The WSIPP benefit-cost analysis examines, on an apples-to-apples basis, the monetary value of programs or policies to determine whether the benefits from the program exceed its costs. WSIPP's research approach to identifying evidence-based programs and policies has three main steps. First, we determine "what works" (and what does not work) to improve outcomes using a statistical technique called meta-analysis. Second, we calculate whether the benefits of a program exceed its costs. Third, we estimate the risk of investing in a program by testing the sensitivity of our results. For more detail on our methods, see our Technical Documentation.

Current estimates replace old estimates. Numbers will change over time as a result of model inputs and monetization methods.

# Cognitive behavioral therapy (CBT) for adult anxiety

## Adult Mental Health: Anxiety

Benefit-cost estimates updated December 2017. Literature review updated September 2016.

Program Description: Cognitive-behavioral therapies (CBT) include various components, such as cognitive restructuring, behavioral activation, emotion regulation, exposure, communication skills, and problem-solving. Most commonly, treatments in this review provided 10 to 20 therapeutic hours per client in an individual or group modality. Most studies in this analysis focused on a single anxiety disorder (generalized anxiety, obsessive-compulsive, panic, social phobia) with aspects of the treatment tailored to the specific disorder. This review excludes studies of CBT for post-traumatic stress disorder.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:

| | |
|---|---|
| Taxpayers | $9,781 |
| Participants | $20,326 |
| Others | $800 |
| Indirect | $36 |
| Total benefits | $30,943 |
| Net program cost | ($573) |
| Benefits minus cost | $30,370 |

| | |
|---|---|
| Benefit to cost ratio | $54.01 |
| Benefits minus costs | $30,370 |
| Chance the program will produce benefits greater than the costs | 100 % |

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

## Detailed Monetary Benefit Estimates Per Participant

| Benefits from changes to:[1] | Benefits to: | | | | |
|---|---|---|---|---|---|
| | Participants | Taxpayers | Others[2] | Indirect[3] | Total |
| Labor market earnings associated with anxiety disorder | $20,115 | $9,135 | $0 | $0 | $29,250 |
| Health care associated with anxiety disorder | $210 | $646 | $800 | $323 | $1,980 |
| Adjustment for deadweight cost of program | $0 | $0 | $0 | ($287) | ($287) |
| Totals | $20,326 | $9,781 | $800 | $36 | $30,943 |

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

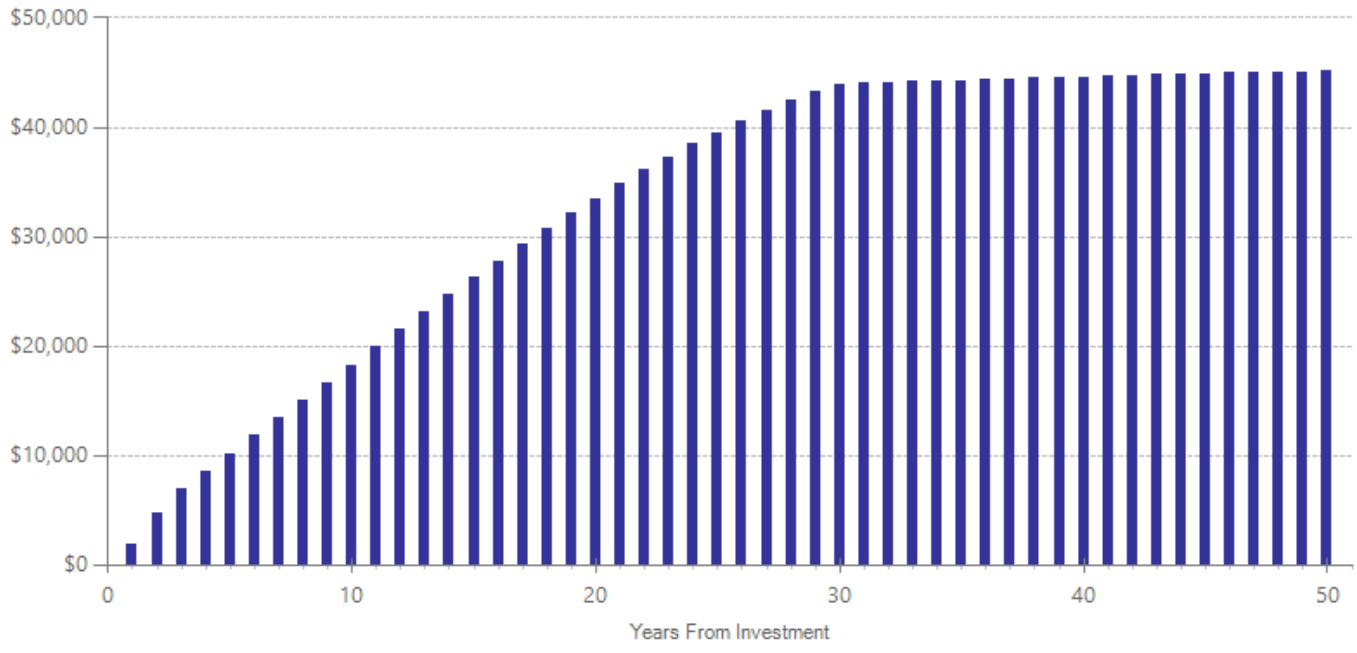
## Detailed Annual Cost Estimates Per Participant

| | Annual cost | Year dollars | Summary | |
|---|---|---|---|---|
| Program costs | $1,458 | 2015 | Present value of net program costs (in 2016 dollars) | ($573) |
| Comparison costs | $814 | 2008 | Cost range (+ or -) | 10 % |

This therapy typically takes place over 10 to 20 weekly sessions. Per-participant costs are based on therapist time as reported in the studies, multiplied by DSHS reimbursement rates reported in Mercer (2014) Behavioral Health Data Book for the State of Washington For Rates Effective January 1, 2015.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

## Detailed Annual Cost Estimates Per Participant



The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the "break-even" point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

## Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Anxiety disorder | 36 | 32 | 726 | -0.525 | 0.064 | 37 | -0.273 | 0.078 | 39 | -0.968 | 0.001 |
| Major depressive disorder^^ | 36 | 19 | 384 | -0.400 | 0.080 | 37 | -0.208 | 0.098 | 39 | -0.784 | 0.001 |

^^WSIPP does not include this outcome when conducting benefit-cost analysis for this program.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

## Citations Used in the Meta-Analysis


Arntz, A., & Van den Hout, M.A. (1996). Psychological treatments of panic disorder without agoraphobia: cognitive therapy versus applied relaxation. *Behaviour Research and Therapy, 34*(2), 113-21.

Barlow, D.H., Cohen, A.S., Waddell, M.T., Vermilyea, B.B., Klosko, J.S., Blanchard, E.B., & Di Nardo, P.A. (1984). Panic and generalized anxiety disorders: Nature and treatment. *Behavior Therapy, 15*(5), 431-449.

Barlow, D.H., Gorman, J.M., Shear, M.K., & Woods, S.W. (2000) Cognitive-behavioral therapy, imipramine, or their combination for panic disorder: A randomized controlled trial. *JAMA, 283*(19), 2529-2536.

Beck, J.G., & Stanley, M.A. (1994). Comparison of cognitive therapy and relaxation training for panic disorder. *Journal of Consulting and Clinical Psychology, 62*,4.

Beck, A.T., Sokol, L., Clark, D.A., Berchick, R., & Wright, F. (1992). A crossover study of focused cognitive therapy for panic disorder. *American Journal of Psychiatry, 149*(6), 778-783.

Borkovec, T.D., & Costello, E. (1993). Efficacy of applied relaxation and cognitive-behavioral therapy in the treatment of generalized anxiety disorder. *Journal of Consulting and Clinical Psychology, 61*(4), 611-619.

Borkovec, T.D., & Mathews, A.M. (1988). Treatment of nonphobic anxiety disorders: A comparison of nondirective, cognitive and coping desensitization therapy. *Journal of Consulting and Clinical Psychology, 56*(6), 877-884.

Borkovec, T.D., Mathews, A.M., Chambers, A., Ebrahimi, S., Lytle, R., & Nelson, R. (1987). The effects of relaxation training with cognitive or nondirective therapy and the role of relaxation-induced anxiety in the treatment of generalized anxiety. *Journal of Consulting and Clinical Psychology, 55*(6), 883-888.

Clark, D.M., Salkovskis, P.M., Hackmann, A., Wells, A., Ludgate, J., & Gelder, M. (1999). Brief cognitive therapy for panic disorder: a randomized controlled trial. *Journal of Consulting and Clinical Psychology, 67*(4) 583-9.

Clark, D.M., Ehlers, A., McManus, F., Hackmann, A., Fennell, M., Campbell, H., Flower, T., Davenport, C. & Louis, B. (2003). Cognitive therapy versus fluoxetine in generalized social phobia: a randomized placebo-controlled trial. *Journal of Consulting and Clinical Psychology, 71*(6) 1058-67.

Clark, D.M., Ehlers, A., Hackmann, A., McManus, F., Fennell, M., Grey, N., Waddington, L., & Wild, J. (2006). Cognitive therapy versus exposure and applied relaxation in social phobia: A randomized controlled trial. *Journal of Consulting and Clinical Psychology, 74*(3), 568-78.

Clark, D.M., Salkovskis, P.M., Hackman, A., Middleton, H., Pavlos, A., & Gelder, M. (1994). A comparison of cognitive therapy, applied relaxation, and imipramine in the treatment of panic disorder. *British Journal of Psychiatry, 164*, 759-169.

Cordioli, A.V., Heldt, E., Braga, B.D. Margis, R., Basso de Sousa, M., Tonello, J. F., Manfro G.G., & Kapczinski, F. (2003). Cognitive-behavioral group therapy in obsessive-compulsive disorder: A randomized clinical trial. *Psychotherapy and Psychosomatics, 72*(4), 211-216.

Dugas, M.J., Ladouceur, R., Leger, E., Freeston, M.H., Langolis, F., Provencher, M.D., & Boisvert, J.M. (2003). Group cogitive-behavioral therapy for generalized anxiety disorder: Treatment outcome and long-term follow-up. *Journal of Consulting and Clinical Psychology,* 71(4), 821-825.

Dugas, M.J., Brillon, P., Savard, P., Turcotte, J., Gaudet, A., Ladouceur, R., Leblanc, R., ... Gervais, N.J. (2010). A randomized clinical trial of cognitive-behavioral therapy and applied relaxation for adults with generalized anxiety disorder. *Behavior Therapy,* 41(1), 46-58.

Foa, E.B., Liebowitz, M.R., Kozak, M.J., Davies, S., Campeas, R., Franklin, M.E., . . . Tu, X. (2005). Randomized, placebo-controlled trial of exposure and ritual prevention, clomipramine, and their combination in the treatment of obsessive-compulsive disorder. *The American Journal of Psychiatry, 162*(1), 151-161.

Heimberg, R.G., Liebowitz, M.R., Hope, D.A., Schneier, F.R., Holt, C.S., Welkowitz, L.A., . . . Klein, D.F. (1998). Cognitive behavioral group therapy vs phenelzine therapy for social phobia: 12-week outcome. *Archives of General Psychiatry, 55*(12), 1133-41.

Kenardy, J.A., Dow, M.G., Johnston, D.W., Newman, M.G., Thomson, A., & Taylor, C.B. (2003). A comparison of delivery methods of cognitive-behavioral therapy for panic disorder: an international multicenter trial. *Journal of Consulting and Clinical Psychology, 71(*6), 1068-75.

Klosko, J.S., Barklow, D.H., Tassinari, R., Cerny, J.A. (1990). A comparison of Alprazolam and behavior therapy in treatment of panic disorder. *Journal of Consulting and Clinical Psychology, 8*(1), 77-84

Koszycki, D., Benger, M., Shlik, J., & Bradwejn, J. (2007). Randomized trial of a meditation-based stress reduction program and cognitive behavior therapy in generalized social anxiety disorder. *Behaviour Research and Therapy, 45*(10), 2518-2526.

Ladouceur, R., Dugas, M. J., Freeston, M. H., Leger, E., Gagnon, F., & Thibodeau, N. (2000). Efficacy of a cognitive-behavioral treatment for generalized anxiety disorder: Evaluation in a controlled clinical trial. *Journal of Consulting and Clinical Psychology, 68*(6), 957-964.

Lidren, D.M., Watkins, P.L., Gould, R.A., Clum, G.A., Asterino, M., & Tulloch, H.L. (1994). A comparison of bibliotherapy and group therapy in the treatment of panic disorder. *Journal of Consulting and Clinical Psychology, 62*(4), 865-869.

Lindsay, W.R., Gamsu, C.V., McLaughlin, E., Hood, E.M., & Espie, C.A. (1987). A controlled trial of treatments for generalized anxiety. *British Journal of Clinical Psychology, 26*(Pt 1), 3-15.

Lindsay, M., Crino, R., & Andrews, G. (1997). Controlled trial of exposure and response prevention in obsessive-compulsive disorder. *The British Journal of Psychiatry : the Journal of Mental Science, 171,*135-9.

McLean, P.D., Whittal, M.L., Thordarson, D.S., Taylor, S., Sochting, I., Koch, W.J., Paterson, R., ... Anderson, K.W. (2001). Cognitive versus behavior therapy in the group treatment of obsessive-compulsive disorder. *Journal of Consulting and Clinical Psychology, 69(*2), 205-14.

Mortberg, E., Karlsson, A., Fyring, C., & Sundin, O. (2006). Intensive cognitive-behavioral group treatment (CBGT) of social phobia: A randomized controlled study. *Journal of Anxiety Disorders, 20*(5), 646-660.

Sharp, D.M., Power, K.G, Simpson, R.J., Swanson, V., Moodie, E., Anstee, J.A., & Ashford, J.J. (1996). Fluvoxamin, placebo, and cognitive behaviour therapy used alone and in combination in the treatment of panic disorder and agoraphobia. *Journal of Anxiety Disorders, 10*(4), 219-242.

Stangier, U., Schramm, E., Heidenreich, T., Berger, M., & Clark, D.M. (2011). Cognitive therapy vs interpersonal psychotherapy in social anxiety disorder: a randomized controlled trial. *Archives of General Psychiatry, 68(*7), 692-700.

Telch, M.J., Lucas, J.A., Schmidt, N.B., Hanna, H.H., LaNae, J.T., & Lucas, R.A. (1993). Group cognitive-behavioral treatment of panic disorder. *Behaviour Research and Therapy, 31*(3), 279-287.

White, J., Keenan, M., & Brooks, N. (1992). Stress control: A controlled comparative investigation of large group therapy for generalized anxiety disorder. *Behavioural Psychotherapy, 20*(2), 97-114.

White, J., Brooks, N., & Keenan, M. (1995). Stress control: A controlled comparative investigation of large group therapy for generalized anxiety disorder: Process of change. *Clinical Psychology & Psychotherapy, 2(*2), 86-97.

Williams, S.L., & Falbo, J. (1996). Cognitive and performance-based treatments for panic attacks in people with varying degrees of agoraphobic disability. *Behaviour Research and Therapy, 34(3*), 253-64.

# Acceptance and Commitment Therapy for adult anxiety

## Adult Mental Health: Anxiety

Benefit-cost estimates updated December 2017. Literature review updated September 2016.

Program Description: Acceptance and Commitment Therapy for anxiety aims to increase client acceptance of negative thoughts and feelings and to reduce the negative behavioral impact of anxiety. Acceptance and Commitment Therapy relies on six core processes of change: 1) acceptance; 2) learning to view thoughts as hypotheses rather than facts, 3) being present, 4) viewing the self as context for experience, 5) identifying core values, and 6) acting based on those values. These core principles are applied through various exercises and through homework.

Treatments in this review provided 7 to 18 hours per client of either group or individual therapy in an outpatient setting. Comparison groups were either on a waitlist for treatment or received treatment as usual. This review excludes studies of acceptance and commitment therapy for other disorders.

### Benefit-Cost Summary Statistics Per Participant

**Benefits to:**

| | |
|---|---|
| Taxpayers | $6,643 |
| Participants | $13,809 |
| Others | $541 |
| Indirect | $3 |
| Total benefits | $20,995 |
| Net program cost | ($432) |
| Benefits minus cost | $20,562 |

| | |
|---|---|
| Benefit to cost ratio | $48.55 |
| Benefits minus costs | $20,562 |
| Chance the program will produce benefits greater than the costs | 85 % |

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

### Detailed Monetary Benefit Estimates Per Participant

**Benefits from changes to:[1]** **Benefits to:**

| | Participants | Taxpayers | Others[2] | Indirect[3] | Total |
|---|---|---|---|---|---|
| Labor market earnings associated with anxiety disorder | $13,666 | $6,206 | $0 | $0 | $19,873 |
| Health care associated with anxiety disorder | $142 | $437 | $541 | $218 | $1,338 |
| Adjustment for deadweight cost of program | $0 | $0 | $0 | ($216) | ($216) |
| Totals | $13,809 | $6,643 | $541 | $3 | $20,995 |

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

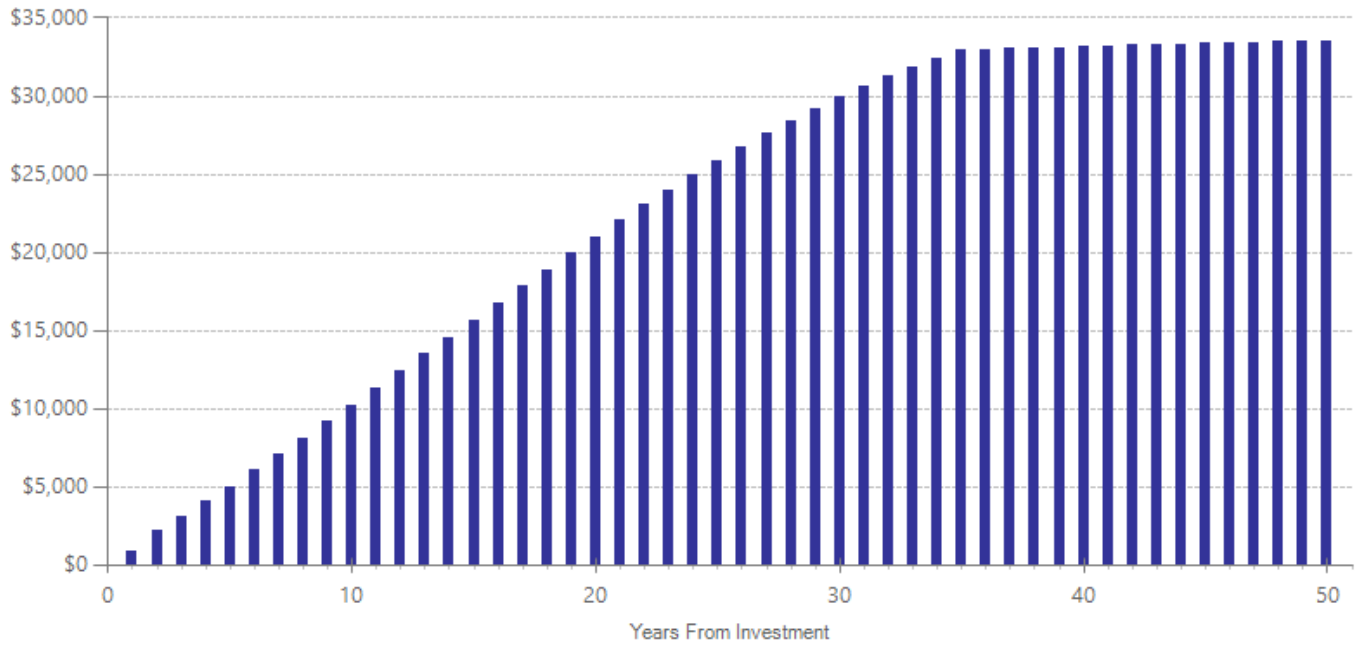
## Detailed Annual Cost Estimates Per Participant

| | Annual cost | Year dollars | Summary | |
|---|---|---|---|---|
| Program costs | $1,319 | 2015 | Present value of net program costs (in 2016 dollars) | ($432) |
| Comparison costs | $814 | 2008 | Cost range (+ or -) | 10 % |

These therapies took place over 8-16 weekly sessions; total length of treatment averaged 12 weeks. The per-participant cost of treatment by modality (individual or group) was weighted by the treatment Ns reported in the studies. Cost per session is $40.04/session for group and $122.25/session for individual (2015 dollars). This rate is based on actuarial tables reported in Mercer (2014) Behavioral Health Data Book for the State of Washington For Rates Effective January 1, 2015. The comparison group costs are from the average Medicaid expenditures for anxiety treatment in Washington in 2009.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

## Detailed Annual Cost Estimates Per Participant




The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

## Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Anxiety disorder | 31 | 4 | 74 | -0.395 | 0.175 | 31 | -0.205 | 0.214 | 33 | -0.710 | 0.004 |

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

## Citations Used in the Meta-Analysis


England, E.L., Herbert, J.D., Forman, E.M., Rabin, S.J., Juarascio, A., & Goldstein, S.P. (2012). Acceptance-based exposure therapy for public speaking anxiety. *Journal of Contextual Behavioral Science, 1*, 66-72.

Roemer, L., Orsillo, S.M., & Salters-Pedneault, K. (2008). Efficacy of an acceptance-based behavior therapy for generalized anxiety disorder: evaluation in a randomized controlled trial. *Journal of Consulting and Clinical Psychology, 76* (6), 1083-9.

Craske, M.G., Niles, A.N., Burklund, L.J., Wolitzky-Taylor, K.B., Vilardaga, J.C., Arch, J.J., Saxbe, D.E., ... Lieberman, M.D. (2014). Randomized controlled trial of cognitive behavioral therapy and acceptance and commitment therapy for social phobia: outcomes and moderators. *Journal of Consulting and Clinical Psychology, 82* (6), 1034-48.

Zargar, F., Asgharnejad, F.A.A., Atef-Vahid, M.K., Afshar, H., Maroofi, M., & Omranifard, V. (2012). Effect of acceptance-based behavior therapy on severity of symptoms, worry and quality of life in women with generalized anxiety disorder. *Iranian Journal of Psychiatry and Behavioral Sciences, 6*(2), 23-32.

# Collaborative primary care for anxiety (general adult population)

## Adult Mental Health: Anxiety

Benefit-cost estimates updated December 2017. Literature review updated December 2016.

Program Description: Collaborative primary care for anxiety integrates behavioral health and primary care services to treat patients with anxiety disorders including panic disorder, generalized anxiety disorder, and social anxiety disorder. In the collaborative care model, a care manager coordinates with a primary care provider and other specialists, like a psychologist or psychiatrist, to develop measurement-based treatment plans for individual patients. Care managers can be mental health providers (e.g psychologists) or non-behavioral specialists (e.g registered nurses or social workers) and are located in primary care settings. In this review, patients received treatment for 6 to 12 months.

