reliance on emergency services utilization; however, there was no apparent evidence that this was the case. We

alleviated this bias by using non-downtown hospitals as a comparison group. From our study we were not able to determine whether the campaign was effective in targeting individuals naïve to psychiatric services or whether this subset was more likely to access care outside of the ED, such as primary care and outpatient psychiatric programs. Third, we were unable to confirm whether patients sought treatment as a result of the campaign, since this information was unavailable in the administrative databases.

While we acknowledge these limitations, our findings suggest that media campaigns to address mental health-related stigma had a highly localized effect on help-seeking behaviour, with significant increases in PED visit volumes observed at CAMH and neighbouring EDs. The campaign attracted new and existing patients in similar proportions and dramatically increased the distance patients travelled to CAMH post-campaign.

Appendix A. The Mental Health and Addictions Acute Care Alliance impact indicator for a mental health and addiction emergency department visit (June 29, 2012)

Diagnosis codes that fall within the following mental health and addictions-related groups under the Comprehensive Ambulatory Care Classification System: Mental Health Interventions and Other Counseling (B055); Mental Health and Psychosocial Condition (B170); Addiction/Substance Abuse (E701); and Other General Mental Health Disorders (E702)

All F codes in F00–F99	"R462",	"Z605",	"Z628",
"G300",	"R463",	"Z608",	"Z629",
"G301",	"R464",	"Z609",	"Z630",
"G308",	"R465",	"Z610",	"Z631",
"G309",	"R466",	"Z611",	"Z632",
"R440",	"R467",	"Z612",	"Z633",
"R441",	"R4680",	"Z613",	"Z634",
"R442",	"R4688",	"Z614",	"Z635",
"R443",	"R54",	"Z615",	"Z636",
"R448",	"Z004",	"Z616",	"Z637",
"R451",	"Z032",	"Z617",	"Z638",
"R452",	"Z046",	"Z618",	"Z639",
"R453",	"Z133",	"Z619",	"Z642",
"R454",	"Z134",	"Z620",	"Z643",
"R455",	"Z504",	"Z621",	"Z644",
"R456",	"Z554",	"Z622",	"Z654",
"R457",	"Z600",	"Z623",	"Z658",
"R458",	"Z601",	"Z624",	"Z659",
"R460",	"Z603",	"Z625",	
"R461",	"Z604",	"Z626",	

Intervention (CCI) codes that fall within the following mental health and addictions-related group under the Comprehensive Ambulatory Care Classification System: Mental Health Intervention and Other Counseling (B055)

"5AD14BJ",	"6AA10ZZ",	"6DA30DFBE",
"5AD14SL",	"6AA30ADAA",	"6DA30DFCE",
"5PD14SK",	"6AA30BEAA",	"6DA30DFDE",
"6AA02CM",	"6AA30CTAA",	"6DA30DFJA",
"6AA02CP",	"6AA30CTZZ",	"6DA30DFRE",
"6AA02FR",	"6AA30MAAA",	"6DA30DFXA",
"6AA02SK",	"6AA30ZZAA",	"6DA30DFZZ",
"6AA02ZZ",	"6AA30ZZZZ",	"6DA30DZBE",
"6AA03ZZ",	"6DA08DZ",	"6DA30DZCE",
"6AA08FR",	"6DA10DC",	"6DA30DZDE",
"6AA08PE",	"6DA10DF",	"6DA30DZJA",
"6AA08ZZ",	"6DA10DS",	"6DA30DZRE",
"6AA10AD",	"6DA10DW",	"6DA30DZXA",
"6AA10AV",	"6DA10DZ",	"6DA30DZZZ",
"6AA10BE",	"6DA30DCBE",	"7SF12ZZ",
"6AA10CD",	"6DA30DCCE",	
"6AA10CT",	"6DA30DCDE",	
"6AA10FR",	"6DA30DCJA",	
"6AA10GA",	"6DA30DCRE",	
"6AA10GB",	"6DA30DCXA",	
"6AA10MA",	"6DA30DCZZ",	

