**Supplementary methods appendix**

# **Costing supplement**

## **Intervention costs**

Costs included:

* Therapists’ salary based on two-hour sessions;
* Preparation time for sessions (reported by therapists);
* Individual pre-therapy appointments (based on the average length);
* Telephone follow-up to enhance compliance (reported by therapists);
* Supporting documents (participants’ booklet);
* General overhead costs - based on activity centers (Ministère de la Santé et des Services sociaux, 2017a): facility operations [electricity, insurance, heating, ventilation, air-conditioning, water], security, hygiene and cleanliness – operational tasks and finally, administrative support [based on average hourly rate].
* Limited societal cost – Time spent in therapy sessions for participants: 4 hours per session including transportation, session time, and needed arrangements, as for medical appointments;
* Limited societal cost – Transportation (estimated): diameter of the cities (in km) multiplied by the cost of the preferred mean of transportation for each region (e.g., taxi, metro, car, walking).

## **Mental health services use**

The costs associated with hospitalizations, emergency department visits and outpatient visits within the healthcare system were evaluated using a direct allocation method (Vasiliadis, Dionne, et al., 2013). The costs were based on annual financial and activity reports submitted by healthcare establishments to the Quebec Ministry of Health and Social Services in 2016-2017 (Ministère de la Santé et des Services sociaux, 2017a, 2017b), with a marginal mark-up for overhead (Tan, Van Ineveld, Redekop, & Hakkaart-Van Roijen, 2009) and opportunity and building-depreciation costs (Rosenheck, Frisman, & Neale, 1994). Fees paid to general practitioners and specialists for medical outpatient consultations were estimated from the 2016 Manual for general practice physicians (Régie de l’assurance maladie du Québec, 2016a)and Manual for specialist physicians (Régie de l’assurance maladie du Québec, 2016b). A standard hospitalization scenario was applied including physician consultation fees ((Vasiliadis, Dionne, et al., 2013). Costs associated with alternative medicine and private health professionals were evaluated based on information from professional associations or Colleges. Where unavailable, costs from randomly selected practices in the three regions were averaged.

## **Medication**

Costing of medications used included the cost of the drugs, pharmacist fees and the wholesaler’s mark-up as per the 2018 Medication registry (Régie de l’assurance maladie du Québec, 2018). For those insured by the provincial public drug insurance plan, pharmacist fees are regulated by the Pharmacists' manual (Régie de l’assurance maladie du Québec, 2017), but for those with private drug insurance, pharmacist fees are not regulated. Most people under 65 are privately insured and co-pays vary across plans. A mark-up equal to 16.1% of the pharmacist fee was applied (Association québecoise des pharmaciens propriétaires, 2018).

## **Indirect costs related to loss of productivity**

To estimate the costs of mental health-related absenteeism, we considered four hours lost per outpatient consultation (and for tCBT sessions), eight hours for emergency department visits and 24 hours per day for inpatient stays (Lamoureux-Lamarche, Vasiliadis, Préville, & Berbiche, 2016; Vasiliadis, Latimer, Dionne, & Préville, 2013; Vasiliadis, Marchand, Gosselin, Guerra, & Breton, 2019). We weighted costs according to the average hours worked in a week, remaining off-work time and usual business hours.

The cost associated with absenteeism due to leaves of absence because of mental health reasons was estimated using the friction cost method based on periods corresponding to the average duration of unemployment (Hopkins, Goeree, & Longo, 2010) in the province of Quebec in 2017, adjusted for age and sex, and ranging from 9.1 to 26.2 weeks (Statistics Canada, 2017). During the friction period, a factor of elasticity of 0.80 was applied (Koopmanschap, Rutten, van Ineveld, & van Roijen, 1995). Presenteeism cost was based on the difference between work output in a fully productive state (100%) and self-reported productivity on a scale of 1 to 10 (Kessler et al., 2003).

## **Non-medical costs**

Costs related to transportation were estimated for participant’s preferred mode of transport (e.g., walking, car, public transit, taxi, bike) and adjusted for each region. Distance was estimated by using the diameter of the cities where the study took place to represent a round trip. Assistance with day-to-day activities (e.g., groceries, domestic chores) for mental health reasons was valued at $11.25/hour (Commission des normes de l’équité de la santé et de la sécurité du travail, 2017).

# **Analysis supplement**

## **Missing Data and Imputations**

The presence (yes/no) of missing data was evaluated with logistic regression models (Faria, Gomes, Epstein, & White, 2014) using baseline study factors as independent variables. Significant associations indicated that the data were not ‘Missing Completely at Random’ and multiple imputation was used on the assumption of a ‘Missing at Random’ mechanism. Missing baseline values were imputed with the variable median, mean or mode (Faria et al., 2014). The imputation of T1 and T2 was done with the *Amelia II* multiple imputation package which can handle longitudinal data (Honaker, King, & Blackwell, 2019). Twenty datasets were imputed. The imputation model included baseline variables associated with the probability of missing data as well as sex and age. Variables without a normal distribution were not transformed and the imputation model was not restricted by logical bounds (Kleinke, Reinecke, Salfrán, & Spiess, 2020; Rodwell, Lee, Romaniuk, & Carlin, 2014). Rubin’s rule was used to determine the pooled estimates of means and 95% confidence intervals for costs and outcomes (Marshall, Altman, Holder, & Royston, 2009).

## **QALY modelling**

As the QALY distribution was left-skewed, it was transposed into a right-skewed distribution to fit a gamma distribution for modelling purpose, by subtracting the maximum possible QALYs minus the actual QALYs obtained.

## **Confidence interval bootstrapping in multiple imputation**

Point estimates were computed for each multiply imputed dataset and were pooled with Rubin’s Rule. Imputed confidence intervals were obtained using the standard errors of the ICUR/ICER computed from the 10,000 bootstrap samples of each multiply imputed dataset. After pooling according to Rubin’s Rule, 95% confidence intervals were derived assuming a t-distribution (Barnard & Rubin, 1999; Dong & Peng, 2013; Schomaker & Heumann, 2018).

## **Sensitivity analysis**

Data did not specify whether consultations occurred in the public health system or in the private sector for mental health professionals (psychologists, psychotherapists, neuropsychologists) and social service professionals (social workers and psycho-educators). This could impact estimated mental health costs as fees vary significantly between public and private sectors. For example, for psychologists, a visit in the private sector costs on average $105 for a one-hour consultation (paid out-of-pocket) while in the public sector, the cost is $1,104 per year after including mark-ups for overhead, opportunity and building depreciation cost. For social workers, we estimated a cost of $75 per consultation in the private sector and $1,506 per year in the public sector. To be comparable with private sector costs, the estimation of the public sector costs in this study was weighted proportionally to represent a 4-month period. Based on available literature and consultation with experts, in the base case, the proportion of individuals consulting for psychological services in the private and public sectors was 65% and 35%, respectively (Chodos, 2017). Based on an interview with the professional college of social workers of Quebec, for the base case, the proportion of individuals consulting in the private and public sectors was 3.5% and 96.5%, respectively (Ordre des travailleurs sociaux et des thérapeutes conjugaux et familiaux du Québec, 2021).Since visits with these professionals were common, one-way and two-way deterministic sensitivity analysis (DSA) with extreme values were carried out where all participants either: 1) consulted in the private or 2) in the public sector. DSA were done on non-imputed data, as mental health service use was imputed on the aggregated level. Unadjusted point-estimates ICUR were derived for each scenario.

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