## Benefit-Cost Summary Statistics Per Participant

### Benefits to:

| | |
|---|---|
| Taxpayers | $3,985 |
| Participants | $8,234 |
| Others | $357 |
| Indirect | ($276) |
| Total benefits | $12,301 |
| Net program cost | ($834) |
| Benefits minus cost | $11,467 |

| | |
|---|---|
| Benefit to cost ratio | $14.76 |
| Benefits minus costs | $11,467 |
| Chance the program will produce benefits greater than the costs | 90 % |

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

## Detailed Monetary Benefit Estimates Per Participant

### Benefits from changes to:[1] Benefits to:

| | Participants | Taxpayers | Others[2] | Indirect[3] | Total |
|---|---|---|---|---|---|
| Labor market earnings associated with anxiety disorder | $8,140 | $3,697 | $0 | $0 | $11,837 |
| Health care associated with anxiety disorder | $94 | $289 | $357 | $145 | $885 |
| Adjustment for deadweight cost of program | $0 | $0 | $0 | ($421) | ($421) |
| Totals | $8,234 | $3,985 | $357 | ($276) | $12,301 |

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

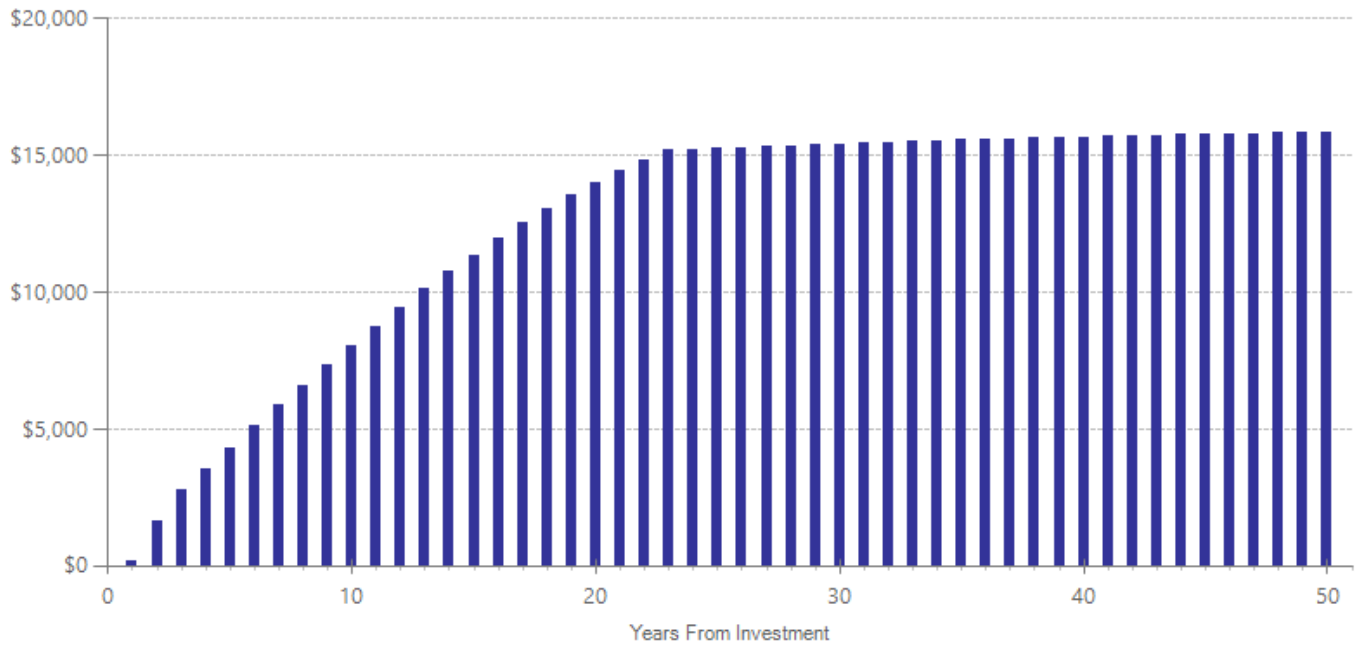
## Detailed Annual Cost Estimates Per Participant

| | Annual cost | Year dollars | Summary | |
|---|---|---|---|---|
| Program costs | $834 | 2016 | Present value of net program costs (in 2016 dollars) | ($834) |
| Comparison costs | $0 | 2016 | Cost range (+ or -) | 20 % |

Treatment cost estimates for this program reflect costs beyond treatment as usual. Costs are based on a weighted average of per-participants costs published in Adler et al. (2004), Katon et al. (1996), Katon et al. (1999), Rost et al. (2001), Simon et al. (2000), and Grochtdreis et al (2015). Cost-effectiveness of collaborative care for the treatment of depressive disorders in primary care: a systematic review. PLoS One 10(5): e0123078.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

## Detailed Annual Cost Estimates Per Participant




The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

## Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Anxiety disorder | 43 | 4 | 691 | -0.244 | 0.088 | 44 | -0.127 | 0.107 | 46 | -0.300 | 0.001 |
| Emergency department visits | 43 | 1 | 116 | -0.097 | 0.291 | 44 | -0.051 | 0.356 | 46 | -0.123 | 0.772 |
| Employment^^ | 43 | 1 | 82 | 0.236 | 0.293 | 44 | 0.123 | 0.359 | 46 | 0.298 | 0.354 |
| Hospitalization^^ | 43 | 1 | 116 | 0.144 | 0.450 | 44 | 0.075 | 0.551 | 46 | 0.182 | 0.684 |
| Major depressive disorder | 43 | 2 | 198 | -0.109 | 0.164 | 44 | -0.057 | 0.201 | 46 | -0.137 | 0.402 |

^^WSIPP does not include this outcome when conducting benefit-cost analysis for this program.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

## Citations Used in the Meta-Analysis


Craske, M.G., Stein, M.B., Sullivan, G., Sherbourne, C., Bystritsky, A., Rose, R.D., . . . Roy-Byrne, P. (2011). Disorder-specific impact of coordinated anxiety learning and management treatment for anxiety disorders in primary care. *Archives of General Psychiatry, 68*(4), 378-88.

Muntingh, A., van der Feltz-Cornelis, C., van Marwijk, H., Spinhoven, P., Assendelft, W., de Waal, M., Ader. A., van Balkom, A. (2014). Effectiveness of collaborative stepped care for anxiety disorders in primary care: a pragmatic cluster randomized controlled trial. *Psychotherapy and Psychosomatics, 83*(1), 37-44.

Price, D., Beck, A., Nimmer, C., & Bensen, S. (2000). The treatment of anxiety disorders in a primary care HMO setting. *The Psychiatric Quarterly, 71*(1), 31-45.

Rollman, B.L., Belnap, B.H., Mazumdar, S., Houck, P.R., Zhu, F., Gardner, W., . . . Shear, M.K. (2005). A randomized trial to improve the quality of treatment for panic and generalized anxiety disorders in primary care. *Archives of General Psychiatry, 62*(12), 1332-1341.

# Cognitive behavioral therapy (CBT) for adult depression

## Adult Mental Health: Depression

Benefit-cost estimates updated December 2017. Literature review updated September 2016.

Program Description: Cognitive-behavioral therapies include various components, such as cognitive restructuring, behavioral activation, emotion regulation, communication skills, and problem-solving. Treatment is goal-oriented and generally of limited duration. Most commonly, treatments in this review provided 10-20 therapeutic hours per client in an individual or group modality.

## Benefit-Cost Summary Statistics Per Participant

### Benefits to:

| | |
|---|---|
| Taxpayers | $7,758 |
| Participants | $14,317 |
| Others | $1,826 |
| Indirect | $892 |
| Total benefits | $24,793 |
| Net program cost | ($505) |
| Benefits minus cost | $24,288 |

| | |
|---|---|
| Benefit to cost ratio | $49.09 |
| Benefits minus costs | $24,288 |
| Chance the program will produce benefits greater than the costs | 100 % |

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

## Detailed Monetary Benefit Estimates Per Participant

### Benefits from changes to:[1] Benefits to:

| | Participants | Taxpayers | Others[2] | Indirect[3] | Total |
|---|---|---|---|---|---|
| Labor market earnings associated with major depression | $13,836 | $6,283 | $0 | $404 | $20,523 |
| Health care associated with major depression | $480 | $1,475 | $1,826 | $740 | $4,522 |
| Adjustment for deadweight cost of program | $0 | $0 | $0 | ($252) | ($252) |
| Totals | $14,317 | $7,758 | $1,826 | $892 | $24,793 |

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

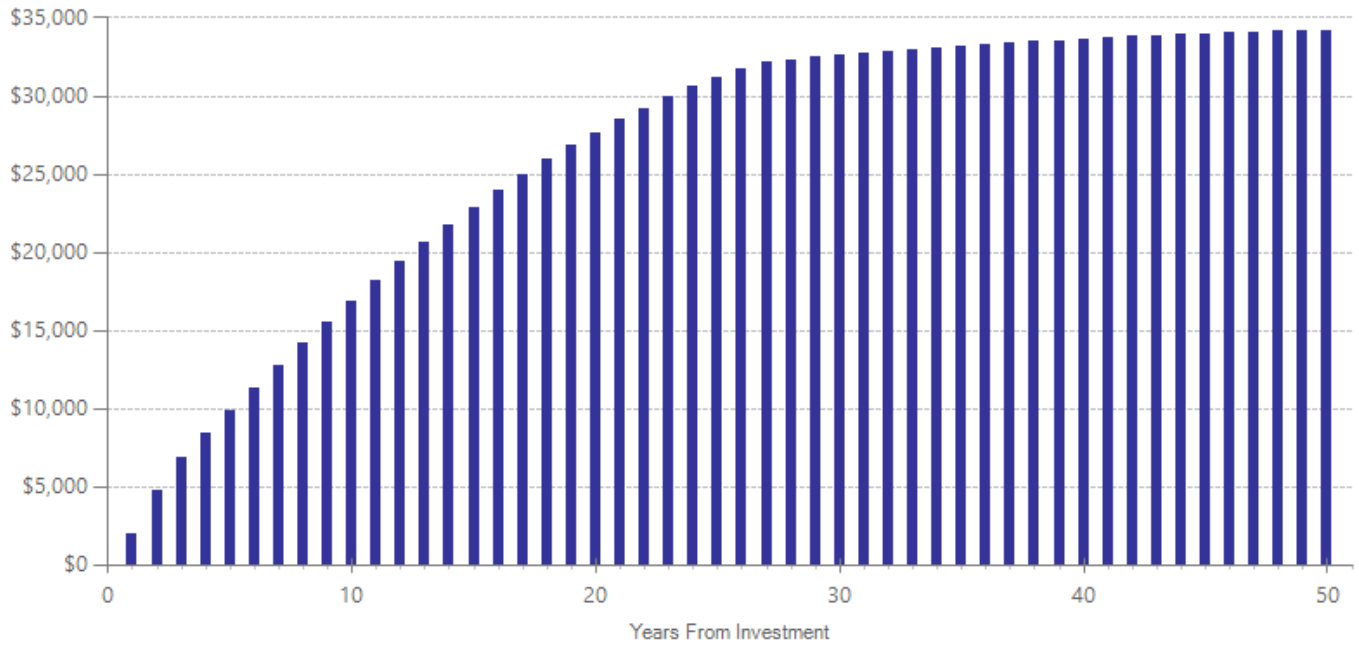
## Detailed Annual Cost Estimates Per Participant

| | Annual cost | Year dollars | Summary | |
|---|---|---|---|---|
| Program costs | $1,231 | 2014 | Present value of net program costs (in 2016 dollars) | ($505) |
| Comparison costs | $672 | 2008 | Cost range (+ or -) | 10 % |

This therapy typically takes place over 10 to 20 weekly sessions. Per-participant costs are based on therapist time as reported in the studies, multiplied by DSHS reimbursement rates reported in Mercer (2013) Behavioral Health Data Book for the State of Washington For Rates Effective January 1, 2014.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

## Detailed Annual Cost Estimates Per Participant




The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the "break-even" point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

## Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Major depressive disorder | 39 | 64 | 1489 | -0.481 | 0.044 | 40 | -0.250 | 0.053 | 42 | -0.733 | 0.001 |

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

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## Citations Used in the Meta-Analysis

Ammerman, R.T., Putnam, F.W., Altaye, M., Stevens, J., Teeters, A.R., & Van, G.J.B. (2013). A clinical trial of in-home CBT for depressed mothers in home visitation. *Behavior Therapy, 44*(3), 359-72.

Barnhofer, T., Crane, C., Hargus, E., Amarasinghe, M., Winder, R., & Williams, J.M. ( 2009). Mindfulness-based cognitive therapy as a treatment for chronic depression: A preliminary study. *Behaviour Research and Therapy, 47*(5), 366-373.

Barrera, M.J. (1979). An evaluation of a brief group therapy for depression. *Journal of Consulting and Clinical Psychology, 47*(2), 413-415.

Beach, S.R.H., & Daniel, K.D. O'Leary (1992). Treating depression in the context of marital discord: Outcome and predictors of response of marital therapy versus cognitive therapy. *Behavior Therapy, 23*(4), 507-528.

Beutler, L.E., Engle, D., Mohr, D., Daldrup, R.J., Bergan, J., Meredith, K., & Merry, W. (1991). Predictors of differential response to cognitive, experiential, and self-directed psychotherapeutic procedures. *Journal of Consulting and Clinical Psychology, 59*(2), 333-340.

Blackburn, I.M., Bishop, S., Glen, A.I., Whalley, L.J., & Christie, J.E. (1981). The efficacy of cognitive therapy in depression: A treatment trial using cognitive therapy and pharmacotherapy, each alone and in combination. *The British Journal of Psychiatry, 139*(3), 181-189.

Bockting, C.L., Schene, A.H., Spinhoven, P., Koeter, M.W., Wouters, L.F., Huyser, J., & Kamphuis, J.H. (2005). Preventing relapse/recurrence in recurrent depression with cognitive therapy: A randomized controlled trial. *Journal of Consulting and Clinical Psychology, 73*(4), 647-657.

Bondolfi, G., Jermann, F., Bizzini, L., Gonzalez, C., der, L.M.V., Gex-Fabry, M., Myers-Arrazola, L., . . . Segal, Z. (2010). Depression relapse prophylaxis with Mindfulness-Based Cognitive Therapy: Replication and extension in the Swiss health care system. *Journal of Affective Disorders, 122*(3), 224-231.

Bowers, W.A. (1990). Treatment of depressed in-patients. Cognitive therapy plus medication, relaxation plus medication, and medication alone. *The British Journal of Psychiatry, 156*(1), 73-78.

Carrington, C.H. (1979). *A comparison of cognitive and analytically oriented brief treatment approaches to depression in black women.* Dissertation Abstracts.

Castonguay, L.G., Schut, A.J., Aikins, D.E., Constantino, M. ., Laurenceau, J.-P., Bologh, L., & Burns, D.D. (2004). Integrative cognitive therapy for depression: A preliminary investigation. *Journal of Psychotherapy Integration, 14,* 4-20.

Cho, H.J., Kwon, J.H., & Lee, J.J. (2008). *Antenatal cognitive-behavioral therapy for prevention of postpartum depression: A pilot study.* Yonsei University College of Medicine.

Comas-Diaz, L. (1981). Effects of cognitive and behavioral group treatment on the depressive symptomatology of Puerto Rican women. *Journal of Consulting and Clinical Psychology, 49*(5), 627-632.

Cooper, P.J., Murray, L., Wilson, A., & Romaniuk, H. (2003). Controlled trial of the short- and long-term effect of psychological treatment of post-partum depression: 1. Impact on maternal mood. *The British Journal of Psychiatry, 182*(5), 412-419.

Covi, L., & Lipman, R.S. (1987). Cognitive behavioral group psychotherapy combined with imipramine in major depression. *Psychopharmacology Bulletin, 23*(1), 173-176.

Cullen, J.M., Spates, C.R., Pagoto, S.L., & Doran, N. (2006). Behavioral activation treatment for major depressive disorder: A pilot investigation. *Behavior Analyst Today, 7*(1), 151-166.

Dobkin, R.D., Menza, M., Allen, L.A., Gara, M.A., Mark, M.H., Tiu, J., Bienfait, K. L., . . . Friedman, J. (2011). Cognitive-behavioral therapy for depression in Parkinson's disease: a randomized, controlled trial. *The American Journal of Psychiatry, 168*(10), 1066-74.

Dozois, D.J.A., Bieling, P.J., Patelis-Siotis, I., Hoar, L., Chudzik, S., McCabe, K., & Westra, H. A. (2009). Changes in self-schema structure in cognitive therapy for major depressive disorder: A randomized clinical trial. *Journal of Consulting and Clinical Psychology, 77*(6), 1078-1088.

Dunn, R.J. (1979). Cognitive modification with depression-prone psychiatric patients. *Cognitive Therapy and Research, 3*(3), 307-317.

Elkin, I., Shea, M.T., Watkins, J.T., Imber, S.D., Sotsky, S.M., Collins, J.F., . . . Parloff, M.B. (1989). National Institute of Mental Health Treatment of Depression Collaborative Research Program: General effectiveness of treatments. *Archives of General Psychiatry, 46*(11), 971-982.

Hogg, J.A., & Deffenbacher, J.L. (1988). A comparison of cognitive and interpersonal-process group therapies in the treatment of depression among college students. *Journal of Counseling Psychology, 35*(3), 304-310.

Hollon, S.D., DeRubeis, R.J., Evans, M.D., Wiemer, M.J., Garvey, M.J., Grove, W.M., & Tuason, V.B. (1992). Cognitive therapy and pharmacotherapy for depression: Singly and in combination. *Archives of General Psychiatry, 49*(10), 774-781.

Hopko, D.R., Lejuez, C.W., LePage, J.P., Hopko, S.D., & McNeil, D.W. (2003). A brief behavioral activation treatment for depression: A randomized pilot trial within an inpatient psychiatric hospital. *Behavior Modification, 27*(4), 458-469.

Laidlaw, K., Davidson, K., Toner, H., Jackson, G., Clark, S., Law, J., Howley, M., . . . Cross, S. (2008). A randomised controlled trial of cognitive behaviour therapy vs treatment as usual in the treatment of mild to moderate late life depression. *International Journal of Geriatric Psychiatry, 23*(8), 843-50.

Ma, S.H., & Teasdale, J.D. (2004). Mindfulness-based cognitive therapy for depression: Replication and exploration of differential relapse prevention effects. *Journal of Consulting and Clinical Psychology, 72*(1), 31-40.

Macaskill, N.D., & Macaskill, A. (1996). Rational-Emotive Therapy Plus Pharmacotherapy Versus Pharmacotherapy Alone in the Treatment of High Cognitive Dysfunction Depression. *Cognitive Therapy and Research, 20*(6), 575-592.

Markowitz, J.C., Kocsis, J.H., Fishman, B., Spielman, L.A., Jacobsberg, L.B., Frances, A.J., Klerman, G.L., . . . Perry, S.W. (1998). Treatment of depressive symptoms in human immunodeficiency virus-positive patients. *Archives of General Psychiatry, 55*(5), 452-7.

McNamara, K., & Horan, J.J. (1986). Experimental construct validity in the evaluation of cognitive and behavioral treatments for depression. *Journal of Counseling Psychology, 33*(1), 23-30.

Miller, I.W., Norman, W.H., Keitner, G.I., Bishop, S.B., & Dow, M.G. (1989). Cognitive-behavioral treatment of depressed inpatients. *Behavior Therapy, 20*(1), 25-47.

Miranda, J., Chung, J.Y., Green, B. L., Krupnick, J., Siddique, J., Revicki, D.A., & Belin, T. (2003). Treating depression in predominantly low-income young minority women: A randomized controlled trial. *JAMA : The Journal of the American Medical Association, 290*(1), 57-65.

Mohr, D.C., Boudewyn, A.C., Goodkin, D.E., Bostrom, A., & Epstein, L. (2001). Comparative outcomes for individual cognitive-behavior therapy, supportive-expressive group psychotherapy, and sertraline for the treatment of depression in multiple sclerosis. *Journal of Consulting and Clinical Psychology, 69*(6), 942-949.

Murphy, G.E., Simons, A.D., Wetzel, R.D., & Lustman, P.J. (1984). Cognitive therapy and pharmacotherapy. Singly and together in the treatment of depression. *Archives of General Psychiatry, 41*(1), 33-41.

Murphy, G.E., Carney, R.M., Knesevich, M.A., Wetzel, R.D., & Whitworth, P. (1995). Cognitive behavior therapy, relaxation training, and tricyclic antidepressant medication in the treatment of depression. *Psychological Reports, 77*(2), 403-420.

Pace, T.M., & Dixon, D.N. (1993). Changes in depressive self-schemata and depressive symptoms following cognitive therapy. *Journal of Counseling Psychology, 40*(3), 288-294.

Propst, L.R., Ostrom, R., Watkins, P., Dean, T., & Mashburn, D. (1992). Comparative efficacy of religious and nonreligious cognitive-behavioral therapy for the treatment of clinical depression in religious individuals. *Journal of Consulting and Clinical Psychology, 60*(1), 94-103.

Rieu, J., Bui, E., Rouch, V., Faure, K., Birmes, P., & Schmitt, L. (2011). Efficacy of Ultrabrief Cognitive and Behavioural Therapy Performed by Psychiatric Residents on Depressed Inpatients. *Psychotherapy and Psychosomatics, 80*(6), 374-376.

Ross, M. & Scott, M. (1985). An evaluation of the effectiveness of individual and group cognitive therapy in the treatment of depressed patients in an inner city health centre. *Journal of the Royal College of General Practitioners, 35*(274), 239-242.

Rush, A.J., Beck, A.T., Kovacs, M., & Hollon, S. (1977). Comparative efficacy of cognitive therapy and pharmacotherapy in the treatment of depressed outpatients. *Cognitive Therapy and Research, 1*(1), 17-37.

Scott, A.I., & Freeman, C.P. (1992). Edinburgh primary care depression study: Treatment outcome, patient satisfaction, and cost after 16 weeks. *British Medical Journal, 304*(6831), 883-887.

Scott, M.J., & Stradling, S.G. (1990). Group cognitive therapy for depression produces clinically significant reliable change in community-based settings. *Behavioural Psychotherapy, 18,* 1.

Selmi, P.M., Klein, M.H., Greist, J.H., Sorrell, S.P., & Erdman, H.P. (1990). Computer-administered cognitive-behavioral therapy for depression. *The American Journal of Psychiatry, 147*(1), 51-56.

Shaw, B.F. (1977). Comparison of cognitive therapy and behavior therapy in the treatment of depression. *Journal of Consulting and Clinical Psychology, 45*(4), 543-551.

Taylor, F.G., & Marshall, W.L. (1977). Experimental analysis of a cognitive-behavioral therapy for depression. *Cognitive Therapy and Research, 1*(1), 59-72.

Teasdale, J.D., Fennell, M.J., Hibbert, G.A., & Amies, P.L. (1984). Cognitive therapy for major depressive disorder in primary care. *The British Journal of Psychiatry, 144*(4), 400-406.

Teasdale, J.D., Segal, Z.V., Williams, J.M., Ridgeway, V.A., Soulsby, J.M., & Lau, M.A. (2000). Prevention of relapse/recurrence in major depression by mindfulness-based cognitive therapy. *Journal of Consulting and Clinical Psychology, 68*(4), 615-623.