Appendix B. Interrupted time series models for the TC LHIN hospitals*

Model parameters	Parameter estimate	Standard error	p-value
<i>Downtown hospitals</i>			
Centre for Addiction and Mental Health			
AR1	0.3	0.13	0.0554
AR2	-0.1	0.15	0.5896
Campaign	182.5	17.05	<0.0001
University Health Network			
AR1	0.6	0.11	<0.0001
AR2	0.0	0.14	0.9804
Campaign	140.1	30.79	<0.0001
St. Michael's Hospital			
AR1	0.3	0.13	0.0307
AR2	0.2	0.13	0.0902
Campaign	101.3	18.11	<0.0001
Mount Sinai Hospital			
AR1	0.3	0.13	0.0351
AR2	0.0	0.14	0.7966
Campaign	77.3	14.50	<0.0001
<i>Non-downtown hospitals</i>			
St. Joseph's Health Centre			
AR1	0.3	0.13	0.0329
AR2	-0.35	0.13	0.0064
Campaign	-26.4	17.06	0.1221
Sunnybrook Health Sciences Centre			
AR1	0.4	0.12	0.0013
AR2	-0.1	0.14	0.5374
Campaign	21.8	9.69	0.0246
Toronto East General Hospital			
AR1	0.4	0.13	0.0032
AR2	-0.2	0.15	0.3320
Campaign	39.6	14.46	0.0061

* Hospitals in the Toronto Central Local Health Integration Network (TC LHIN) were modelled separately using monthly psychiatric emergency department visits from April 2007 to March 2012. The campaign parameter estimate measures the change in visit volumes from April 2010 to March 2012.

AR = autoregressive parameters, adjusting for seasonality and autocorrelation of errors.

Appendix C. Difference-in-difference (DID) model coefficients

Model parameter	Coefficient	SE	p-value
Constant term	328.7	15.64	0.000
Downtown hospitals*	8.3	17.03	0.625
Post-campaign†	12.3	23.23	0.595
Downtown hospitals*Post-campaign‡	68.4	26.11	0.009

* Downtown hospital specific effect.

† Time trend common to both downtown hospitals and non-downtown hospitals.

‡ DID estimator of the campaign effect.

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RÉSUMÉ

OBJECTIF : Malgré la prévalence élevée des maladies mentales et des toxicomanies, les taux de traitement demeurent faibles. En avril 2010, on a lancé une campagne régionale d'information dans les médias pour mieux faire connaître les services de santé mentale au centre-ville de Toronto, au Canada. Nous avons étudié l'impact de cette campagne sur les taux de visites aux services d'urgence en psychiatrie (SUP) dans l'ensemble des services d'urgence (SU) des hôpitaux de Toronto.

PLAN : Nous avons obtenu les totaux mensuels des visites aux SUP pour l'ensemble des SU de Toronto entre le 1^{er} avril 2007 et le 31 mars 2012 (n = 148 704). Nous avons mesuré l'impact de la campagne sur les taux de

visite à l'aide d'une analyse des séries chronologiques interrompues et d'un estimateur de la double différence. Nous avons mené des analyses pré- et post-campagne pour déterminer si les hausses de volume s'expliquaient par certaines catégories de diagnostic et/ou par de nouvelles présentations (de nouveaux patients n'ayant pas visité un SUP antérieurement) et pour examiner les tendances géographiques.

RÉSULTATS : La campagne a été associée à un volume accru de visites aux SUP dans les hôpitaux du centre-ville (Centre de toxicomanie et de santé mentale : hausse de 7,6 visites/mois [$p < 0,0001$]; Réseau médical universitaire : 5,8 visites/mois [$p < 0,0001$]; hôpital St. Michael's : 4,2 visites/mois [$p < 0,0001$]; et hôpital Mount Sinai : 3,2 visites/mois [$p < 0,0001$]), mais pas dans les hôpitaux situés hors du centre-ville. Ni les visites de nouveaux patients, ni des catégories de diagnostic particulières

n'ont expliqué de façon disproportionnée les hausses globales observées. Après la campagne, les patients ont parcouru de plus longues distances pour recevoir des services d'urgence.

CONCLUSIONS : Les campagnes d'information dans les médias faisant la promotion de la santé mentale et des services psychiatriques peuvent avoir un effet sur les comportements de recours aux soins de santé et sur l'utilisation des soins de santé. Nos constatations peuvent avoir des conséquences pour la planification systémique des services, car des hausses de volume sont à prévoir quand on envisage des campagnes de santé publique axées sur la santé mentale.

MOTS CLÉS : campagne sanitaire; psychiatrie; santé mentale; toxicomanie; service urgences; analyse des séries chronologiques interrompues