Teichman, Y., Bar-el, Z., Shor, H., Sirota, P., & Elizur, A. (1995). A comparison of two modalities of cognitive therapy (individual and marital) in treating depression. *Psychiatry, 58*(2), 136-48.

Thompson, L.W., Coon, D.W., Gallagher-Thompson, D., Sommer, B.R., & Koin, D. (2001). Comparison of desipramine and cognitive/behavioral therapy in the treatment of elderly outpatients with mild-to-moderate depression. *The American Journal of Geriatric Psychiatry, 9*(3), 225-40.

Tovote, K.A., Fleer, J., Snippe, E., Peeters, A.C., Emmelkamp, P.M., Sanderman, R., Links, T.P., . . . Schroevers, M.J. (2014). Individual mindfulness-based cognitive therapy and cognitive behavior therapy for treating depressive symptoms in patients with diabetes: results of a randomized controlled trial. *Diabetes Care, 37*(9), 2427-34.

Ward, E., King, M., Lloyd, M., Bower, P., Sibbald, B., Farrelly, S., . . . Addington-Hall, J. (2000). Randomised controlled trial of non-directive counselling, cognitive behaviour therapy, and usual general practitioner care for patients with depression. I: Clinical effectiveness. *British Medical Journal, 321*(7273), 1383-1388.

Warren, R., McLellarn, R., & Ponzoha, C. (1988). Rational-emotive therapy vs general cognitive-behavior therapy in the treatment of low self-esteem and related emotional disturbances. *Cognitive Therapy and Research, 12*(1), 21-37.

Wilson, P.H., Goldin, J.C., & Charbonneau-Powis, M. (1983). Comparative efficacy of behavioral and cognitive treatments of depression. *Cognitive Therapy and Research, 7*(2), 111-124.

Wilson, P.H. (1982). Combined pharmacological and behavioural treatment of depression. *Behaviour Research and Therapy, 20*(2), 173-184.

Wright, J.H., Wright, A.S., Albano, A.M., Basco, M.R., Goldsmith, L.J., Raffield, T., & Otto, M.W. (2005). Computer-assisted cognitive therapy for depression: maintaining efficacy while reducing therapist time. *The American Journal of Psychiatry, 162*(6), 1158-64.

# Collaborative primary care for depression (general adult population)

## Adult Mental Health: Depression

Benefit-cost estimates updated December 2017. Literature review updated December 2016.

Program Description: Collaborative primary care for depression integrates behavioral health into the primary care setting to treat adult patients with major or minor depression, dysthymia, or subthreshold depression. In the collaborative care model, a care manager coordinates with a primary care provider and behavioral health care providers to develop and implement measurement-based treatment plans for individual patients. Care managers can be mental health providers (e.g. psychologists) or non-behavioral health specialists (e.g. registered nurses or social workers). Programs included in this review were intended for adult populations, age 18 and over. All programs were implemented in primary care settings, where patients received collaborative care for 3 to 36 months.

We report separate results for collaborative primary care programs for depression among older adults.

## Benefit-Cost Summary Statistics Per Participant

### Benefits to:

| | |
|---|---|
| Taxpayers | $3,371 |
| Participants | $6,068 |
| Others | $894 |
| Indirect | $139 |
| Total benefits | $10,471 |
| Net program cost | ($834) |
| Benefits minus cost | $9,637 |

| | |
|---|---|
| Benefit to cost ratio | $12.56 |
| Benefits minus costs | $9,637 |
| Chance the program will produce benefits greater than the costs | 98 % |

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

## Detailed Monetary Benefit Estimates Per Participant

### Benefits from changes to:[1] Benefits to:

| | Participants | Taxpayers | Others[2] | Indirect[3] | Total |
|---|---|---|---|---|---|
| Labor market earnings associated with major depression | $5,833 | $2,649 | $0 | $195 | $8,677 |
| Health care associated with major depression | $235 | $722 | $894 | $359 | $2,210 |
| Adjustment for deadweight cost of program | $0 | $0 | $0 | ($416) | ($416) |
| Totals | $6,068 | $3,371 | $894 | $139 | $10,471 |

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

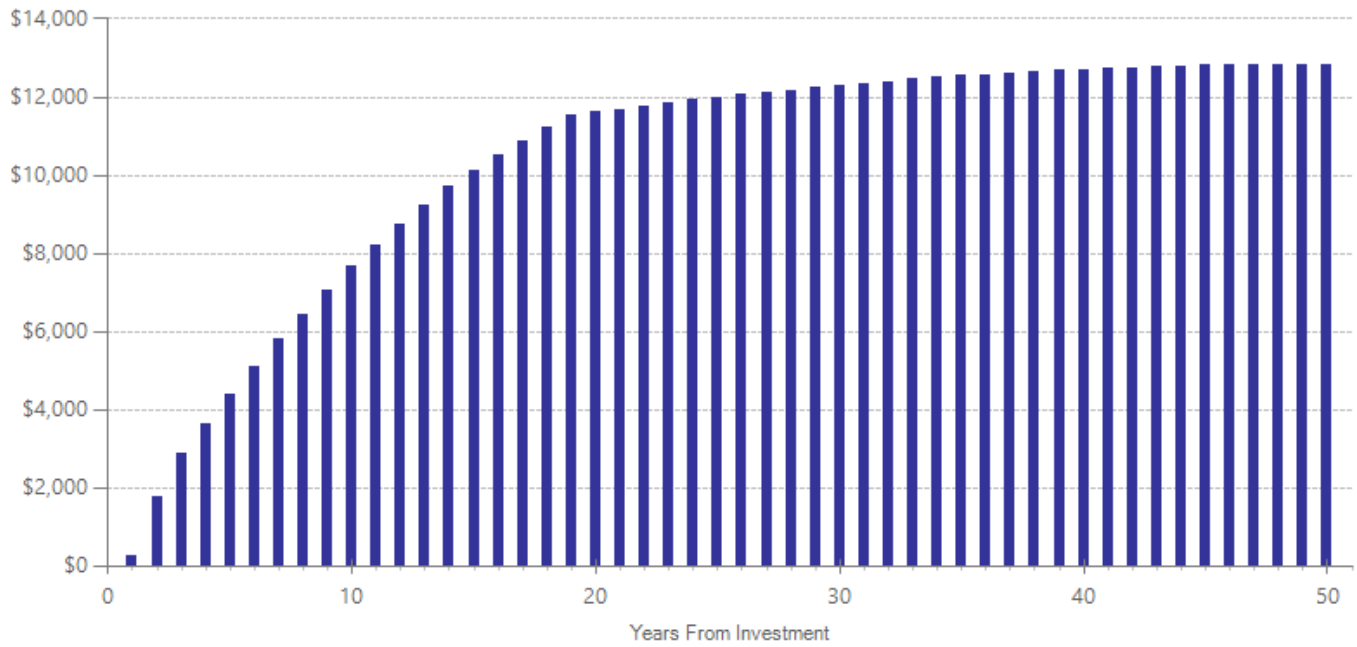
## Detailed Annual Cost Estimates Per Participant

| | Annual cost | Year dollars | Summary | |
|---|---|---|---|---|
| Program costs | $834 | 2016 | Present value of net program costs (in 2016 dollars) | ($834) |
| Comparison costs | $0 | 2016 | Cost range (+ or -) | 15 % |

Treatment cost estimates for this program reflect costs beyond treatment as usual. Costs are based on a weighted average of per-participants costs published in Adler et al. (2004), Katon et al. (1996); Katon et al. (1999), Rost et al. (2001), Simon et al. (2000); and Grochtdreis et al (2015). Cost-effectiveness of collaborative care for the treatment of depressive disorders in primary care: a systematic review. PLoS One 10(5): e0123078.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

## Detailed Annual Cost Estimates Per Participant




The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

## Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Major depressive disorder | 47 | 25 | 4094 | -0.258 | 0.058 | 48 | -0.134 | 0.071 | 50 | -0.307 | 0.001 |

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

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## Citations Used in the Meta-Analysis


Adler, D.A., Bungay, K. M., Wilson, I. B., Pei, Y., Supran, S., Peckham, E., . . . Rogers, W. H. (2004). The impact of a pharmacist intervention on 6-month outcomes in depressed primary care patients. *General Hospital Psychiatry, 26*(3), 199-209.

Aragones, E., Lluis, P. J., Caballero, A., Lopez-Cortacans, G., Casaus, P., Maria, H. J., . . . Folch, S. (2012). Effectiveness of a multi-component programme for managing depression in primary care: A cluster randomized trial. The INDI project. *Journal of Affective Disorders, 142*(1-3), 297-305.

Bergho?fer, A., Hartwich, A., Bauer, M., Unu?tzer, J., Willich, S. N., & Pfennig, A. (2012). Efficacy of a systematic depression management program in high utilizers of primary care: A randomized trial. *BMC Health Services Research, 12*(298).

Capoccia, K. L., Boudreau, D. M., Blough, D. K., Ellsworth, A. J., Clark, D. R., Stevens, N. G., . . . Sullivan, S. D. (2004). Randomized trial of pharmacist interventions to improve depression care and outcomes in primary care. *American Journal of Health-System Pharmacy, 61*(4), 364-372.

Datto, C. J., Thompson, R., Horowitz, D., Disbot, M., & Oslin, D. W. (2003). The pilot study of a telephone disease management program for depression. *General Hospital Psychiatry,* 25, 3.

Dietrich, A. J., Oxman, T. E., Williams, J. J. W., Schulberg, H. C., Bruce, M. L., Lee, P. W., Barry, S., … Nutting, P. A. (2004). Re-engineering systems for the treatment of depression in primary care: Cluster randomised controlled trial. *British Medical Journal,* 329, 7466, 602.

Dobscha, S. K., Corson, K., Hickam, D. H., Perrin, N. A., Kraemer, D. F., & Gerrity, M. S. (2006) Depression decision support in primary care: A cluster randomized trial. *Annals of Internal Medicine, 145*(7), 477-487.

Finley, P. R., Rens, H. R., Pont, J. T., Gess, S. L., Louie, C., Bull, S. A., . . . Bero, L. A. (2003). Impact of a collaborative care model on depression in a primary care setting: A randomized controlled trial. *Pharmacotherapy, 23*(9), 1175-1185.

Gensichen, J., von Korff, M., Peitz, M., Muth, C., Beyer, M., Gu?thlin, C., . . . Gerlach, F. M. (2009). Case management for depression by health care assistants in small primary care practices: a cluster randomized trial. *Annals of Internal Medicine, 151*(6), 369-378.

Hedrick, S. C., Chaney, E. F., Felker, B., Liu, C.-F., Hasenberg, N., Heagerty, P., . . . Katon, W. (2003). Effectiveness of collaborative care depression treatment in veterans' affairs primary care. *Journal of General Internal Medicine, 18*(1), 9-16.

Katon, W., Robinson, P., Von, K. M., Lin, E., Bush, T., Ludman, E., . . . Walker, E. (1996). A multi-faceted intervention to improve treatment of depression in primary care. *Archives of General Psychiatry, 53*(10), 924-932.

Katon, W., Von, K. M., Lin, E., Simon, G., Walker, E., Unu¨tzer, J., Bush, T., … Ludman, E. (1999). Stepped collaborative care for primary care patients with persistent symptoms of depression: a randomized trial. *Archives of General Psychiatry, 56*(12), 1109-15.

Katzelnick, D. J., Simon, G. E., Pearson, S. D., Manning, W. G., Helstad, C. P., Henk, H. J., . . . Kobak, K. A. (2000). Randomized trial of a depression management program in high utilizers of medical care. *Archives of Family Medicine, 9*(4), 345-351.

Klinkman, M. S., Bauroth, S., Fedewa, S., Kerber, K., Kuebler, J., Adman, T., & Sen, A. (2010). Long-term clinical outcomes of care management for chronically depressed primary care patients: A report from the depression in primary care project. *Annals of Family Medicine, 8*(5), 387-396.

Landis, S. E., Gaynes, B. N., Morrissey, J. P., Vinson, N., Ellis, A. R., & Domino, M. E. (2007). Generalist care managers for the treatment of depressed medicaid patients in North Carolina: A pilot study. *BMC Family Practice, 8*(1), 7-11.

Lin, E.H., VonKorff, M., Russo, J., Katon, W., Simon, G.E., Unutzer, J., . . . Ludman, E. (2000). Can depression treatment in primary care reduce disability? A stepped care approach. *Archives of Family Medicine, 9*(10), 1052-1058.

Menchetti, M., Sighinolfi, C., Di Michele, V., Peloso, P., Nespeca, C., Bandieri, P.V., . . . Berardi, D. (2013). Effectiveness of collaborative care for depression in Italy. A randomized controlled trial. *General Hospital Psychiatry, 35*(6), 579-586.

Richards, D. A., Lovell, K., Gilbody, S., Gask, L., Torgerson, D., Barkham, M., . . . Richardson, R. (2008). Collaborative care for depression in UK primary care: A randomized controlled trial. *Psychological Medicine, 38*(2), 279-287.

Richards, D. A., Hill, J. J., Gask, L., Lovell, K., Chew-Graham, C., Bower, P., . . . Barkham, M. (2013). Clinical effectiveness of collaborative care for depression in UK primary care (CADET): Cluster randomised controlled trial. *British Medical Journal* (Clinical Research Ed.), 347.

Rost, K., Nutting, P., Smith, J., Werner, J., & Duan, N. (2001). Improving Depression Outcomes in Community Primary Care Practice. A Randomized Trial of the QuEST Intervention. *Journal of General Internal Medicine, 16*(3), 143-149.

Schoenbaum, M., Unutzer, J., Sherbourne, C., Duan, N., Rubenstein, L. V., Miranda, J., . . . Wells, K. (2001). Cost-effectiveness of practice-initiated quality improvement for depression: results of a randomized controlled trial. *Jama : the Journal of the American Medical Association, 286*(11), 1325-30.

Shippee, N. D., Shah, N. D., Angstman, K. B., DeJesus, R. S., Wilkinson, J. M., Bruce, S. M., & Williams, M. D. (2013). Impact of collaborative care for depression on clinical, functional, and work outcomes: A practice-based evaluation. *The Journal of Ambulatory Care Management, 36*(1),13-23

Simon, G. E., VonKorff, M., Rutter, C., & Wagner, E. (2000). Randomised trial of monitoring, feedback, and management of care by telephone to improve treatment of depression in primary care. *British Medical Journal, 320*(7234), 550-554.

Simon, G. E., Ludman, E. J., Tutty, S., Operskalski, B., & Von, K. M. (2004). Telephone psychotherapy and telephone care management for primary care patients starting antidepressant treatment: a randomized controlled trial. *Journal of the American Medical Association, 292*(8), 935-42.

Smit, A., Kluiter, H., Conradi, H. J., van der Meer, K., Tiemens, B. G., Jenner, J. A., . . . Ormel, J. (2006). Short-term effects of enhanced treatment for depression in primary care: Results from a randomized controlled trial. *Psychological Medicine, 36*(1), 15-26.

Swindle, R. W., Rao, J. K., Helmy, A., Plue, L., Zhou, X. H., Eckert, G. J., & Weinberger, M. (2003). Integrating clinical nurse specialists into the treatment of primary care patients with depression. *International Journal of Psychiatry in Medicine, 33*(1), 17-37.

Uebelacker, L. A., Marootian, B. A., Tigue, P., Haggarty, R., Primack, J. M., & Miller, I. W. (2011). Telephone depression care management for Latino Medicaid health plan members: A pilot randomized controlled trial. *The Journal of Nervous and Mental Disease, 199*(9), 678-683.

Wells, K. B., Sherbourne, C., Schoenbaum, M., Duan, N., Meredith, L., Unu?tzer, J., . . . Rubenstein, L. V. (2000). Impact of disseminating quality improvement programs for depression in managed primary care: a randomized controlled trial. *JAMA : The Journal of the American Medical Association, 283*(2), 212-220.

# Collaborative primary care for depression with comorbid medical conditions (general adult population)

## Adult Mental Health: Depression

Benefit-cost estimates updated December 2017. Literature review updated December 2016.

Program Description: Collaborative primary care integrates behavioral health into the primary care setting to treat adult patients with all levels of depression (i.e. major or minor depression or dysthymia) and comorbid health conditions including diabetes, heart disease, acute coronary syndrome, hypertension, or stroke. In the collaborative care model, a care manager coordinates with a primary care provider and behavioral health care providers to develop and implement measurement-based treatment plans for individual patients. Care managers can be mental health providers (e.g. psychologists) or non-behavioral health specialists (e.g. registered nurses or social workers). Programs included in this review were intended for adult populations, age 18 and over. All programs were implemented in primary care settings, where patients received collaborative care for 3 to 12 months.

We report separate results for collaborative primary care programs for depression among older adults with comorbid medical conditions.

## Benefit-Cost Summary Statistics Per Participant

### Benefits to:

| | |
|---|---|
| Taxpayers | $2,275 |
| Participants | $3,578 |
| Others | $945 |
| Indirect | $78 |
| Total benefits | $6,877 |
| Net program cost | ($937) |
| Benefits minus cost | $5,939 |

| | |
|---|---|
| Benefit to cost ratio | $7.34 |
| Benefits minus costs | $5,939 |
| Chance the program will produce benefits greater than the costs | 100 % |

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

## Detailed Monetary Benefit Estimates Per Participant

### Benefits from changes to:[1] Benefits to:

| | Participants | Taxpayers | Others[2] | Indirect[3] | Total |
|---|---|---|---|---|---|
| Labor market earnings associated with major depression | $3,329 | $1,512 | $0 | $164 | $5,005 |
| Health care associated with major depression | $249 | $763 | $945 | $381 | $2,338 |
| Adjustment for deadweight cost of program | $0 | $0 | $0 | ($467) | ($467) |
| Totals | $3,578 | $2,275 | $945 | $78 | $6,877 |

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

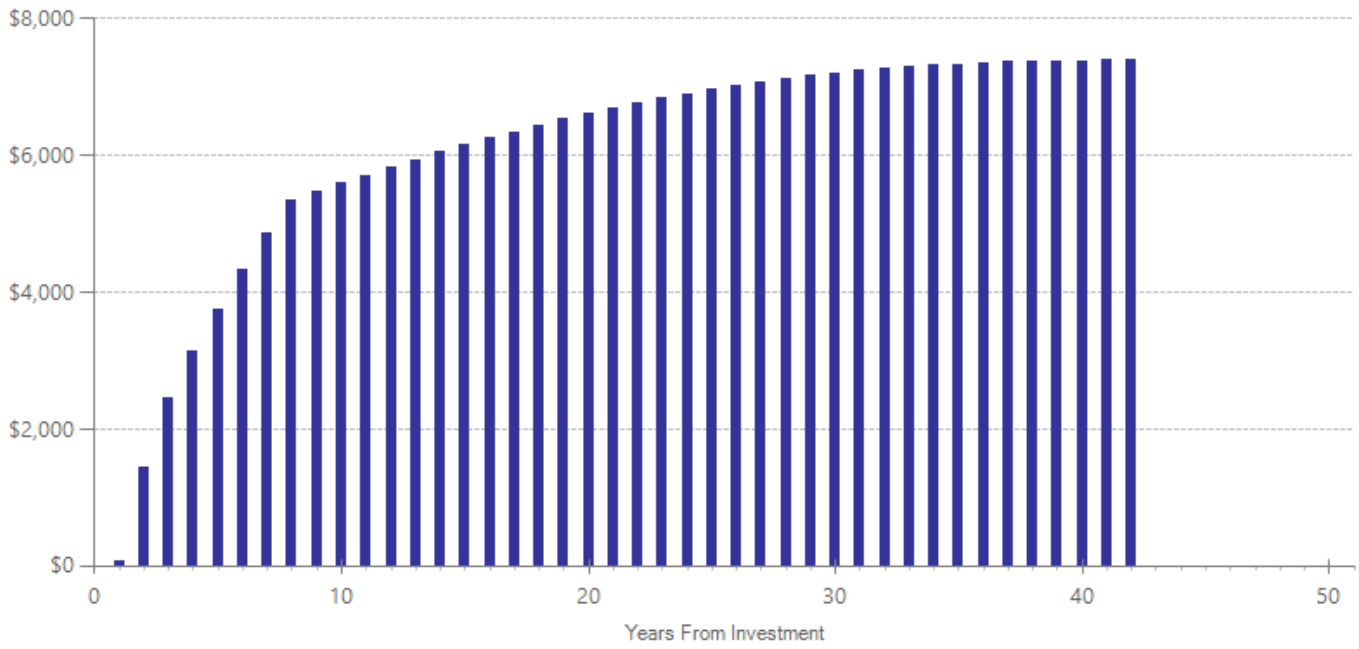
## Detailed Annual Cost Estimates Per Participant

| | Annual cost | Year dollars | Summary | |
|---|---|---|---|---|
| Program costs | $938 | 2016 | Present value of net program costs (in 2016 dollars) | ($937) |
| Comparison costs | $0 | 2016 | Cost range (+ or -) | 15 % |

Treatment cost estimates for this program reflect costs beyond treatment as usual. When available, we use the average cost of the program reported by the studies, weighted by treatment sample sizes. Average program costs were obtained from Davidson et al. (2013), Ell et al. (2010), Katon et al. (2010), and Katon et al. (2004).

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

## Detailed Annual Cost Estimates Per Participant




The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

## Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Blood sugar (HbA1c)^ | 58 | 2 | 242 | -0.151 | 0.163 | 59 | n/a | n/a | n/a | -0.151 | 0.354 |
| Global functioning^ | 58 | 3 | 684 | -0.157 | 0.084 | 59 | n/a | n/a | n/a | -0.157 | 0.061 |
| LDL cholesterol^ | 58 | 1 | 98 | -0.185 | 0.220 | 59 | n/a | n/a | n/a | -0.185 | 0.400 |
| Major depressive disorder | 58 | 12 | 1616 | -0.357 | 0.050 | 59 | -0.186 | 0.061 | 61 | -0.357 | 0.001 |
| Systolic blood pressure^ | 58 | 2 | 133 | -0.274 | 0.178 | 59 | n/a | n/a | n/a | -0.274 | 0.125 |

^WSIPP’s benefit-cost model does not monetize this outcome.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

## Citations Used in the Meta-Analysis


Bogner, H.R., de Vries, H.F., Kaye, E. M., & Morales, K.H. (2013). Pilot trial of a licensed practical nurse intervention for hypertension and depression. *Family Medicine, 45*(5), 323-329.

Coventry, P., Lovell, K., Dickens, C., Bower, P., Chew-Graham, C., McElvenny, D., . . . Gask, L. (2015). Integrated primary care for patients with mental and physical multimorbidity: cluster randomized controlled trial of collaborative care for patients with depression comorbid with diabetes or cardiovascular disease. *BMJ, 350,* h638.

Davidson, K.W., Rieckmann, N., Clemow, L., Schwartz, J. E., Shimbo, D., Medina, V., . . . Burg, M.M. (2010). Enhanced depression care for patients with acute coronary syndrome and persistent depressive symptoms: Coronary psychosocial evaluation studies randomized controlled trial. *Archives of Internal Medicine, 170*(7), 600-608.

Davidson, K. W., Bigger, J. T., Burg, M. M., Duer-Hefele, J., Medina, V., Newman, J. D., . . . Vaccarino, V. (2013). Centralized, stepped, patient preference-based treatment for patients with post-acute coronary syndrome depression: CODIACS vanguard randomized controlled trial. *JAMA Internal Medicine, 173*(11), 997-1004.

Ell, K., Katon, W., Xie, B., Lee, P. J., Kapetanovic, S., Guterman, J., & Chou, C. P. (2010). Collaborative care management of major depression among low-income, predominantly Hispanic subjects with diabetes: A randomized controlled trial. *Diabetes Care, 33*(4), 706-713.

Katon, W., Russo, J., Lin, E. H., Schmittdiel, J., Ciechanowski, P., Ludman, E., . . . Von Korff, M. (2012). Cost-effectiveness of a multicondition collaborative care intervention: a randomized controlled trial. *Archives of General Psychiatry, 69*(5), 506-514.

Katon, W.J., Von Korff, M., Lin, E. H., Simon, G., Ludman, E., Russo, J., . . . Bush, T. (2004). The Pathways Study: A randomized trial of collaborative care in patients with diabetes and depression. *Archives of General Psychiatry, 61*(10), 1042-1049.

Katon, W.J., Lin, E.H., Von, K.M., Ciechanowski, P., Ludman, E. J., Young, B., . . . McCulloch, D. (2010). Collaborative care for patients with depression and chronic illnesses. *The New England Journal of Medicine, 363*(27), 2611-2620.

Morgan, M.A.J., Coates, M.J., Dunbar, J.A., Schlicht, K., Reddy, P., & Fuller, J. (2013). The TrueBlue model of collaborative care using practice nurses as case managers for depression alongside diabetes or heart disease: A randomised trial. *British Medical Journal Open, 3*(1).

Rollman, B.L., Belnap, B.H., LeMenager, M.S., Mazumdar, S., Houck, P.R., Counihan, P.J., . . . Reynolds, C.F. (2009). Telephone-delivered collaborative care for treating post-CABG depression: A randomized controlled trial. *JAMA : The Journal of the American Medical Association, 302*(19), 2095-2103.

Simon, G.E., Katon, W.J., Lin, E.H., Rutter, C., Manning, W.G., Von, K.M., . . . Young, B.A. (2007). Cost-effectiveness of systematic depression treatment among people with diabetes mellitus. *Archives of General Psychiatry, 64*(1), 65-72.

Vera, M., Perez-Pedrogo, C., Huertas, S.E., Reyes-Rabanillo, M.L., Juarbe, D., Huertas, A., . . . Chaplin, W. (2010). Collaborative care for depressed patients with chronic medical conditions: A randomized trial in Puerto Rico. *Psychiatric Services, 61*(2), 144-150.

Williams, L.S., Kroenke, K., Bakas, T., Plue, L.D., Brizendine, E., Tu, W., & Hendrie, H. (2007). Care management of poststroke depression: A randomized, controlled trial. *Stroke, 38*(3), 998-1003.

Wu, B., Jin, H., Vidyanti, I., Lee, P.J., Ell, K., & Wu, S. (2014). Collaborative depression care among Latino patients in diabetes disease management, Los Angeles, 2011-2013. *Preventing Chronic Disease, 11,* E148.

# Collaborative primary care for depression with comorbid medical conditions (older adult population)

## Adult Mental Health: Depression

Benefit-cost estimates updated December 2017. Literature review updated December 2016.

Program Description: Collaborative primary care integrates behavioral health into the primary care setting to treat older adult patients, age 50 and over, with all levels of depression (i.e. major or minor depression or dysthymia) and comorbid health conditions including diabetes and hypertension. In the collaborative care model, a care manager coordinates with a primary care provider and behavioral health care providers to develop and implement measurement-based treatment plans for individual patients. Care managers can be mental health providers (e.g. psychologists) or non-behavioral health specialists (e.g. registered nurses or social workers). Programs included in this review were intended for older adult populations. All programs were implemented in primary care settings, where patients received collaborative care for 1 to 12 months.

We report separate results for collaborative primary care programs for depression among adults with comorbid medical conditions.

## Benefit-Cost Summary Statistics Per Participant

### Benefits to:

| | |
|---|---|
| Taxpayers | $692 |
| Participants | $225 |
| Others | $856 |
| Indirect | $194 |
| Total benefits | $1,968 |
| Net program cost | ($575) |
| Benefits minus cost | $1,392 |

| | |
|---|---|
| Benefit to cost ratio | $3.42 |
| Benefits minus costs | $1,392 |
| Chance the program will produce benefits greater than the costs | 82 % |

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

## Detailed Monetary Benefit Estimates Per Participant

| Benefits from changes to:[1] | Benefits to: | | | | |
|---|---|---|---|---|---|
| | Participants | Taxpayers | Others[2] | Indirect[3] | Total |
| Labor market earnings associated with major depression | $0 | $0 | $0 | $135 | $135 |
| Health care associated with major depression | $225 | $692 | $856 | $347 | $2,120 |
| Adjustment for deadweight cost of program | $0 | $0 | $0 | ($287) | ($287) |
| Totals | $225 | $692 | $856 | $194 | $1,968 |

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

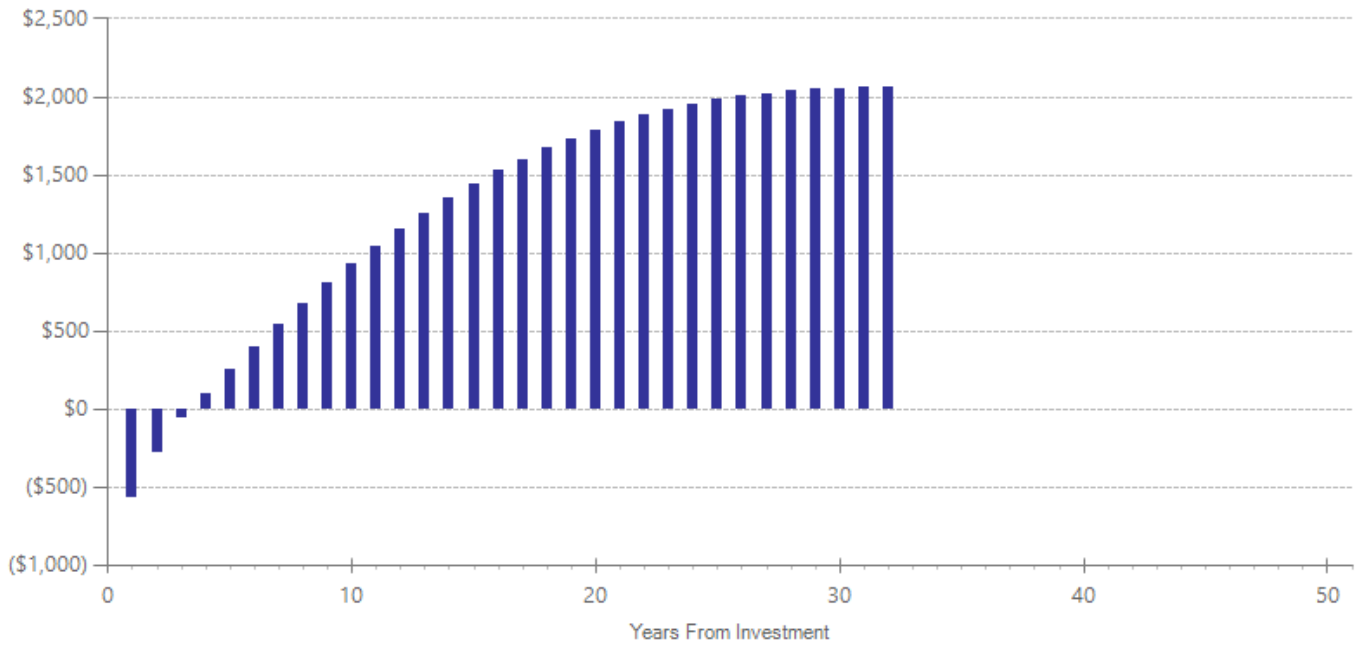
## Detailed Annual Cost Estimates Per Participant

| | Annual cost | Year dollars | Summary | |
|---|---|---|---|---|
| Program costs | $576 | 2016 | Present value of net program costs (in 2016 dollars) | ($575) |
| Comparison costs | $0 | 2016 | Cost range (+ or -) | 20 % |

Treatment cost estimates for this program reflect costs beyond treatment as usual. Costs are based on a weighted average of per-participant costs for included studies. Based on Blanchard et al. (1995), Chew-Graham et al. (2007), and McCusker et al. (2008), we estimate provider hours, apply the mean hourly wage estimate for Washington State reported by the Bureau of Labor Statistics (September 2016) for the appropriate provider, and increase wages by a factor of 1.441 to account for the cost of employee benefits. These studies average 6.5 behavioral health nurse hours per participant. We use reported per-participant costs from Unutzer et al. (2002).

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

## Detailed Annual Cost Estimates Per Participant




The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

## Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Blood sugar (HbA1c)^ | 68 | 1 | 128 | -0.020 | 0.162 | 69 | n/a | n/a | n/a | -0.020 | 0.902 |
| Major depressive disorder | 68 | 3 | 262 | -0.483 | 0.110 | 69 | -0.251 | 0.135 | 71 | -0.483 | 0.001 |

^WSIPP’s benefit-cost model does not monetize this outcome.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

## Citations Used in the Meta-Analysis


Bogner, H.R., & de Vries, H.F. (2008). Integration of depression and hypertension treatment: A pilot randomized controlled trial. *Annals of Family Medicine, 6*(4), 295-301.

Bogner, H.R., & de Vries, H.F. (2010). Integrating type 2 diabetes mellitus and depression treatment among African Americans; a randomized controlled pilot trial. *The Diabetes Educator, 36*(2), 284-292.

Williams, J.W.J., Katon, W., Lin, E.H., Noel, P.H., Worchel, J., Cornell, J., . . . IMPACT Investigators. (2004). The effectiveness of depression care management on diabetes-related outcomes in older patients. *Annals of Internal Medicine, 140*(12), 1015-24.

# Collaborative primary care for depression (older adult population)

## Adult Mental Health: Depression

Benefit-cost estimates updated December 2017. Literature review updated December 2016.

Program Description: Collaborative primary care for depression integrates behavioral health into the primary care setting to treat older adult patients, aged 60 or over, with major or minor depression, dysthymia, or subthreshold depression. In the collaborative care model, a care manager coordinates with a primary care provider and behavioral health care providers to develop and implement measurement-based treatment plans for individual patients. Care managers can be mental health providers (e.g. psychologists) or non-behavioral health specialists (e.g. registered nurses or social workers). All programs were implemented in primary care settings, where older adult patients received collaborative care for 3 to 12 months.

We report separate results for collaborative primary care programs for depression among adults.

## Benefit-Cost Summary Statistics Per Participant

### Benefits to:

| | |
|---|---|
| Taxpayers | $481 |
| Participants | $156 |
| Others | $595 |
| Indirect | $43 |
| Total benefits | $1,275 |
| Net program cost | ($577) |
| Benefits minus cost | $698 |

| | |
|---|---|
| Benefit to cost ratio | $2.21 |
| Benefits minus costs | $698 |
| Chance the program will produce benefits greater than the costs | 78 % |

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

## Detailed Monetary Benefit Estimates Per Participant

### Benefits from changes to:[1] Benefits to:

| | Participants | Taxpayers | Others[2] | Indirect[3] | Total |
|---|---|---|---|---|---|
| Labor market earnings associated with major depression | $0 | $0 | $0 | $90 | $90 |
| Health care associated with major depression | $156 | $481 | $595 | $240 | $1,473 |
| Adjustment for deadweight cost of program | $0 | $0 | $0 | ($288) | ($288) |
| Totals | $156 | $481 | $595 | $43 | $1,275 |

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

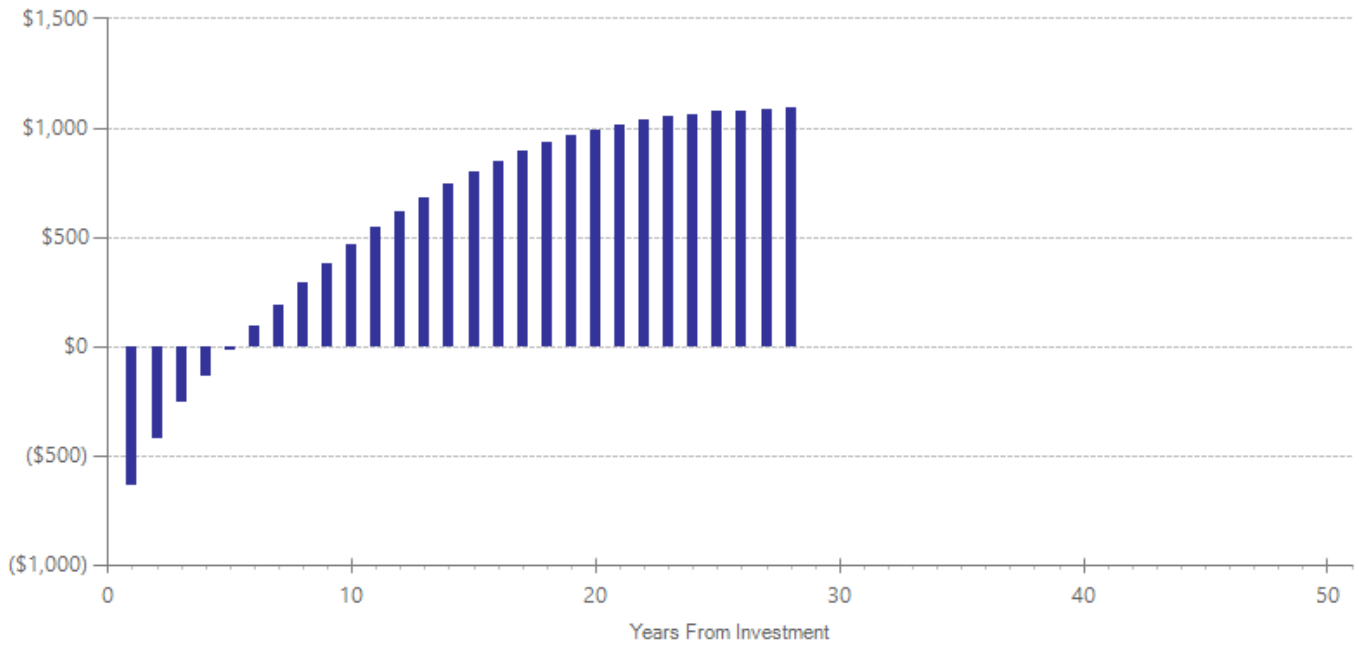
## Detailed Annual Cost Estimates Per Participant

| | Annual cost | Year dollars | Summary | |
|---|---|---|---|---|
| Program costs | $577 | 2016 | Present value of net program costs (in 2016 dollars) | ($577) |
| Comparison costs | $0 | 2016 | Cost range (+ or -) | 15 % |

Treatment cost estimates for this program reflect costs beyond treatment as usual. Costs are based on a weighted average of per-participant costs for included studies. We use reported per-participant costs from Unutzer et al., 2002. For the other studies (Blanchard et al., 1995; Chew-Graham et al., 2007; and McCusker et al. 2008), we estimate provider hours, apply the mean hourly wage estimate for Washington State reported by the Bureau of Labor Statistics (September 2016) for the appropriate provider, and increase wages by a factor of 1.441 to account for the cost of employee benefits. These studies average 6.5 behavioral health nurse hours per participant.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

## Detailed Annual Cost Estimates Per Participant




The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

## Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Major depressive disorder | 72 | 5 | 1358 | -0.379 | 0.056 | 73 | -0.197 | 0.069 | 75 | -0.438 | 0.001 |
| Suicidal ideation^ | 72 | 2 | 1154 | -0.328 | 0.100 | 73 | -0.170 | 0.123 | 75 | -0.363 | 0.001 |

^WSIPP’s benefit-cost model does not monetize this outcome.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

## Citations Used in the Meta-Analysis


Blanchard, M.R., Waterreus, A., & Mann, A.H. (1995). The effect of primary care nurse intervention upon older people screened as depressed. *International Journal of Geriatric Psychiatry, 10*(4), 289-298.

Bruce, M.L., Ten, H.T.R., Reynolds, C.F., Katz, I.I., Schulberg, H.C., Mulsant, B.H., . . . Alexopoulos, G.S. (2004). Reducing suicidal ideation and depressive symptoms in depressed older primary care patients: a randomized controlled trial. *Jama, 291*(9), 1081-1091.

Chew-Graham, C.A., Lovell, K., Roberts, C., Baldwin, R., Morley, M., Burns, A., . . . Burroughs, H. (2007). A randomized controlled trial to test the feasibility of a collaborative care model for the management of depression in older people. *The British Journal of General Practice, 57*(538), 364-370.

Gallo, J.J., Bogner, H.R., Morales, K.H., Post, E.P., Lin, J.Y., & Bruce, M.L. (2007). The effect of a primary care practice-based depression intervention on mortality in older adults: a randomized trial. *Annals of Internal Medicine, 146*(10), 689-98.

McCusker, J., Sewitch, M., Cole, M., Yaffe, M., Cappeliez, P., Dawes, M., . . . Latimer, E. (2008). Project Direct: pilot study of a collaborative intervention for depressed seniors. *Canadian Journal of Community Mental Health, 27*(2), 201-218.

Unutzer, J., Katon, W., Callahan, C.M., Williams, J.W., Hunkeler, E., Harpole, L., . . . Lin, E.H.B. (2002). Collaborative care management of late-life depression in the primary care setting: A randomized controlled trial. *Journal- American Medical Association, 288,* 2836-2845.

Unutzer, J., Tang, L., Oishi, S., Katon, W., Williams, J. W., Hunkeler, E., . . . Langston, C. (2006). Reducing suicidal ideation in depressed older primary care patients. *Journal of the American Geriatrics Society, 54*(10), 1550-1556.

# Cognitive behavioral therapy (CBT) for adult posttraumatic stress disorder (PTSD)

## Adult Mental Health: Trauma

Benefit-cost estimates updated December 2017. Literature review updated September 2016.

Program Description: Treatments in this review include several components, such as psycho-education about posttraumatic stress disorder (PTSD), relaxation and other techniques for managing physiological and emotional stress, exposure (the gradual desensitization to memories of the traumatic event), and cognitive restructuring of inaccurate or unhelpful thoughts. The studies in this review employed a number of trauma-specific treatment models including Prolonged Exposure Therapy (PE), Narrative Exposure Therapy (NET), and Cognitive Processing Therapy (CPT). In the studies in this review, treatments provided between 1-45 therapeutic hours per client in individual or group settings. Studies were conducted on all continents and subjects had experienced one of a variety of types of trauma including terrorism, sexual or physical assault, domestic violence, war, political detention, and automobile accidents.

### Benefit-Cost Summary Statistics Per Participant

Benefits to:

| | | | |
|---|---|---|---|
| Taxpayers | $15,791 | Benefit to cost ratio | $88.11 |
| Participants | $27,660 | Benefits minus costs | $49,184 |
| Others | $4,695 | Chance the program will produce benefits greater than the costs | 100 % |
| Indirect | $1,602 | | |
| Total benefits | $49,748 | | |
| Net program cost | ($565) | | |
| Benefits minus cost | $49,184 | | |

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

### Detailed Monetary Benefit Estimates Per Participant

Benefits from changes to:[1] — Benefits to:

| | Participants | Taxpayers | Others[2] | Indirect[3] | Total |
|---|---|---|---|---|---|
| Labor market earnings associated with PTSD | $26,425 | $12,000 | $0 | $0 | $38,425 |
| Health care associated with PTSD | $1,235 | $3,791 | $4,695 | $1,884 | $11,605 |
| Adjustment for deadweight cost of program | $0 | $0 | $0 | ($282) | ($282) |
| Totals | $27,660 | $15,791 | $4,695 | $1,602 | $49,748 |

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

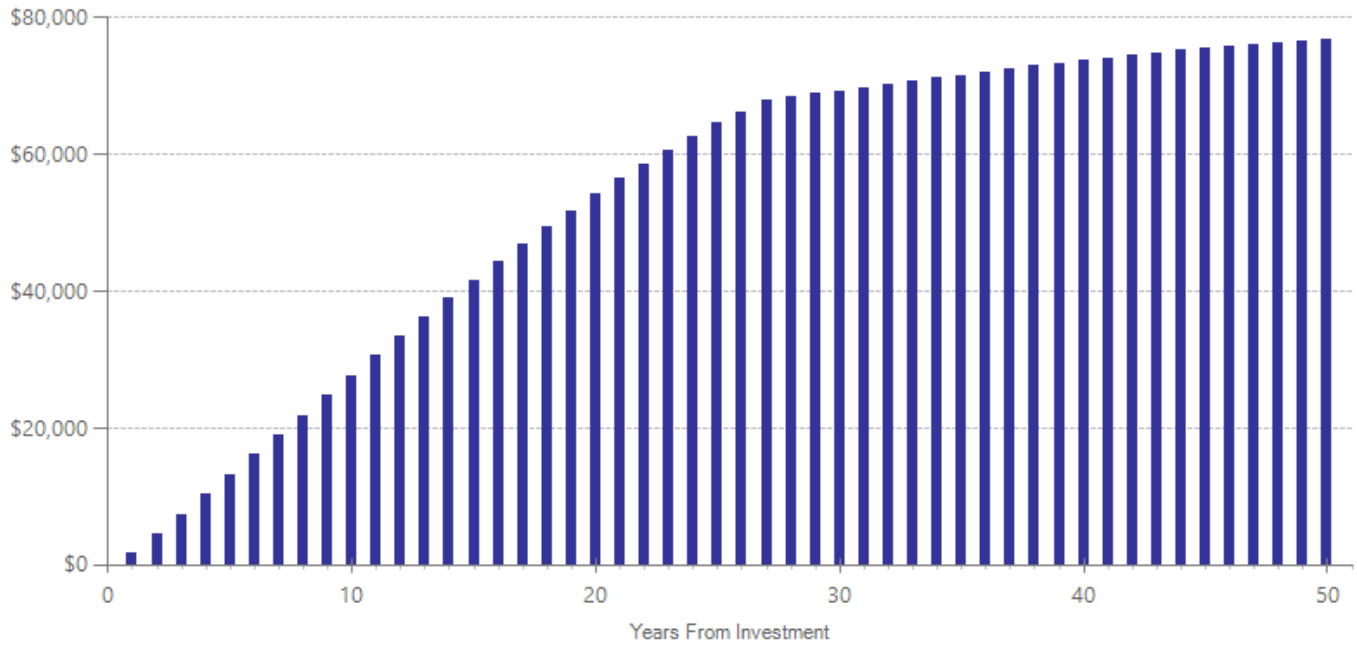
## Detailed Annual Cost Estimates Per Participant

| | Annual cost | Year dollars | Summary | |
|---|---|---|---|---|
| Program costs | $1,444 | 2014 | Present value of net program costs (in 2016 dollars) | ($565) |
| Comparison costs | $814 | 2008 | Cost range (+ or -) | 15 % |

These therapies can take place over 1-45 weekly sessions; total length of treatment is less than one year. The per-participant cost of treatment by modality (group/individual) was weighted by the treatment Ns reported in the studies. Cost per session is $40.04/session for group and $122.25 for individual therapy (2015 dollars). This rate is based on actuarial tables reported in Mercer (2014) Behavioral Health Data Book for the State of Washington For Rates Effective January 1, 2015. The comparison group costs are from the average Medicaid expenditures for PTSD treatment in Washington in 2009.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

## Detailed Annual Cost Estimates Per Participant

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|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Anxiety disorder | 39 | 17 | 355 | -0.620 | 0.087 | 40 | -0.620 | 0.087 | 41 | -0.948 | 0.001 |
| Employment^^ | 39 | 1 | 12 | 0.348 | 0.530 | 40 | 0.348 | 0.530 | 41 | 0.821 | 0.125 |
| Major depressive disorder | 39 | 49 | 1389 | -0.433 | 0.046 | 40 | -0.433 | 0.046 | 41 | -0.717 | 0.001 |
| Post-traumatic stress | 39 | 70 | 2361 | -0.539 | 0.047 | 40 | -0.539 | 0.047 | 41 | -0.950 | 0.001 |
| Substance misuse^ | 39 | 1 | 55 | -0.164 | 0.366 | 40 | -0.164 | 0.366 | 41 | -0.261 | 0.477 |

^WSIPP's benefit-cost model does not monetize this outcome.

^^WSIPP does not include this outcome when conducting benefit-cost analysis for this program.

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## Citations Used in the Meta-Analysis


Alghamdi, M., Hunt, N., & Thomas, S. (2015). The effectiveness of Narrative Exposure Therapy with traumatised firefighters in Saudi Arabia: A randomized controlled study. *Behaviour Research and Therapy, 66,* 64-71.

Asukai, N., Saito, A., Tsuruta, N., Kishimoto, J., & Nishikawa, T. (2010). Efficacy of exposure therapy for Japanese patients with posttraumatic stress disorder due to mixed traumatic events: A randomized controlled study. *Journal of Traumatic Stress, 23*(6), 744-750.

Basoglu, M., Salcioglu, E., & Livanou, M. (2007). A randomized controlled study of single-session behavioural treatment of earthquake-related post-traumatic stress disorder using an earthquake simulator. *Psychological Medicine, 37*(2), 203-13.

Basoglu, M., Salcioglu, E., Livanou, M., Kalender, D., & Acar, G. (2005). Single-session behavioral treatment of earthquake-related posttraumatic stress disorder: a randomized waiting list controlled trial. *Journal of Traumatic Stress, 18*(1), 1-11.

Beck, J.G., Coffey, S.F., Foy, D.W., Keane, T.M., & Blanchard, E.B. (2009). Group cognitive behavior therapy for chronic posttraumatic stress disorder: An initial randomized pilot study. *Behavior Therapy, 40*(1), 82-92.

Bichescu, D., Neuner, F., Schaer, M., Elbert, T. (2007) Narrative exposure therapy for political imprisonment-relatedd chronic posttraumatic stress disorder and depression. *Behaviour Research and Therapy, 45*(9), 2212-2220.

Brom, D., Kleber, R.J., & Defares, P.B. (1989). Brief psychotherapy for posttraumatic stress disorders. *Journal of Consulting and Clinical Psychology, 57*(5), 607-612.

Bryant, R.A., Ekasawin, S., Chakrabhand, S., Suwanmitri, S., Duangchun, O., & Chantaluckwong, T. (2011). A randomized controlled effectiveness trial of cognitive behavior therapy for post-traumatic stress disorder in terrorist-affected people in Thailand. *World Psychiatry, 10*(3), 205-209.

Bryant, R.A., Moulds, M.L., Guthrie, R.M., Dang, S.T., & Nixon, R.D.V. (2003). Imaginal exposure alone and imaginal exposure with cognitive restructuring in treatment of posttraumatic stress disorder. *Journal of Consulting and Clinical Psychology, 71*(4), 706-712.

Castillo, D.T., Chee, C.L., Nason, E., Keller, J., C'de, B.J., Qualls, C., Fallon, S.K., . . . Keane, T.M. (2016). Group-delivered cognitive/exposure therapy for PTSD in women veterans: A randomized controlled trial. *Psychological Trauma: Theory, Research, Practice, and Policy, 8*(3), 404.

Chard, K.M. (2005). An evaluation of cognitive processing therapy for the treatment of posttraumatic stress disorder related to childhood sexual abuse. *Journal of Consulting and Clinical Psychology, 73*(5), 965-971.

Cottraux, J., Note, I., Yao, S.N., de Mey-Guillard, C., Bonasse, F., Djamoussian, D., Mollard, E., ... Chen, Y. (2008). Randomized controlled comparison of cognitive behavior therapy with Rogerian Supportive Therapy in chronic post-traumatic stress disorder: A 2-year follow-up. *Psychotherapy and Psychosomatics, 77*(2), 101-110.

Difede, J., Malta, L.S., Best, S., Henn-Haase, C., Metzler, T., Bryant, R., & Marmar, C. (2007). A randomized controlled clinical treatment trial for World Trade Center attack-related PTSD in disaster workers. *The Journal of Nervous and Mental Disease, 195*(10), 861-5.

Dorrepaal, E., Thomaes, K., Smit, J.H., van Balkom, A.J., Veltman, D.J., Hoogendoorn, A.W., & Draijer, N. (2012). Stabilizing group treatment for complex posttraumatic stress disorder related to child abuse based on psychoeducation and cognitive behavioural therapy: a multisite randomized controlled trial. *Psychotherapy and Psychosomatics, 81*(4), 217-25.

Duffy, M., Gillespie, K., & Clark, D.M. (2007). Post-traumatic stress disorder in the context of terrorism and other civil conflict in Northern Ireland: randomised controlled trial. *BMJ, 334*(7604), 1147.

Dunne, R.L., Kenardy, J., & Sterling, M. (2012). A randomized controlled trial of cognitive-behavioral therapy for the treatment of PTSD in the context of chronic whiplash. *The Clinical Journal of Pain, 28*(9), 755-765.

Echeburua, E., Corral, P.D., Zubizarreta, I., & Sarasua, B. (1997). Psychological treatment of chronic posttraumatic stress disorder in victims of sexual aggression. *Behavior Modification, 21*(4), 433-456.

Ehlers, A., Clark, D.M., Hackmann, A., McManus, F., Fennell, M., Herbert, C., & Mayou, R. (2003). A randomized controlled trial of cognitive therapy, a self-help booklet, and repeated assessments as early interventions for posttraumatic stress disorder. *Archives of General Psychiatry, 60*(10), 1024-1032.

Ehlers, A., Clark, D.M., Hackmann, A., McManus, F., & Fennell, M. (2005). Cognitive therapy for post-traumatic stress disorder: development and evaluation. *Behaviour Research and Therapy, 43*(4), 413-431.

Ehlers, A., Hackmann, A., Grey, N., Wild, J., Liness, S., Albert, I., Deale, A., ... Clark, D.M. (2014). A randomized controlled trial of 7-day intensive and standard weekly cognitive therapy for PTSD and emotion-focused supportive therapy. *The American Journal of Psychiatry, 171*(3), 294-304.

Fecteau, G., & Nicki, R. (1999). Cognitive behavioural treatment of post traumatic stress disorder after motor vehicle accident. *Behavioural and Cognitive Psychotherapy, 27*(3), 201-214.

Feske, U. (2008). Treating low-income and minority women with posttraumatic stress disorder: A pilot study comparing prolonged exposure and treatment as usual conducted by community therapists. *Journal of Interpersonal Violence, 23*(8), 1027-1040.

Foa, E.B., Rothbaum, B.O., Riggs, D.S., & Murdock, T.B. (1991). Treatment of posttraumatic stress disorder in rape victims: A comparison between cognitive-behavioral procedures and counseling. *Journal of Consulting and Clinical Psychology, 59*(5), 715-723.

Foa, E.B., Dancu, C.V., Hembree, E.A., Jaycox, L.H., Meadows, E.A., Street, G.P. (1999). A comparison of exposure therapy, stress inoculation therapy, and their combination for reducing posttraumatic stress disorder in female assault victioms. *Journal of Consulting and Clinical Psychology, 67*(2), 194-200

Foa, E.B., Hembree, E.A., Cahill, S.P., Rauch, S.A.M., Riggs, D.S., Feeny, N.C., & Yadin, E. (2005). Randomized trial of prolonged exposure for posttraumatic stress disorder with and without cognitive restructuring: Outcome at academic and community clinics. *Journal of Consulting and Clinical Psychology, 73*(5), 953-964.

Forbes, D., Lloyd, D., Nixon, R.D.V., Elliott, P., Varker, T., Perry, D., Bryant, R.A., . . . Creamer, M. (2012). A multisite randomized controlled effectiveness trial of cognitive processing therapy for military-related posttraumatic stress disorder. *Journal of Anxiety Disorders, 26*(3), 442-452.

Gersons, B.P., Carlier, I.V., Lamberts, R.D., & van der Kolk, B.A. (2000). Randomized clinical trial of brief eclectic psychotherapy for police officers with posttraumatic stress disorder. *Journal of Traumatic Stress, 13*(2), 333-347.

Hinton, D.E., Pollack, M.H., Hofmann, S.G., & Otto, M.W. (2009). Mechanisms of efficacy of CBT for Cambodian refugees with PTSD: Improvement in emotion regulation and orthostatic blood pressure response. *CNS Neuroscience and Therapeutics, 15*(3), 255-263.

Hinton, D.E., Hofmann, S.G., Rivera, E., Otto, M.W., & Pollack, M.H. (2011). Culturally adapted CBT (CA-CBT) for Latino women with treatment-resistant PTSD: A pilot study comparing CA-CBT to applied muscle relaxation. *Behaviour Research and Therapy, 49*(4), 275-280.

Hinton, D.E., Chhean, D., Pich, V., Safren, S.A., Hofmann, S.G., & Pollack, M.H. (2005). A randomized controlled trial of cognitive-behavior therapy for Cambodian refugees with treatment-resistant PTSD and panic attacks: a cross-over design. *Journal of Traumatic Stress, 18*(6), 617-29.

Hollifield, M., Sinclair-Lian, N., Warner, T.D., & Hammerschlag, R. (2007). Acupuncture for posttraumatic stress disorder: a randomized controlled pilot trial. *The Journal of Nervous and Mental Disease, 195*(6), 504-13.

Johnson, D.M., Zlotnick, C., & Perez, S. (2011). Cognitive behavioral treatment of PTSD in residents of battered women's shelters: Results of a randomized clinical trial. *Journal of Consulting and Clinical Psychology, 79*(4), 542-551.

Kent, M., Davis, M.C., Stark, S.L., & Stewart, L.A. (2011). A resilience-oriented treatment for posttraumatic stress disorder: Results of a preliminary randomized clinical trial. *Journal of Traumatic Stress, 24*(5), 591-595.

Krakow, B., Hollifield, M., Johnston, L., Koss, M., Schrader, R., Warner, T. D., Tandberg, D., . . . Prince, H. (2001). Imagery rehearsal therapy for chronic nightmares in sexual assault survivors with posttraumatic stress disorder: a randomized controlled trial. *Journal of the American Medical Association, 286*(5), 537-45.

Kubany, E.S., Hill, E.E., & Owens, J.A. (2003). Cognitive trauma therapy for battered women with PTSD: preliminary findings. *Journal of Traumatic Stress, 16*(1), 81-91.

Kubany, E.S., Hill, E.E., Owens, J.A., Iannce-Spencer, C., McCaig, M.A., Tremayne, K.J., & Williams, P.L. (2004). Cognitive trauma therapy for battered women with PTSD (CTT-BW). *Journal of Consulting and Clinical Psychology, 72*(1), 3-18.

Lindauer, R.J., Gersons, B.P., van Meijil, E.P., Blom, K., Carlier, I.V., Vrijlandt, I., & Olff, M. (2005). Effects of brief eclectic psychotherapy in patients with posttraumatic stress disorder: randomized clinical trial. *Journal of Traumatic Stress, 18*(3), 205-12.

Maercker, A., Zoellner, T., Menning, H., Rabe, S., Karl, A. (2006). Dresden PTSD treatment study: randomized controlled trial of motor vehicle accident survivors. *BMC Psychiatry, 6*(1), 29-36.

Markowitz, J.C., Petkova, E., Neria, Y., Van Meter P.E., Zhao, Y., Hembree, E., Lovell, K., . . . Marshall, R.D. (2015). Is exposure necessary? A randomized clinical trial of interpersonal psychotherapy for PTSD. *American Journal of Psychiatry, 172*(5), 430-440.

Marks, I., Lovell, K., Noshirvani, H., Livanou, M., & Thrasher, S. (1998). Treatment of posttraumatic stress disorder by exposure and/or cognitive restructuring: a controlled study. *Archives of General Psychiatry, 55*(4), 317-25.

Maxwell, K., Callahan, J.L., Holtz, P., Janis, B.M., Gerber, M.M., & Connor, D.R. (2015). Comparative study of group treatments for posttraumatic stress disorder. *Psychotherapy.*

McDonagh, A., Friedman, M., McHugo, G., Ford, J., Sengupta, A., Mueser, K., Demment, C.C., ... Descamps, M. (2005). Randomized trial of cognitive-behavioral therapy for chronic posttraumatic stress disorder in adult female survivors of childhood sexual abuse. *Journal of Consulting and Clinical Psychology, 73*(3), 515-524.

Mills, K.L., Teesson, M., Back, S.E., Brady, K.T., Baker, A.L., Hopwood, S., Sannibale, C., . . . Ewer, P.L. (2012). Integrated exposure-based therapy for co-occurring posttraumatic stress disorder and substance dependence: a randomized controlled trial. *Jama, 308*(7), 690-9.

Monson, C.M., Schnurr, P.P., Resick, P.A., Friedman, M.J., Young-Xu, Y., & Stevens, S.P. (2006). Cognitive processing therapy for veterans with military-related posttraumatic stress disorder. *Journal of Consulting and Clinical Psychology, 74*(5), 898-907.

Monson, C.M., Fredman, S.J., Macdonald, A., Pukay-Martin, N.D., Resick, P.A., & Schnurr, P.P. (2012). Effect of cognitive-behavioral couple therapy for PTSD: a randomized controlled trial. *Jama, 308*(7), 700-9.

Mueser, K.T., Rosenberg, S.D., Xie, H., Jankowski, M.K., Bolton, E.E., Lu, W., Hamblen, J.L., . . . Wolfe, R. (2008). A randomized controlled trial of cognitive-behavioral treatment for posttraumatic stress disorder in severe mental illness. *Journal of Consulting and Clinical Psychology, 76*(2), 259-71.

Mueser, K.T., Gottlieb, J.D., Xie, H., Lu, W., Yanos, P.T., Rosenberg, S.D., Silverstein, S.M., . . . McHugo, G.J. (2015). Evaluation of cognitive restructuring for post-traumatic stress disorder in people with severe mental illness. *The British Journal of Psychiatry : the Journal of Mental Science, 206*(6), 501-8.

Nacasch, N., Tzur, D., Fostick, L., Dinstein, Y., Polliack, M., Zohar, J., Foa, E.B., . . . Huppert, J.D. (2011). Prolonged exposure therapy for combat- and terror-related posttraumatic stress disorder: A randomized control comparison with treatment as usual. *Journal of Clinical Psychiatry, 72*(9), 1174-1180.

Neuner, F., Schauer, M., Klaschik, C., Karunakara, U., & Elbert, T. (2004). A comparison of narrative exposure therapy, supportive counseling, and psychoeducation for treating posttraumatic stress disorder in an African refugee settlement. *Journal of Consulting and Clinical Psychology, 72*(4), 579-587.

Neuner, F., Ertl, V., Odenwald, M., Schauer, E., Elbert, T., & Onyut, P.L. (2008). Treatment of posttraumatic stress disorder by trained lay counselors in an African refugee settlement: A randomized controlled trial. *Journal of Consulting and Clinical Psychology, 76*(4), 686-694.

Neuner, F., Kurreck, S., Ruf, M., Odenwald, M., Elbert, T., & Schauer, M. (2010). Can asylum-seekers with posttraumatic stress disorder be successfully treated? A randomized controlled pilot study. *Cognitive Behaviour Therapy, 39*(2), 81-91.

Power, K., McGoldrick, T., Brown, K., Buchanan, R., Sharp, D., Swanson, V., & Karatzias, A. (2002). A controlled comparison of eye movement desensitization and reprocessing versus exposure plus cognitive restructuring versus waiting list in the treatment of post-traumatic stress disorder. *Clinical Psychology & Psychotherapy, 9*(5), 299-318.

Resick, P.A., & Schnicke, M.K.. (1992). Cognitive processing therapy for sexual assault victims. *Journal of Consulting and Clinical Psychology, 60*(5), 748-756.

Resick, P.A., Nishith, P., Weaver, T.L., Astin, M.C., & Feuer, C.A. (2002). A comparison of cognitive-processing therapy with prolonged exposure and a waiting condition for the treatment of chronic posttraumatic stress disorder in female rape victims. *Journal of Consulting and Clinical Psychology, 70*(4), 867-879.

Schnurr, P.P., Friedman, M.J., Foy, D.W., Shea, M.T., Hsieh, F.Y., Lavori, P.W., Glynn, S.M., . . . Bernardy, N. C. (2003). Randomized trial of trauma-focused group therapy for posttraumatic stress disorder: results from a department of veterans affairs cooperative study. *Archives of General Psychiatry, 60*(5), 481-9.

Schnurr, P.P., Friedman, M.J., Engel, C.C., Foa, E.B., Shea, M.T., Chow, B.K., Resick, P.A., . . . Bernardy, N. (2007). Cognitive behavioral therapy for posttraumatic stress disorder in women: A randomized controlled trial. *Jama : the Journal of the American Medical Association, 297*(8), 820-830.

Taylor, S., Thordarson, D.S., Maxfield, L., Fedoroff, I.C., Lovell, K., & Ogrodniczuk, J. (2003). Comparative efficacy, speed, and adverse effects of three PTSD treatments: exposure therapy, EMDR, and relaxation training. *Journal of Consulting and Clinical Psychology, 71*(2), 330-338.

van Emmerik, A.A.P., Kamphuis, J.H., & Emmelkamp, P.M.G. (2008). Treating acute stress disorder and posttraumatic stress disorder with cognitive behavioral therapy or structured writing therapy: A randomized controlled trial. *Psychotherapy and Psychosomatics, 77*(2), 93-100.

Zang, Y., Hunt, N., & Cox, T. (2013). A randomised controlled pilot study: the effectiveness of narrative exposure therapy with adult survivors of the Sichuan earthquake. *BMC Psychiatry, 13*(1), 1.

Zang, Y., Hunt, N., & Cox, T. (2014). Adapting narrative exposure therapy for Chinese earthquake survivors: a pilot randomised controlled feasibility study. *BMC Psychiatry, 14*(1), 1.

# Eye Movement Desensitization and Reprocessing (EMDR) for adult posttraumatic stress disorder (PTSD)

## Adult Mental Health: Trauma

Benefit-cost estimates updated December 2017. Literature review updated September 2016.

Program Description: Eye Movement Desensitization and Reprocessing (EMDR) is a psychological treatment commonly used to treat posttraumatic stress disorder. During treatment, clients focus on the traumatic memory for 30 seconds at a time while the therapist provides a stimulus. For most clients, the therapist moves a hand slowly back and forth in front of the client (eye movement) but other stimuli may be used. Clients report on what thoughts come up and are guided to refocus on that thought in the next stimulus session. During therapy visits, clients report the level of distress they feel. In later phases, a positive thought is emphasized during the stimulus sessions. Afterward, clients are asked to focus on residual physical tensions they may feel in order to enhance relaxation. A more complete description of this therapy is available at: http://www.emdrnetwork.org/description.html

We evaluated studies where EMDR was used in the treatment of PTSD confirmed by a diagnosis using the criteria of the Diagnostic and Statistical Manual of Mental Disorders (DSM). Studies consisted of patients with a variety of traumatic experiences, including combat, sexual abuse or assault, physical or emotional abuse, accidents, and war or disaster experiences. We only included studies where EMDR was compared to a control condition receiving treatment as usual, which consisted of standard care or a wait list for care. One study was included in which patients had comorbid psychosis disorder. Patients in the studies received between two and twelve total sessions of EMDR.

## Benefit-Cost Summary Statistics Per Participant

### Benefits to:

| | |
|---|---|
| Taxpayers | $13,082 |
| Participants | $22,809 |
| Others | $3,958 |
| Indirect | $1,569 |
| Total benefits | $41,418 |
| Net program cost | ($69) |
| Benefits minus cost | $41,349 |

| | |
|---|---|
| Benefit to cost ratio | $598.94 |
| Benefits minus costs | $41,349 |
| Chance the program will produce benefits greater than the costs | 100 % |

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

## Detailed Monetary Benefit Estimates Per Participant

### Benefits from changes to:[1] Benefits to:

| | Participants | Taxpayers | Others[2] | Indirect[3] | Total |
|---|---|---|---|---|---|
| Labor market earnings associated with PTSD | $21,769 | $9,886 | $0 | $0 | $31,654 |
| Health care associated with PTSD | $1,041 | $3,196 | $3,958 | $1,604 | $9,799 |
| Adjustment for deadweight cost of program | $0 | $0 | $0 | ($35) | ($35) |
| Totals | $22,809 | $13,082 | $3,958 | $1,569 | $41,418 |

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

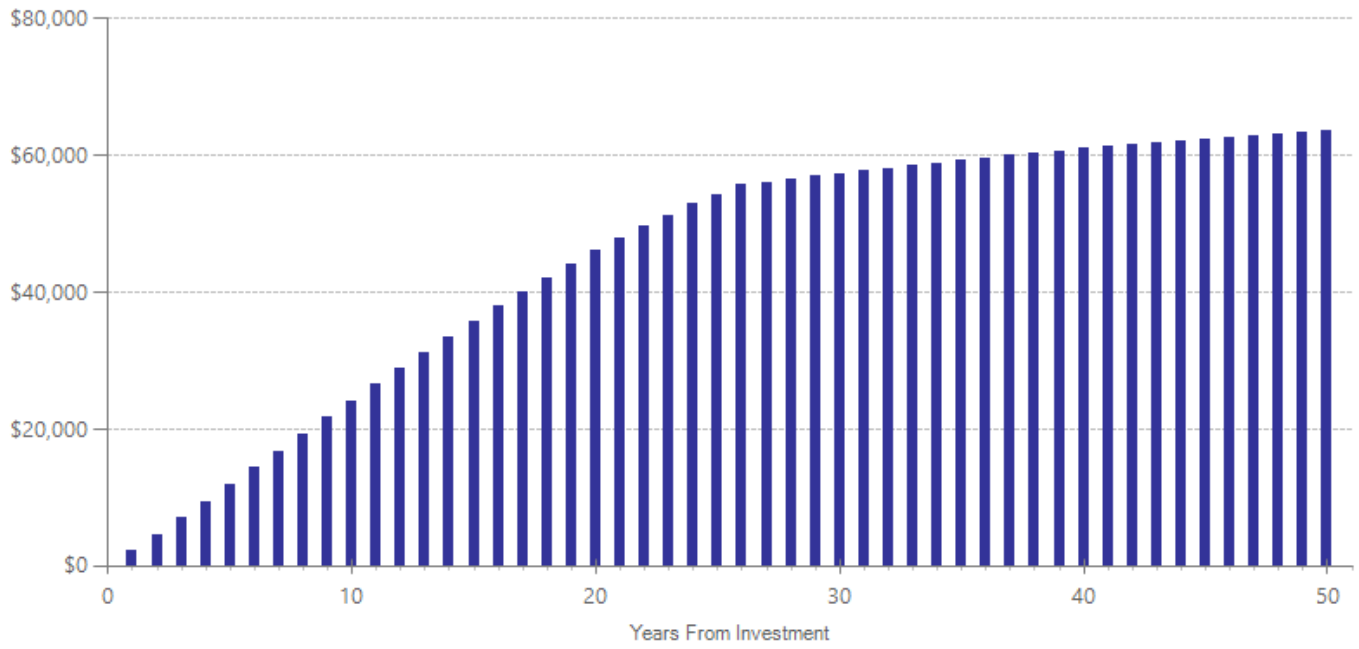
## Detailed Annual Cost Estimates Per Participant

| | Annual cost | Year dollars | Summary | |
|---|---|---|---|---|
| Program costs | $974 | 2014 | Present value of net program costs (in 2016 dollars) | ($69) |
| Comparison costs | $830 | 2008 | Cost range (+ or -) | 10 % |

Per-participant costs for EMDR are estimated based on the average hours of therapy reported in the studies (7.96) and the rate for individual therapy for non-disabled adults reported in Mercer (2013) Behavioral Health Data Book for the State of Washington For Rates Effective January 1, 2014.
The comparison group costs are from the average Medicaid expenditures for PTSD treatment in Washington in 2014.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

## Detailed Annual Cost Estimates Per Participant




The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

## Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Anxiety disorder | 40 | 4 | 72 | -0.305 | 0.207 | 41 | -0.305 | 0.207 | 42 | -0.659 | 0.009 |
| Global functioning^ | 40 | 2 | 42 | 0.201 | 0.281 | 41 | 0.209 | 0.281 | 42 | 0.613 | 0.362 |
| Major depressive disorder | 40 | 6 | 111 | -0.333 | 0.157 | 41 | -0.333 | 0.157 | 42 | -0.333 | 0.001 |
| Post-traumatic stress | 40 | 11 | 224 | -0.460 | 0.134 | 41 | -0.460 | 0.134 | 42 | -0.730 | 0.001 |

^WSIPP’s benefit-cost model does not monetize this outcome.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

## Citations Used in the Meta-Analysis


Boudewyns, P.A., Stwertka, S.A., Hyer, L.A., Albrecht, J.W., & Sperr, E.V. (1993). Eye movement desensitization for PTSD of combat: A treatment outcome pilot study. *The Behavior Therapist, 16*(2), 29-33.

Carlson, J.G., Chemtob, C.M., Rusnak, K., Hedlund, N.L., & Muraoka, M.Y. (1998). Eye Movement Desensitization and Reprocessing (EDMR) treatment for combat-related posttraumatic stress disorder. *Journal of Traumatic Stress, 11*(1), 3-24.

Hogberg, G., Pagani, M., Sundin, O., Soares, J., Aberg-Wistedt, A., Tarnell, B., & Hallstrom, T. (2007). On treatment with eye movement desensitization and reprocessing of chronic post-traumatic stress disorder in public transportation workers—A randomized controlled trial. *Nordic Journal of Psychiatry, 61*(1), 54-61.

Jensen, J.A. (1994). An investigation of eye movement desensitization and reprocessing (EMD/R) as a treatment for posttraumatic stress disorder (PTSD) symptoms of Vietnam combat veterans. *Behavior Therapy, 25*(2), 311-325.

Johnson, D.R., & Lubin, H. (2006). The counting method: Applying the rule of parsimony to the treatment of posttraumatic stress disorder. *Traumatology, 12*(1), 83-99.

Marcus, S.V., Marquis, P., & Sakai, C. (1997). Controlled study of treatment of PTSD using EMDR in an HMO setting. *Psychotherapy: Theory, Research, Practice, Training, 34*(3), 307-315.

Rothbaum, B.O., Austin, M.C., & Marsteller, F. (2005). Prolonged exposure versus eye movement desensitization and reprocessing (EMDR) for PTSD rape victims. *Journal of Traumatic Stress: Publ. for the Society for Traumatic Stress Studies, 18*(6), 607-616.

Rothbaum, B.O. (1997). Acontrolled study of eye movement desensitization and reprocessing in the treatment of posttraumatic stress disordered sexual assault victims. *Bulletin of the Menninger Clinic, 61*(3), 317-334.

Taylor, S., Thordarson, D.S., Maxfield, L., Fedoroff, I.C., Lovell, K., & Ogrodniczuk, J. (2003). Comparative efficacy, speed, and adverse effects of three PTSD treatments: exposure therapy, EMDR, and relaxation training. *Journal of Consulting and Clinical Psychology, 71*(2), 330-338.

van den Berg, D.P.G., de Bont, P.A.J.M, Berber M.v.d.V, de Roos, C., de Jongh, A., Van Minnen, A., & van der Gaag, M. (2015). Prolonged exposure vs eye movement desensitization and reprocessing vs waiting list for posttraumatic stress disorder in patients with a psychotic disorder: a randomized clinical trial. *Jama Psychiatry, 72*(3), 259-67.

van der Kolk, B.A., Spinazzola, J., Blaustein, M.E., Hopper, J.W., Hopper, E.K., Korn, D.L., & Simpson, W.B. (2007). A randomized clinical trial of eye movement desensitization and reprocessing (EMDR), fluoxetine, and pill placebo in the treatment of posttraumatic stress disorder: treatment effects and long-term maintenance. *The Journal of Clinical Psychiatry, 68*(1), 37-46.

# Posttraumatic stress disorder (PTSD) prevention following trauma

## Adult Mental Health: Trauma

Benefit-cost estimates updated December 2017. Literature review updated May 2014.

Program Description: The studies in this review examined Cognitive Behavior Therapy (CBT) treatment for persons in the first weeks and months following trauma but before a diagnosis of PTSD could be made. Treatments in the studies in this review involved five to ten hours of individual therapy that combined education on effects of trauma, relaxation, and exposure.

## Benefit-Cost Summary Statistics Per Participant

### Benefits to:

| | |
|---|---|
| Taxpayers | $1,873 |
| Participants | $3,260 |
| Others | $571 |
| Indirect | ($196) |
| Total benefits | $5,508 |
| Net program cost | ($854) |
| Benefits minus cost | $4,654 |

| | |
|---|---|
| Benefit to cost ratio | $6.45 |
| Benefits minus costs | $4,654 |
| Chance the program will produce benefits greater than the costs | 100 % |

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

## Detailed Monetary Benefit Estimates Per Participant

| Benefits from changes to:[1] | Benefits to: | | | | |
|---|---|---|---|---|---|
| | Participants | Taxpayers | Others[2] | Indirect[3] | Total |
| Labor market earnings associated with PTSD | $3,109 | $1,412 | $0 | $0 | $4,522 |
| Health care associated with PTSD | $150 | $461 | $571 | $229 | $1,411 |
| Adjustment for deadweight cost of program | $0 | $0 | $0 | ($425) | ($425) |
| Totals | $3,260 | $1,873 | $571 | ($196) | $5,508 |

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

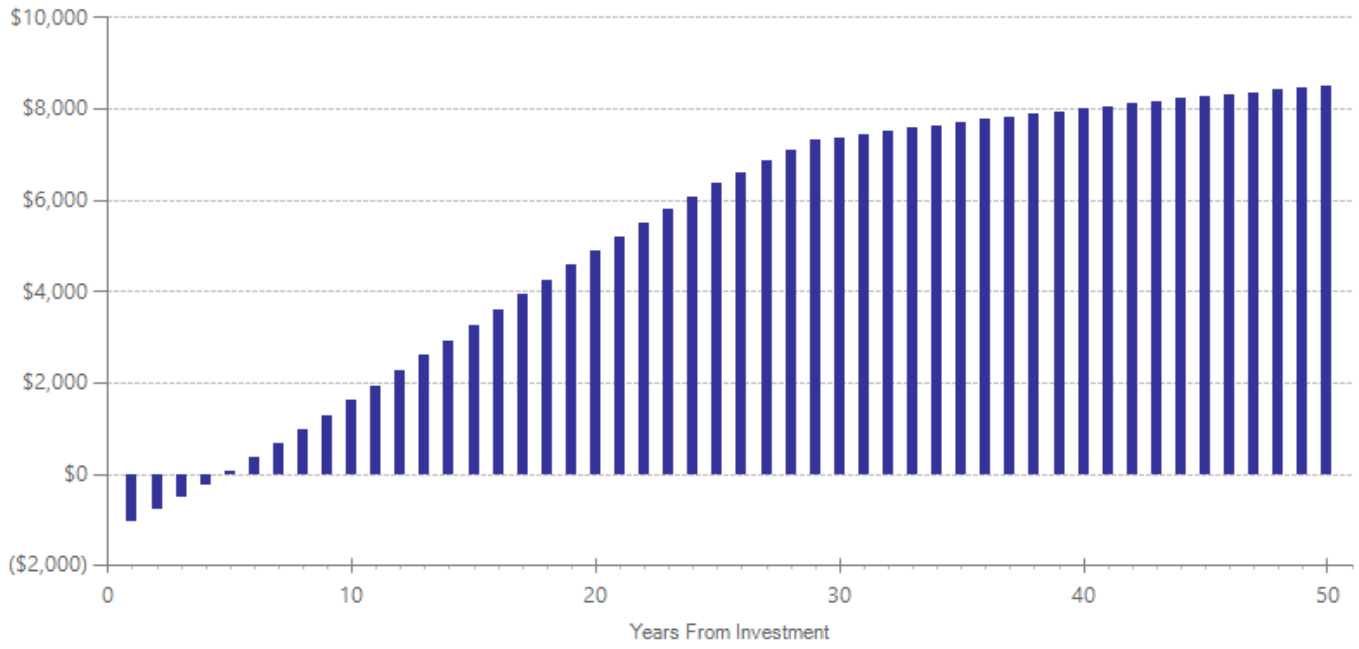
## Detailed Annual Cost Estimates Per Participant

| | Annual cost | Year dollars | Summary | |
|---|---|---|---|---|
| Program costs | $772 | 2008 | Present value of net program costs (in 2016 dollars) | ($854) |
| Comparison costs | $0 | 2008 | Cost range (+ or -) | 15 % |

This intervention takes place over five to ten weekly sessions. The per-participant cost of treatment by modality (group/individual) was weighted by the treatment Ns reported in the studies. Cost per session is $33.63/session for group and $96.63 for individual therapy (2009 dollars). This is based on actuarial tables reported in Mercer (2009) Behavioral Health Data Book for the State of Washington For Rates Effective January 1, 2010. In this set of studies, we assume a comparison cost of $0 because typically, this group of people would not receive treatment.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

## Detailed Annual Cost Estimates Per Participant




The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the "break-even" point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

## Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Major depressive disorder | 37 | 6 | 232 | -0.192 | 0.099 | 38 | -0.100 | 0.121 | 39 | -0.356 | 0.002 |
| Post-traumatic stress | 37 | 11 | 405 | -0.336 | 0.076 | 38 | -0.336 | 0.076 | 39 | -0.641 | 0.001 |

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

# Citations Used in the Meta-Analysis


Blanchard, E.B., Hickling, E.J., Devineni, T., Veazey, C.H., Galovski, T.E., & Mundy, E. (2003). A controlled evaluation of cognitive behavioral therapy for posttraumatic stress in motor vehicle accident survivors. *Behavior Research and Therapy, 41*(1): 79-96.

Bryant, R.A., Moulds, M.L., Guthrie, R.M., & Nixon, R.D.V. (2005). The additive benefit of hypnosis and cognitive- behavioral therapy in treating acute stress disorder. *Journal of Consulting and Clinical Psychology, 73*(2), 334-340.

Bryant, R.A., Harvey, A.G., Dang, S.T., Sackville, T., & Basten, C. (1998). Treatment of acute stress disorder: A comparison of cognitive-behavioral therapy and supportive counseling. *Journal of Consulting and Clinical Psychology, 66*(5), 862-866.

Bryant, R.A., Mastrodomenico, J., Felmingham, K.L., Hopwood, S., Kenny, L., Kandris, E., . . . Creamer, M. (2008). Treatment of acute stress disorder: A randomized controlled trial. *Archives of General Psychiatry, 65*(6), 659-667.

Davis, J.L., Rhudy, J.L., Pruiksma, K.E., Byrd, P., Williams, A.E., McCabe, K.M., & Bartley, E.J. ( 2011). Physiological predictors of response to exposure, relaxation, and rescripting therapy for chronic nightmares in a randomized clinical trial. *Journal of Clinical Sleep Medicine, 7*(6), 622-631.

Davis, J.L., & Wright, D.C. (2007). Randomized clinical trial for treatment of chronic nightmares in trauma-exposed adults. *Journal of Traumatic Stress, 20*(2), 123-33.

Ford, J.D., Steinberg, K.L., & Zhang, W. (2011). A randomized clinical trial comparing affect regulation and social problem-solving psychotherapies for mothers with victimization-related PTSD. *Behavior Therapy, 42*(4), 560-578.

Shalev, A.Y., Ankri, Y., Israeli-Shalev, Y., Peleg, T., Adessky, R., & Freedman, S. (2012). Prevention of posttraumatic stress disorder by early treatment: results from the Jerusalem Trauma Outreach And Prevention study. *Archives of General Psychiatry, 69*(2), 166-76.

Sijbrandij, M., Olff, M., Reitsma, J.B., Carlier, I.V.E., de, V.M.H., & Gersons, B.P.R. (2007). Treatment of Acute Posttraumatic Stress Disorder With Brief Cognitive Behavioral Therapy: A Randomized Controlled Trial. *American Journal of Psychiatry, 164*(1), 82-90.

# Cognitive behavioral therapy (CBT) for schizophrenia/psychosis

## Adult Mental Health: Serious Mental Illness

Benefit-cost estimates updated December 2017. Literature review updated December 2014.

Program Description: Cognitive behavioral therapy for psychosis (CBTp) includes the application of cognitive strategies focused on changing thoughts to improve feelings and behaviors as well as behavioral techniques most often used to address negative symptoms. CBTp involves teaching patients methods of coping with their symptoms and training in problem solving, social skills and strategies to reduce risk of relapse. In this collection of studies, CBTp was provided in addition to antipsychotic medication.

## Benefit-Cost Summary Statistics Per Participant

### Benefits to:

| | |
|---|---|
| Taxpayers | $7,954 |
| Participants | $987 |
| Others | $1,677 |
| Indirect | $3,061 |
| Total benefits | $13,679 |
| Net program cost | ($1,457) |
| Benefits minus cost | $12,221 |

| | |
|---|---|
| Benefit to cost ratio | $9.39 |
| Benefits minus costs | $12,221 |
| Chance the program will produce benefits greater than the costs | 60 % |

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

## Detailed Monetary Benefit Estimates Per Participant

### Benefits from changes to:[1] — Benefits to:

| | Participants | Taxpayers | Others[2] | Indirect[3] | Total |
|---|---|---|---|---|---|
| Labor market earnings associated with major depression | $1,603 | $728 | $0 | $15 | $2,345 |
| Labor market earnings associated with anxiety disorder | ($711) | ($323) | $0 | $0 | ($1,035) |
| Health care associated with anxiety disorder | ($8) | ($23) | ($29) | ($12) | ($71) |
| Health care associated with psychiatric hospitalization | $103 | $7,572 | $1,706 | $3,790 | $13,171 |
| Adjustment for deadweight cost of program | $0 | $0 | $0 | ($732) | ($732) |
| Totals | $987 | $7,954 | $1,677 | $3,061 | $13,679 |

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

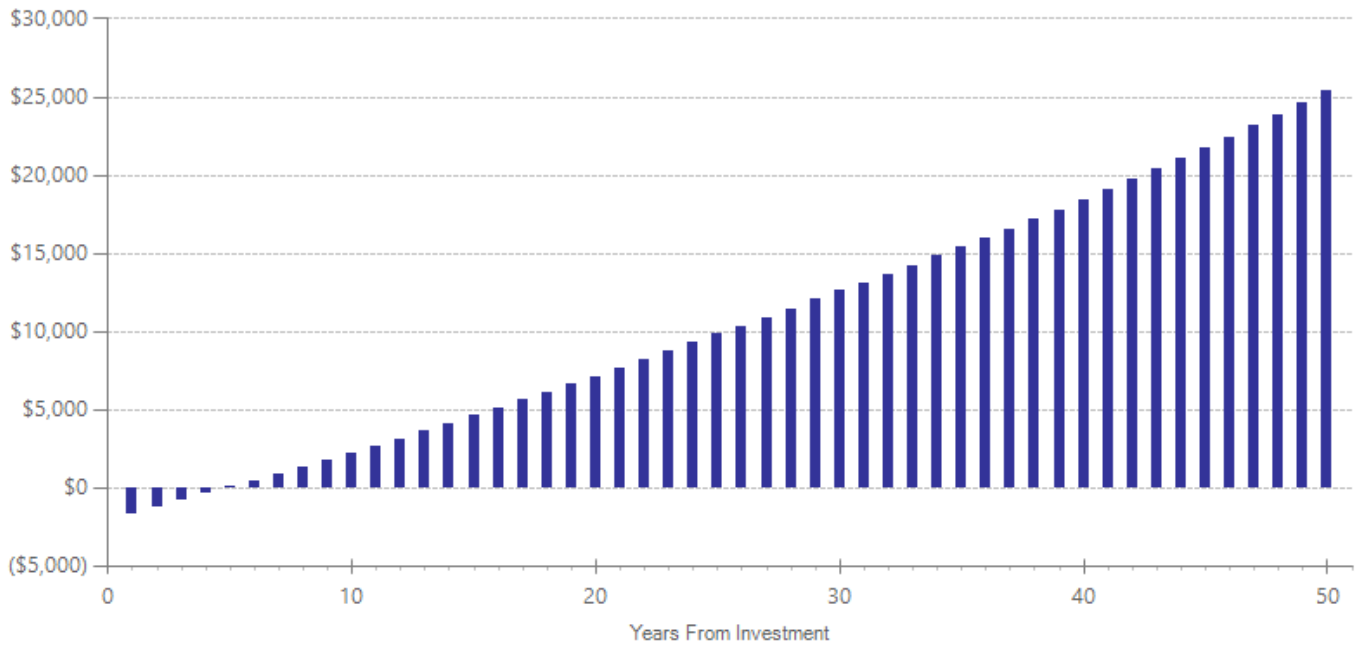
## Detailed Annual Cost Estimates Per Participant

| | Annual cost | Year dollars | Summary | |
|---|---|---|---|---|
| Program costs | $1,436 | 2014 | Present value of net program costs (in 2016 dollars) | ($1,457) |
| Comparison costs | $0 | 2014 | Cost range (+ or -) | 10 % |

Per-participant cost of treatment by modality (group/individual) was weighted by treatment Ns reported in the studies. Cost per-session per-person was $37.91/session for group and $120.90 for individual therapy (2014 dollars), based on actuarial tables reported for disabled adults in Mercer (2013) Behavioral Health Data Book for the State of Washington For Rates Effective January 1, 2014.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

## Detailed Annual Cost Estimates Per Participant




The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

## Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Anxiety disorder | 36 | 7 | 267 | 0.017 | 0.103 | 37 | 0.013 | 0.097 | 38 | 0.017 | 0.866 |
| Global functioning^ | 36 | 18 | 721 | 0.231 | 0.069 | 37 | 0.172 | 0.146 | 38 | 0.232 | 0.001 |
| Hope^ | 36 | 3 | 92 | 0.300 | 0.249 | 37 | 0.223 | 0.289 | 38 | 0.300 | 0.299 |
| Hospitalization (psychiatric) | 36 | 16 | 832 | -0.124 | 0.106 | 37 | -0.092 | 0.122 | 38 | -0.124 | 0.241 |
| Major depressive disorder | 36 | 15 | 727 | -0.123 | 0.070 | 37 | -0.091 | 0.096 | 38 | -0.123 | 0.078 |
| Medication adherence^ | 36 | 2 | 75 | -0.011 | 0.195 | 37 | -0.008 | 0.183 | 38 | -0.011 | 0.956 |
| Psychiatric symptoms^ | 36 | 25 | 1172 | -0.148 | 0.101 | 37 | -0.110 | 0.127 | 38 | -0.148 | 0.144 |
| Psychosis symptoms (negative)^ | 36 | 25 | 1143 | -0.170 | 0.069 | 37 | -0.126 | 0.116 | 38 | -0.170 | 0.014 |
| Psychosis symptoms (positive)^ | 36 | 33 | 1477 | -0.178 | 0.059 | 37 | -0.132 | 0.115 | 38 | -0.178 | 0.003 |
| Suicidal ideation^ | 36 | 2 | 115 | -0.174 | 0.331 | 37 | -0.129 | 0.325 | 38 | -0.174 | 0.599 |

^WSIPP's benefit-cost model does not monetize this outcome.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

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## Citations Used in the Meta-Analysis


Bach, P., & Hayes, S.C. (2002). The use of acceptance and commitment therapy to prevent the rehospitalization of psychotic patients: a randomized controlled trial. *Journal of Consulting and Clinical Psychology, 70*(5), 1129-39.

Barrowclough, C., Haddock, G., Lobban, F., Jones, S., Siddle, R., Roberts, C., & Gregg, L. (2006). Group cognitive-behavioural therapy for schizophrenia: Randomised controlled trial. *The British Journal of Psychiatry, 189,* 6, 527-532.

Bateman, K., Hansen, L., Turkington, D., & Kingdon, D. (2007). Cognitive Behavioral Therapy reduces suicidal ideation in schizophrenia: Results from a randomized controlled trial. *Suicide and Life-Threatening Behavior, 37*(3), 284-290.

Bechdolf, A.,Knost, B.,Kuntermann, C.,Schiller, S, Klosterkotter, J., Hambrecht, M., & Pukrop, R. (2004). A randomized comparison of group cognitive-behavioural therapy and group psychoeducation in patients with schizophrenia. *Acta Psychiatica Scandivica, 110,* 21-28.

Bradshaw, W. (2000). Integrating cognitive-behavioral psychotherapy for persons with schizophrenia into a psychiatric rehabilitation program: results of a three year trial. *Community Mental Health Journal, 36*(5), 491-500.

Cather, C., Penn, D., Otto, M.W., Yovel, I., Mueser, K.T., & Goff, D.C. (2005). A pilot study of functional Cognitive Behavioral Therapy (fCBT) for schizophrenia. *Schizophrenia Research, 74*, 2-3.

Daniels, L. (1998). A group cognitive-behavioral and process-oriented approach to treating the social impairment and negative symptoms associated with chronic mental illness. *The Journal of Psychotherapy Practice and Research, 7*(2), 167-76.

Durham, R.C., Guthrie, M., Morton, R.V., Reid, D.A., Treliving, L.R., Fowler, D., & Macdonald, R.R. (2003). Tayside-Fife clinical trial of cognitive-behavioural therapy for medication-resistant psychotic symptoms. Results to 3-month follow-up. *The British Journal of Psychiatry : the Journal of Mental Science, 182,* 303-11.

Edwards, J., Cocks, J., Burnett, P., Maud, D., Wong, L., Yuen, H.P., Harrigan, S.M., ... McGorry, P D. (2011). Randomized controlled trial of clozapine and CBT for first-episode psychosis with enduring positive symptoms: A pilot study. *Schizophrenia Research and Treatment*.

Farhall, J., Freeman, N.C., Shawyer, F., & Trauer, T. (2009). An effectiveness trial of cognitive behaviour therapy in a representative sample of outpatients with psychosis. *The British Journal of Clinical Psychology / the British Psychological Society, 48,* 47-62.

Fowler, D., Hodgekins, J., Painter, M., Reilly, T., Crane, C., Macmillan, I., Mugford, M., ... Jones, P.B. (2009). Cognitive behaviour therapy for improving social recovery in psychosis: a report from the ISREP MRC Trial Platform Study (Improving Social Recovery in Early Psychosis). *Psychological Medicine, 39*(10), 1627-36.

Garety, P.A., Fowler, D.G., Freeman, D., Bebbinton, P., Dunn, G., & Kuipers, E. (2008). Cognitive-behavioural therapy and family intervention for relapse prevention and symptom reduction in psychosis: randomised controlled trial. *The British Journal of Psychiatry, 192*(6), 412-423.

Gaudiano, B.A., & Herbert, J.D. (2006). Acute treatment of inpatients with psychotic symptoms using Acceptance and Commitment Therapy: Pilot results. *Behaviour Research and Therapy, 44* (3), 415-437.

Granholm, E., McQuaid, J.R., McClure, F.S., Link, P.C., Perivoliotis, D., Gottlieb, J.D., Patterson, T.L., ... Jeste, D. V. (2007). Randomized controlled trial of cognitive behavioral social skills training for older people with schizophrenia: 12-month follow-up. *The Journal of Clinical Psychiatry, 68*(5), 730-7.

Granholm, E., Holden, J., Link, P.C., McQuaid, J.R., & Jeste, D.V. (2013). Randomized controlled trial of cognitive behavioral social skills training for older consumers with schizophrenia: Defeatist performance attitudes and functional outcome. *American Journal of Geriatric Psychiatry, 21* (3), 251-262.

Gumley, A.I., O'Grady, M., Mcnay, L., Reilly, J., Power, K.G., & Norrie, J. (2003). Early intervention for relapse in schizophrenia: results of a 12-month randomized controlled trial of cognitive behavioural therapy. *Psychological Medicine, 33*(3),419-431.

Haddock, G., Tarrier, N., Morrison, A.P., Hopkins, R., Drake, R., & Lewis, S. (1999). A pilot study evaluating the effectiveness of individual inpatient cognitive-behavioural therapy in early psychosis. *Social Psychiatry and Psychiatric Epidemiology, 34*(5), 254-8.

Haddock, G., Barrowclough, C., Shaw, J.J., Dunn, G., Novaco, R.W., & Tarrier, N. (2009). Cognitive-behavioural therapy v. social activity therapy for people with psychosis and a history of violence: randomised controlled trial. *The British Journal of Psychiatry : the Journal of Mental Science, 194*(2), 152-7.

Jackson, H., McGorry, P., Edwards, J., Hulbert, C., Henry, L., Harrigan, S., Dudgeon, P., ... Power, P. (2005). A controlled trial of cognitively oriented psychotherapy for early psychosis (COPE) with four-year follow-up readmission data. *Psychological Medicine, 35*(9), 1295-306.

Jackson, H.J., McGorry, P.D., Killackey, E., Bendall, S., Allott, K., Dudgeon, P., Gleeson, J., ... Harrigan, S. (2008). Acute-phase and 1-year follow-up results of a randomized controlled trial of CBT versus Befriending for first-episode psychosis: the ACE project. *Psychological Medicine, 38*(5), 725-35.

Jolley, S., Garety, P., Craig, T., Dunn, G., White, J., & Aitken, M. (2003). Cognitive therapy in early psychosis: A pilot randomized controlled trial. *Behavioural and Cognitive Psychotherapy, 31*(4), 473-478.

Kuipers, E., Garety, P., Fowler, D., & Dunn, G. (1997). London-East Anglia randomised controlled trial of cognitive-behavioural therapy for psychosis. I: Effects of the treatment phase. *The British Journal of Psychiatry, 171,* 319.

Lecomte, T., Leclerc, C., Corbiere, M., Wykes, T., Wallace, C. J., & Spidel, A. (2008). Group cognitive behavior therapy or social skills training for individuals with a recent onset of psychosis? Results of a randomized controlled trial. *The Journal of Nervous and Mental Disease, 196*(12), 866-75.

Levine, J., Barak, Y., & Granek, L. (1998). Cognitive Group Therapy for Paranoid Schizophrenics: Applying Cognitive Dissonance. *Journal of Cognitive Psychotherapy, 12*(1), 3.

Lewis, D., Tarrier, N., Haddock, G., Bentall, R.,Kinderman, P., Kingdon, D., Siddle, R., Drake, R., Everitt, J., . . . Leadley K., (2002). Randomised controlled trial of cognitive-behavioural therapy in early schizophrenia: acute-phase outcomes. *British Journal of Psychiatry, 181(Supplement),* s91-s97.

Lincoln, T.M., Ziegler, M., Mehl, S., Kesting, M.L., Lullmann, E., Westermann, S., & Rief, W. (2012). Moving from efficacy to effectiveness in cognitive behavioral therapy for psychosis: a randomized clinical practice trial. *Journal of Consulting and Clinical Psychology, 80*(4), 674-86.

Moritz, S., Veckenstedt, R., Bohn, F., Hottenrott, B., Scheu, F., Randjbar, S., Aghotor, J., ... Roesch-Ely, D. (2013). Complementary group Metacognitive Training (MCT) reduces delusional ideation in schizophrenia. *Schizophrenia Research, 151,* 1-3.

Peters, E., Landau, S., McCrone, P., Cooke, M., Evans, R., Carswell, K., . . . Kuipers, E. (2010). A randomised controlled trial of cognitive behaviour therapy for psychosis in a routine clinical service. *Acta Psychiatrica Scandinavica, 122* (4), 302-318.

Pinninti, N.R., Rissmiller, D.J., & Steer, R.A. (2010). Cognitive-behavioral therapy as an adjunct to second-generation antipsychotics in the treatment of schizophrenia. *Psychiatric Services (Washington, D.C.), 61*(9), 940-3.

Pinto, A., La, P.S., Mennella, R., Giorgio, D., & DeSimone, L. (1999). Cognitive-behavioral therapy and clozapine for clients with treatment-refractory schizophrenia. *Psychiatric Services (washington, D.c.), 50*(7), 901-4.

Rector, N.A., Seeman, M.V., & Segal, Z.V. (2003). Cognitive therapy for schizophrenia: a preliminary randomized controlled trial. *Schizophrenia Research, 63,* 1-2.

Sensky, T., Turkington, D., Kingdon, D., Scott, J.L., Scott, J., Siddle, R., O'Carroll, M., ... Barnes, T.R. (2000). A randomized controlled trial of cognitive-behavioral therapy for persistent symptoms in schizophrenia resistant to medication. *Archives of General Psychiatry, 57*(2), 165-72.

Startup, M., Jackson, M.C., & Bendix, S. (2004). North Wales randomized controlled trial of cognitive behaviour therapy for acute schizophrenia spectrum disorders: outcomes at 6 and 12 months. *Psychological Medicine, 34*(3), 413-22.

Startup, M., Jackson, M.C., Evans, K.E., & Bendix, S. (2005). North Wales randomized controlled trial of cognitive behaviour therapy for acute schizophrenia spectrum disorders: two-year follow-up and economic evaluation. *Psychological Medicine, 35*(9), 1307-16.

Tarrier, N., Beckett, R., Harwood, S., Baker, A., Yusupoff, L., & Ugarteburu, I. (1993). A trial of two cognitive-behavioural methods of treating drug-resistant residual psychotic symptoms in schizophrenic patients: I. Outcome. *The British Journal of Psychiatry : the Journal of Mental Science, 162*, 524-32.

Tarrier, N., Wittkowski, A., Kinney, C., McCarthy, E., Morris, J., & Humphreys, L. (1999). Durability of the effects of cognitive-behavioural therapy in the treatment of chronic schizophrenia: 12-month follow-up. *The British Journal of Psychiatry, 174*(6), 500-504.

Tarrier, N., Haddock, G., Lewis, S., Drake, R., & Gregg, L. (2006). Suicide behaviour over 18 months in recent onset schizophrenic patients: The effects of CBT. *Schizophrenia Research, 83*(1), 15-27.

Trower, P., Birchwood, M., Meaden, A., Byrne, S., Nelson, A., & Ross, K. (2004). Cognitive therapy for command hallucinations: randomised controlled trial. *The British Journal of Psychiatry, 184*(4), 312-320.

Turkington, D., & Kingdon, D. (2000). Cognitive-behavioural techniques for general psychiatrists in the management of patients with psychoses. *The British Journal of Psychiatry : the Journal of Mental Science,* 177, 101-6.

Turkington, D., Kingdon, D., Turner, T., & Insight into Schizophrenia Research Group. (2002). Effectiveness of a brief cognitive-behavioural therapy intervention in the treatment of schizophrenia. *The British Journal of Psychiatry : the Journal of Mental Science,* 180, 523-7.

Turkington, D., Kingdon, D., Rathod, S., Hammond, K., Pelton, J., & Mehta, R. (2006). Outcomes of an effectiveness trial of cognitive-behavioural intervention by mental health nurses in schizophrenia. *The British Journal of Psychiatry, 189*(1), 36-40.

Valmaggia, L.R., van der Gaag. M., Tarrier, N., Pijnenborg, M., & Slooff, C.J. (2005). Cognitive-behavioural therapy for refractory psychotic symptoms of schizophrenia resistant to atypical antipsychotic medication: Randomised controlled trial. *The British Journal of Psychiatry, 186*(4), 324-330.

van der Gaag, M., Stant, A.D., Wolters, K.J., Buskens, E., & Wiersma, D. (2011). Cognitive-behavioural therapy for persistent and recurrent psychosis in people with schizophrenia-spectrum disorder: cost-effectiveness analysis. *The British Journal of Psychiatry : the Journal of Mental Science, 198*(1), 59-65.

White, R., Gumley, A., McTaggart, J., Rattrie, L., McConville, D., Cleare, S., & Mitchell, G. (2011). A feasibility study of Acceptance and Commitment Therapy for emotional dysfunction following psychosis. *Behaviour Research and Therapy, 49*(12), 901-907.

Wykes, T., Hayward, P., Thomas, N., Green, N., Surguladze, S., Fannon, D., & Landau, S. (2005). What are the effects of group cognitive behaviour therapy for voices? A randomised control trial. *Schizophrenia Research,* 77, 2-3.

# Illness Management and Recovery (IMR)

## Adult Mental Health: Serious Mental Illness

Benefit-cost estimates updated December 2017. Literature review updated September 2016.

Program Description: Illness Management and Recovery (IMR) is a 40-hour curriculum for individuals with severe mental illness which addresses recovery strategies and information about serious mental illness. The intervention is typically delivered in group format.

## Benefit-Cost Summary Statistics Per Participant

### Benefits to:

| | |
|---|---|
| Taxpayers | $2,021 |
| Participants | $3,581 |
| Others | ($7) |
| Indirect | ($650) |
| Total benefits | $4,945 |
| Net program cost | ($1,624) |
| Benefits minus cost | $3,321 |

| | |
|---|---|
| Benefit to cost ratio | $3.04 |
| Benefits minus costs | $3,321 |
| Chance the program will produce benefits greater than the costs | 55 % |

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

## Detailed Monetary Benefit Estimates Per Participant

### Benefits from changes to:[1] Benefits to:

| | Participants | Taxpayers | Others[2] | Indirect[3] | Total |
|---|---|---|---|---|---|
| Labor market earnings associated with employment | $3,594 | $1,632 | $0 | $0 | $5,226 |
| Health care associated with psychiatric hospitalization | $7 | $490 | $110 | $215 | $822 |
| Health care associated with emergency department visits | ($19) | ($101) | ($118) | ($53) | ($292) |
| Adjustment for deadweight cost of program | $0 | $0 | $0 | ($811) | ($811) |
| Totals | $3,581 | $2,021 | ($7) | ($650) | $4,945 |

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

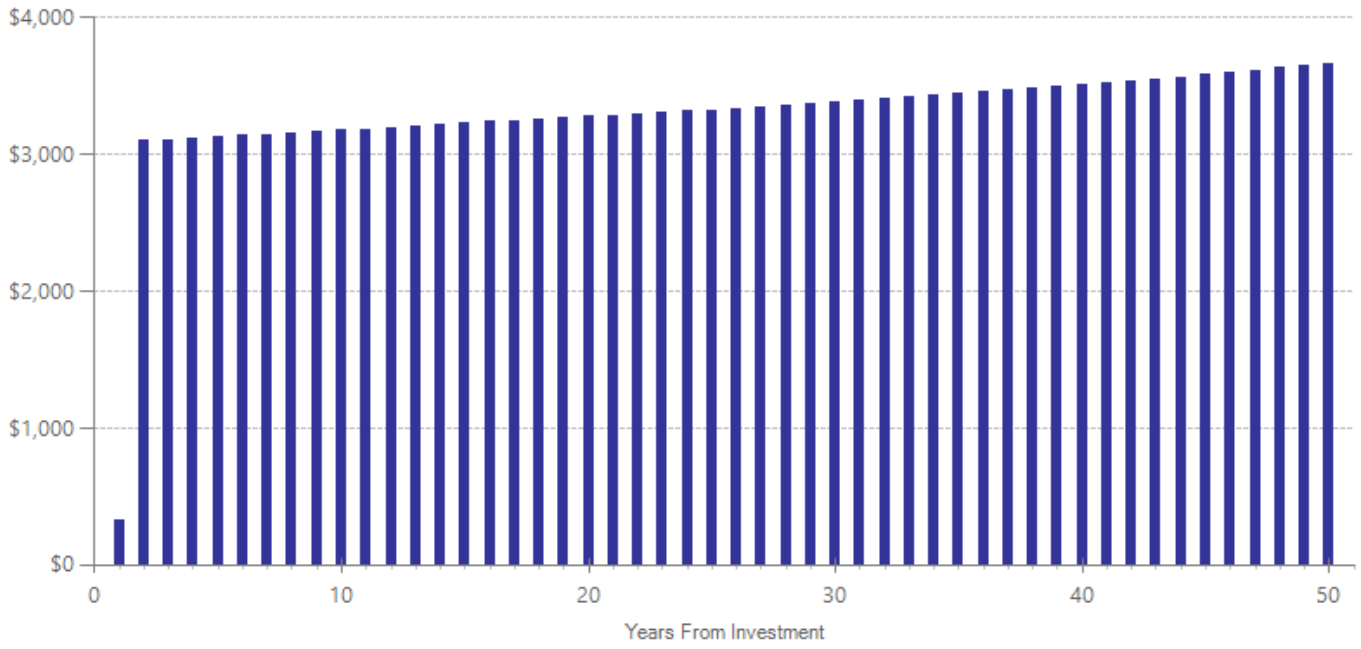
## Detailed Annual Cost Estimates Per Participant

| | Annual cost | Year dollars | Summary | |
|---|---|---|---|---|
| Program costs | $1,602 | 2014 | Present value of net program costs (in 2016 dollars) | ($1,624) |
| Comparison costs | $0 | 2014 | Cost range (+ or -) | 10 % |

This program consists of a 40-hour treatment curriculum. The per-participant cost of treatment is the number of group IMR sessions provided in the studies included in the analysis multiplied by the group treatment reimbursement rates as reported in Mercer, (2013). Behavioral health data book for the state of Washington for rates effective January 1, 2014. The comparison cost is assumed to be zero because IMR was added to treatment as usual.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

## Detailed Annual Cost Estimates Per Participant




The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the "break-even" point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

## Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Emergency department visits | 49 | 1 | 44 | 0.228 | 0.254 | 50 | 0.000 | 0.118 | 51 | 0.228 | 0.369 |
| Employment | 49 | 1 | 44 | 0.325 | 0.456 | 50 | 0.000 | 0.118 | 51 | 0.325 | 0.476 |
| Hospitalization (psychiatric) | 49 | 3 | 107 | -0.073 | 0.286 | 50 | 0.000 | 0.118 | 51 | -0.073 | 0.800 |
| Psychiatric symptoms^ | 49 | 3 | 107 | -0.260 | 0.302 | 50 | 0.000 | 0.118 | 51 | -0.260 | 0.390 |
| Suicidal ideation^ | 49 | 2 | 63 | -0.517 | 0.665 | 50 | 0.000 | 0.118 | 51 | -0.517 | 0.437 |

^WSIPP's benefit-cost model does not monetize this outcome.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

## Citations Used in the Meta-Analysis


Fardig, R., Lewander, T., Melin, L., Folke, F., & Fredriksson, A. (2011). A randomized controlled trial of the illness management and recovery program for persons with schizophrenia. *Psychiatric Services, 62*(6), 606-612.

Levitt, A., Mueser, K., DeGenova, J., Lorenzo, J., Bradford-Watt, D., Barbosa, A., . . . & Chernick, M. (2009). Randomized controlled trial of illness management and recovery in multiple-unit supportive housing. *Psychiatric Services, 60*(12), 1629-1636.

Salyers, M.P., McGuire, A.B., Rollins, A.L., Bond, G.R., Mueser, K.T., & Macy, V.R. (2010). Integrating assertive community treatment and illness management and recovery for consumers with severe mental illness. *Community Mental Health Journal, 46*(4), 319-329.

Salyers, M.P., McGuire, A B., Kukla, M., Fukui, S., Lysaker, P.H., & Mueser, K.T. (2014). A randomized controlled trial of illness management and recovery with an active control group. *Psychiatric Services, 65*(8), 1005-1011.

# Individual Placement and Support (IPS) for individuals with serious mental illness

## Adult Mental Health: Serious Mental Illness

Benefit-cost estimates updated December 2017. Literature review updated May 2014.

Program Description: These studies assess the Individual Placement and Support (IPS) model of supported employment compared with typical vocational services for individuals with serious mental illness. The IPS model focuses on competitive employment, client interests, rapid job placement, and ongoing support by employment specialists. In contrast, the comparison groups typically received vocational services that focused on building job skills before employment placement.

## Benefit-Cost Summary Statistics Per Participant

### Benefits to:

| | |
|---|---|
| Taxpayers | $893 |
| Participants | $1,956 |
| Others | $1 |
| Indirect | ($400) |
| Total benefits | $2,451 |
| Net program cost | ($807) |
| Benefits minus cost | $1,644 |

| | |
|---|---|
| Benefit to cost ratio | $3.04 |
| Benefits minus costs | $1,644 |
| Chance the program will produce benefits greater than the costs | 71 % |

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

## Detailed Monetary Benefit Estimates Per Participant

### Benefits from changes to:[1] Benefits to:

| | Participants | Taxpayers | Others[2] | Indirect[3] | Total |
|---|---|---|---|---|---|
| Labor market earnings associated with employment | $1,956 | $888 | $0 | $0 | $2,844 |
| Health care associated with psychiatric hospitalization | $0 | $5 | $1 | $3 | $9 |
| Adjustment for deadweight cost of program | $0 | $0 | $0 | ($403) | ($403) |
| Totals | $1,956 | $893 | $1 | ($400) | $2,451 |

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

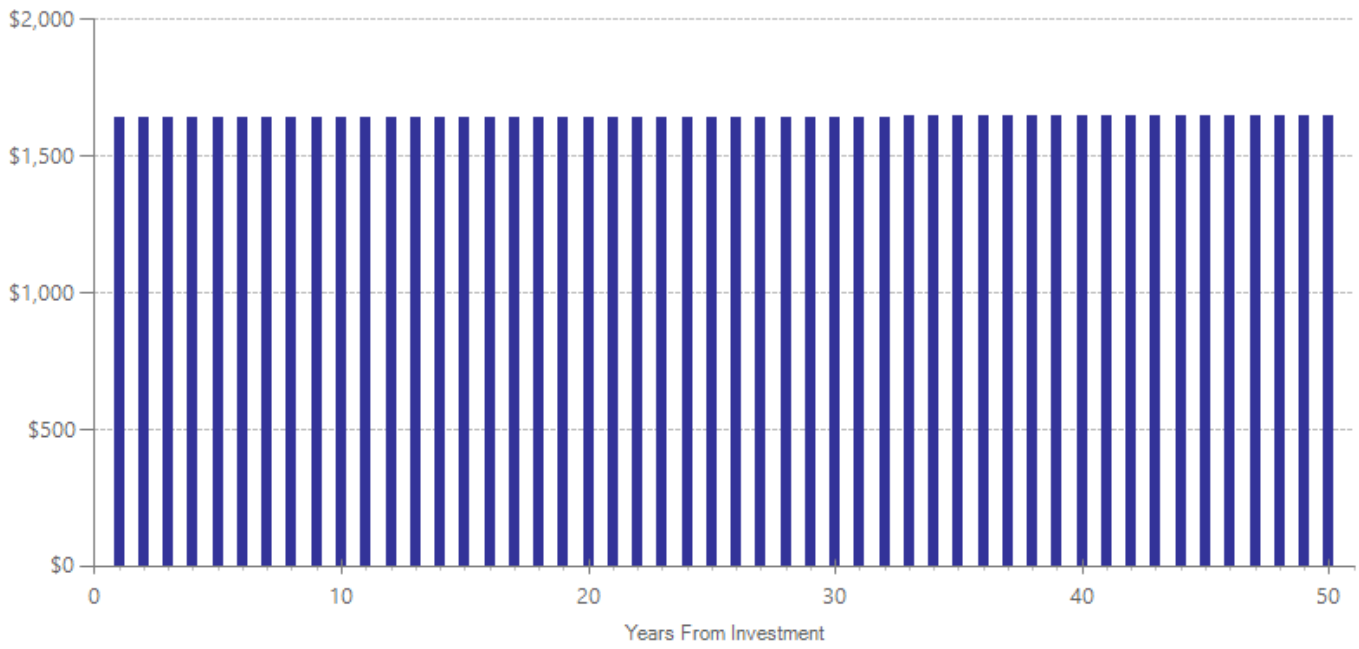
## Detailed Annual Cost Estimates Per Participant

| | Annual cost | Year dollars | Summary | |
|---|---|---|---|---|
| Program costs | $1,644 | 2001 | Present value of net program costs (in 2016 dollars) | ($807) |
| Comparison costs | $1,027 | 2001 | Cost range (+ or -) | 60 % |

The per-participant cost of IPS is based on the average annual cost found by Latimer et al., 2004. The cost of the comparison group is a weighted average of the costs to provide the services that the comparison group received in the studies we reviewed. Comparison group participants in these studies received enhanced vocational rehabilitation, traditional "train and place" vocational services or Clubhouse services. The ratio of the cost of enhanced vocational rehabilitation and traditional train and place vocational services compared to IPS was reported by Dixon et al., 2002 and the cost of Clubhouse vocational services was reported by Macias, 2001. Dixon et al., (2002). Cost-effectiveness of two vocational rehabilitation programs for persons with severe mental illness. *Psychiatric Services, 53*(9), 1118-1124. Latimer et al., (2004). The cost of high-fidelity supported employment programs for people with severe mental illness. *Psychiatric Services, 55*(4), 401-406. Macias, C. (2001). *Massachusetts employment Intervention Demonstration Project: An experimental comparison of PACT and Clubhouse* (Final Report). Retrieved from: http://www.massclubs.org/Docs/ComparisonPACandClubhouseModels2.pdf

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

## Detailed Annual Cost Estimates Per Participant




The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the "break-even" point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

## Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Competitive employment^ | 40 | 13 | 963 | 1.075 | 0.105 | 40 | 0.000 | 0.000 | 41 | 1.075 | 0.001 |
| Earnings | 40 | 6 | 417 | 0.385 | 0.123 | 40 | 0.000 | 0.000 | 41 | 0.385 | 0.002 |
| Employment | 40 | 5 | 403 | 0.358 | 0.283 | 40 | 0.000 | 0.000 | 41 | 0.358 | 0.206 |
| Hospitalization (psychiatric) | 40 | 2 | 222 | -0.003 | 0.288 | 40 | 0.000 | 0.000 | 41 | -0.003 | 0.993 |
| Hours worked^ | 40 | 4 | 347 | 0.303 | 0.196 | 40 | 0.000 | 0.000 | 41 | 0.303 | 0.121 |
| Psychiatric symptoms^ | 40 | 1 | 74 | -0.136 | 0.164 | 40 | 0.000 | 0.000 | 41 | -0.136 | 0.404 |

^WSIPP's benefit-cost model does not monetize this outcome.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

## Citations Used in the Meta-Analysis


Bond, G.R., Salyers, M.P., Dincin, J., Drake, R., Becker, D.R., Fraser, V.V., & Haines, M. (2007). A randomized controlled trial comparing two vocational models for persons with severe mental illness. *Journal of Consulting and Clinical Psychology, 75*(6), 968-982.

Burns, T., Catty, J., Becker, T., Drake, R.E., Fioritti, A., Knapp, M., . . . Wiersma, D. (2007). The effectiveness of supported employment for people with severe mental illness: A randomised controlled trial. *The Lancet, 370*(9593), 1146-1152.

Burns, T. Catty, J., White, S., Becker, T., Koletsi, M., Fioritti, A., . . . Lauber, C. (2009). The impact of supported employment and working on clinical and social functioning: Results of an international study of individual placement and support. *Schizophrenia Bulletin, 35*(5), 949-958.

Davis, L.L., Leon, A.C., Toscano, R., Drebing, C.E., Ward, L.C., Parker, P.E., Kashner, T.M., ... Drake, R.E. (2012). A randomized controlled trial of supported employment among veterans with posttraumatic stress disorder. *Psychiatric Services, 63*(5), 464-470.

Drake, R.E., McHugo, G.J., Becker, D.R., Anthony, W.A., & Clark, R.E. (1996). The New Hampshire Study of Supported Employment for People With Severe Mental Illness. *Journal of Consulting and Clinical Psychology, 64*(2): 391-399.

Drake, R.E., McHugo, G.J., Bebout, R.R., Becker, D.R., Harris, M., Bond, G.R., & Quimby, E. (1999). A randomized clinical trial of supported employment for inner-city patients with severe mental disorders. *Archives of General Psychiatry, 56*(7), 627-633.

Heslin, M., Howard, L., Leese, M., McCrone, P., Rice, C., Jarrett, M., ... & Thornicroft, G. (2011). Randomized controlled trial of supported employment in England: 2 year follow up of the Supported Work and Needs (SWAN) study. *World Psychiatry, 10*(2), 132-137.

Hoffmann, H., Jackel, D., Glauser, S., & Kupper, Z. (2012). A randomised controlled trial of the efficacy of supported employment. *Acta Psychiatrica Scandinavica, 125*(2), 157-67.

Latimer, E., Lecomte, T., Becker, D.R., Drake, R.E., Duclos, I., Piat, M., . . . Xie, H. (2006). Generalisability of the individual placement and support model of supported employment: Results of a Canadian randomised controlled trial. *The British Journal of Psychiatry, 189*(1), 65-73.

Lehman, A.F., Goldberg, R., Dixon, L.B., McNary, S., Postrado, L., Hackman, A., & McDonnell, K. (2002). Improving Employment Outcomes for Persons With Severe Mental Illnesses. *Archives of General Psychiatry, 59*(2): 165-172.

Mueser, K.T., Clark, R.E., Haines, M., Drake, R.E., McHugo, G.J., Bond, G.R., . . . Swain, K. (2004). The Hartford study of supported employment for persons with severe mental illness. *Journal of Consulting and Clinical Psychology, 72*(3), 479-488.

Tsang, H.W.H., Chan, A., Wong, A., & Liberman, R.P. 2009). Vocational outcomes of an integrated supported employment program for individuals with persistent and severe mental illness. *Journal of Behavior Therapy and Experimental Psychiatry, 40*(2), 292-305.

Twamley, E., Narvaez, J., Becker, D., Bartels, S., & Jeste, D. (2008). Supported employment for middle-aged and older people with schizophrenia. *American Journal of Psychiatric Rehabilitation, 11*(1), 76-89.

Wong, K.K., Chiu, R., Tang, B., Mak, D., Liu, J., & Chiu, S.N. (2008). A randomized controlled trial of a supported employment program for persons with long-term mental illness in Hong Kong. *Psychiatric Services, 59*(1), 84-90.

# Primary care in integrated settings (Veteran's Administration, Kaiser Permanente)

## Adult Mental Health: Serious Mental Illness

Benefit-cost estimates updated December 2017. Literature review updated May 2014.

Program Description: Behavioral health settings (mental health and substance abuse treatment centers) provide primary care for patients on site or nearby. This collection of studies was conducted at Veterans Administration facilities or facilities of Kaiser Permanente where patients might have more ready access to primary care than community-based treatment centers.

## Benefit-Cost Summary Statistics Per Participant

### Benefits to:

| | |
|---|---|
| Taxpayers | $406 |
| Participants | $46 |
| Others | $170 |
| Indirect | $139 |
| Total benefits | $761 |
| Net program cost | ($231) |
| Benefits minus cost | $530 |

| | |
|---|---|
| Benefit to cost ratio | $3.30 |
| Benefits minus costs | $530 |
| Chance the program will produce benefits greater than the costs | 51 % |

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

## Detailed Monetary Benefit Estimates Per Participant

### Benefits from changes to:[1] Benefits to:

| | Participants | Taxpayers | Others[2] | Indirect[3] | Total |
|---|---|---|---|---|---|
| Crime | $0 | $0 | $0 | $0 | $0 |
| Property loss associated with alcohol abuse or dependence | $0 | $0 | $0 | $0 | $0 |
| Labor market earnings associated with illicit drug abuse or dependence | $31 | $14 | $0 | $59 | $105 |
| Health care associated with general hospitalization | $4 | $74 | $64 | $37 | $178 |
| Health care associated with psychiatric hospitalization | $4 | $280 | $63 | $139 | $486 |
| Health care associated with emergency department visits | $7 | $38 | $44 | $19 | $108 |
| Adjustment for deadweight cost of program | $0 | $0 | $0 | ($115) | ($115) |
| Totals | $46 | $406 | $170 | $139 | $761 |

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

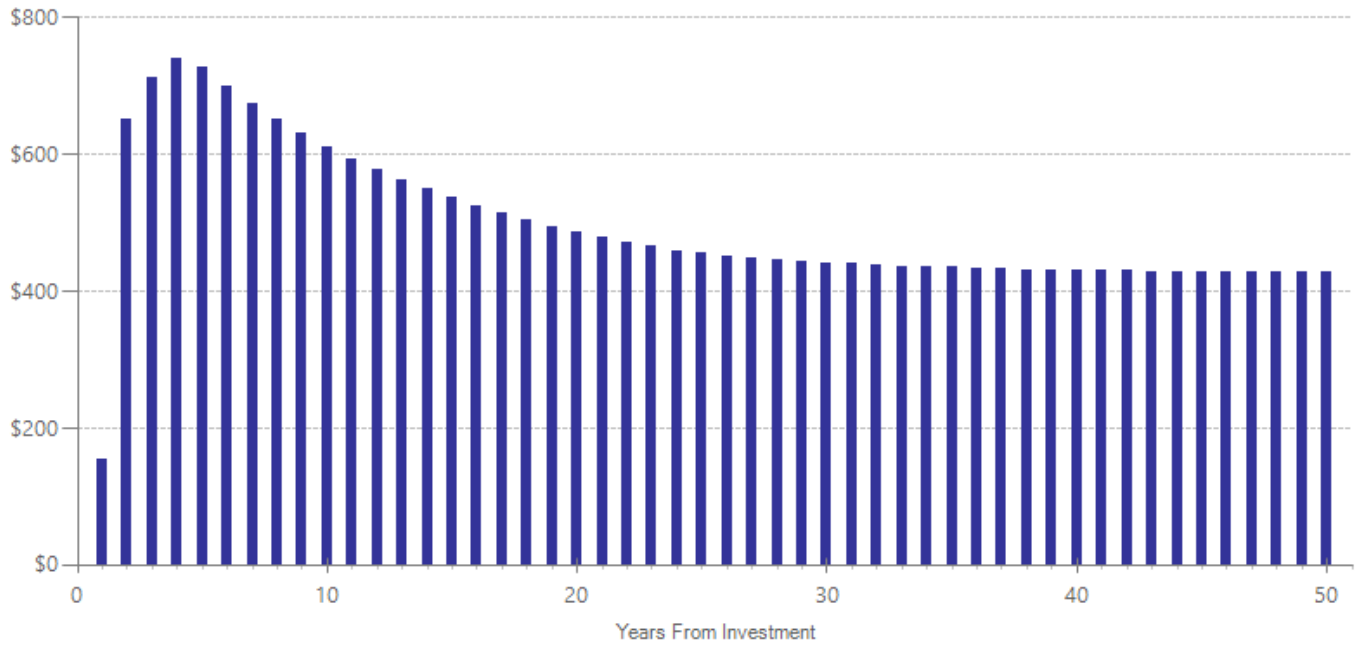
## Detailed Annual Cost Estimates Per Participant

| | Annual cost | Year dollars | Summary | |
|---|---|---|---|---|
| Program costs | $228 | 2014 | Present value of net program costs (in 2016 dollars) | ($231) |
| Comparison costs | $0 | 2014 | Cost range (+ or -) | 20 % |

According to Saxon et al., (2006). Randomized trial of onsite versus referral primary medical care for veterans in addictions treatment. *Medical Care, 44*(4), 334-342, patients in the clinics with co-located primary care had an average of 1.1 more primary care visits than the comparison group in 12 months. We estimated additional cost of the program by multiplying 1.1 visits by the Medicaid enhanced payment rate for the longest primary care visit. See http://www.hca.wa.gov/medicaid/pages/aca_rates.aspx.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

## Detailed Annual Cost Estimates Per Participant




The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

## Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Alcohol use disorder | 40 | 3 | 684 | -0.001 | 0.124 | 41 | 0.000 | 0.186 | 44 | -0.001 | 0.995 |
| Blood pressure^ | 40 | 1 | 751 | -0.168 | 0.071 | 41 | n/a | n/a | n/a | -0.168 | 0.019 |
| Blood sugar (HbA1c)^ | 40 | 1 | 751 | 0.225 | 0.105 | 41 | n/a | n/a | n/a | 0.225 | 0.033 |
| Cholesterol^ | 40 | 1 | 751 | 0.071 | 0.122 | 41 | n/a | n/a | n/a | 0.071 | 0.562 |
| Death | 40 | 2 | 98 | -0.077 | 0.160 | 41 | n/a | n/a | n/a | -0.077 | 0.632 |
| Emergency department visits | 40 | 3 | 753 | -0.090 | 0.105 | 41 | 0.000 | 0.000 | 42 | -0.090 | 0.388 |
| Hospitalization | 40 | 5 | 10449 | -0.050 | 0.060 | 41 | 0.000 | 0.000 | 42 | -0.050 | 0.403 |
| Hospitalization (psychiatric) | 40 | 1 | 59 | -0.068 | 0.293 | 41 | 0.000 | 0.000 | 42 | -0.068 | 0.818 |
| Illicit drug use disorder | 40 | 2 | 643 | -0.016 | 0.081 | 41 | 0.000 | 0.187 | 44 | -0.016 | 0.845 |
| Primary care visits^ | 40 | 2 | 417 | 0.531 | 0.188 | 41 | 0.000 | 0.000 | 42 | 0.531 | 0.005 |

^WSIPP's benefit-cost model does not monetize this outcome.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

## Citations Used in the Meta-Analysis


Druss, B.G., Rohrbaugh, R.M., Levinson, C.M., & Rosenheck, R.A. (2001). Integrated medical care for patients with serious psychiatric illness: a randomized trial. *Archives of General Psychiatry, 58*(9), 861-8.

Kilbourne, A.M., Pirraglia, P.A., Lai, Z., Bauer, M.S., Charns, M.P., Greenwald, D., . . . Yano, E.M. (2011). Quality of general medical care among patients with serious mental illness: does colocation of services matter?. *Psychiatric Services, 62*(8), 922-928.

Parthasarathy, S., Mertens, J., Moore, C., & Weisner, C. (2003). Utilization and Cost Impact of Integrating Substance Abuse Treatment and Primary Care. *Medical Care, 41*(3), 357-367.

Pirraglia, P.A., Kilbourne, A.M., Lai, Z., Friedmann, P.D., & O'Toole, T.P. (2011). Colocated general medical care and preventable hospital admissions for veterans with serious mental illness. *Psychiatric Services, 62*(5), 554-557.

Saxon, A.J., Malte, C.A., Sloan, K.L., Baer, J.S., Calsyn, D.A., Nichol, P., . . . Kivlahan, D.R. (2006). Randomized Trial of Onsite Versus Referral Primary Medical Care for Veterans in Addictions Treatment. *Medical Care, 44*(4), 334-342.

Weisner, C., Mertens, J., Parthasarathy, S., Moore, C., & Lu, Y. (2001). Integrating primary medical care with addiction treatment: A randomized controlled trial. *JAMA : The Journal of the American Medical Association, 286*(14), 1715-1723.

Willenbring, M.L., & Olson, D.H. (1999). A randomized trial of integrated outpatient treatment for medically ill alcoholic men. *Archives of Internal Medicine, 159*(16), 1946-1952.

Willenbring, M.L., Olson, D.H., & Bielinski, J. (1995). Integrated Outpatient Treatment for Medically Ill Alcoholic Men: Results from a Quasi-Experimental Study. *Journal of Studies on Alcohol, 56*(3), 337.

# Acceptance and Commitment Therapy for schizophrenia/psychosis

## Adult Mental Health: Serious Mental Illness

Benefit-cost estimates updated December 2017. Literature review updated September 2016.

Program Description: Acceptance and Commitment Therapy for schizophrenia/psychosis aims to increase client acceptance of psychotic symptoms (such as hallucinations and delusions) and reduce the negative behavioral impact of psychosis. Acceptance and Commitment Therapy relies on six core processes of change: 1) acceptance; 2) learning to view thoughts as hypotheses rather than facts; 3) being present; 4) viewing the self as context for experience; 5) identifying core values; and 6) acting based on those values. These core principles are applied through various exercises and through homework.

Treatment groups received 2 to 16 hours of individual acceptance and commitment therapy. Treatments in this review provided acceptance and commitment therapy as an addition to usual treatment; comparison groups received usual treatment. This review excludes studies of acceptance and commitment therapy for other disorders.

## Benefit-Cost Summary Statistics Per Participant

### Benefits to:

| | |
|---|---|
| Taxpayers | $892 |
| Participants | $12 |
| Others | $201 |
| Indirect | $94 |
| Total benefits | $1,199 |
| Net program cost | ($700) |
| Benefits minus cost | $498 |

| | |
|---|---|
| Benefit to cost ratio | $1.71 |
| Benefits minus costs | $498 |
| Chance the program will produce benefits greater than the costs | 58 % |

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

## Detailed Monetary Benefit Estimates Per Participant

### Benefits from changes to:[1] Benefits to:

| | Participants | Taxpayers | Others[2] | Indirect[3] | Total |
|---|---|---|---|---|---|
| Health care associated with psychiatric hospitalization | $12 | $892 | $201 | $445 | $1,550 |
| Adjustment for deadweight cost of program | $0 | $0 | $0 | ($352) | ($352) |
| Totals | $12 | $892 | $201 | $94 | $1,199 |

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

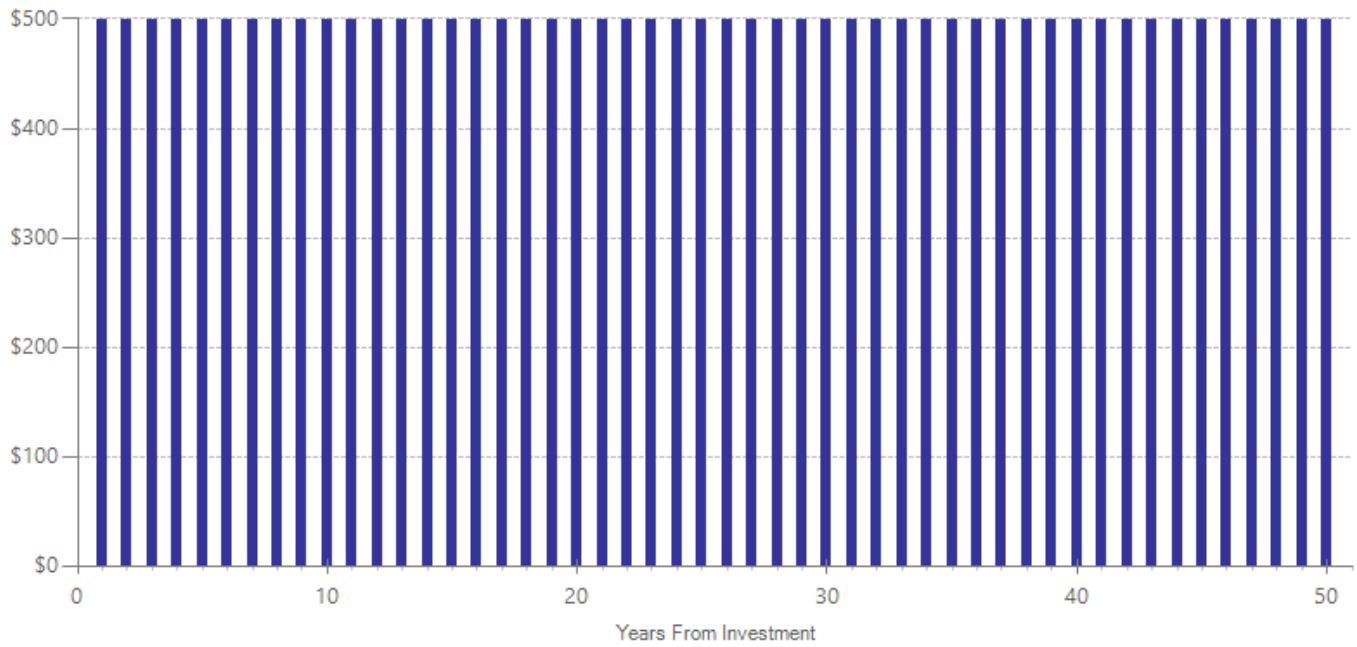
## Detailed Annual Cost Estimates Per Participant

| | Annual cost | Year dollars | Summary | |
|---|---|---|---|---|
| Program costs | $693 | 2015 | Present value of net program costs (in 2016 dollars) | ($700) |
| Comparison costs | $0 | 2015 | Cost range (+ or -) | 15 % |

These therapies took place over 2-12 weekly or bi-weekly sessions; total length of treatment was 6 weeks on average. The per-participant cost of treatment was weighted by the treatment Ns reported in the studies. Cost per session is $122.25/session (2015 dollars). This rate is based on actuarial tables reported in Mercer (2014) Behavioral Health Data Book for the State of Washington For Rates Effective January 1, 2015.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

## Detailed Annual Cost Estimates Per Participant




The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

## Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Global functioning^ | 40 | 2 | 39 | 0.214 | 0.231 | 40 | 0.158 | 0.433 | 41 | 0.214 | 0.355 |
| Hospitalization (psychiatric) | 40 | 3 | 64 | -0.596 | 0.245 | 40 | 0.000 | 0.118 | 41 | -0.596 | 0.015 |
| Medication adherence^ | 40 | 1 | 35 | -0.245 | 0.329 | 40 | -0.181 | 0.522 | 41 | -0.245 | 0.457 |
| Psychiatric symptoms^ | 40 | 2 | 39 | -0.454 | 0.233 | 40 | -0.337 | 0.522 | 41 | -0.454 | 0.051 |
| Psychosis symptoms (negative)^ | 40 | 3 | 53 | -0.433 | 0.209 | 40 | -0.321 | 0.500 | 41 | -0.433 | 0.038 |
| Psychosis symptoms (positive)^ | 40 | 3 | 53 | -0.230 | 0.198 | 40 | -0.170 | 0.411 | 41 | -0.230 | 0.247 |

^WSIPP's benefit-cost model does not monetize this outcome.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

## Citations Used in the Meta-Analysis


Bach, P., & Hayes, S.C. (2002). The use of acceptance and commitment therapy to prevent the rehospitalization of psychotic patients: a randomized controlled trial., *Journal of Consulting and Clinical Psychology, 70,* (5), 1129-39.

Gaudiano, B.A., & Herbert, J.D. (2006). Acute treatment of inpatients with psychotic symptoms using Acceptance and Commitment Therapy: Pilot results. *Behaviour Research and Therapy, 44,* (3), 415-437.

White, R., Gumley, A., McTaggart, J., Rattrie, L., McConville, D., Cleare, S., & Mitchell, G. (2011). A feasibility study of Acceptance and Commitment Therapy for emotional dysfunction following psychosis. *Behaviour Research and Therapy, 49,* (12), 901-907.

Shawyer, F., Farhall, J., Mackinnon, A., Trauer, T., Sims, E., Ratcliff, K., Larner, C., ... Copolov, D. (2012). A randomised controlled trial of acceptance-based cognitive behavioural therapy for command hallucinations in psychotic disorders. *Behaviour Research and Therapy, 50,* (2), 110-121.

Tyrberg, M.J., Carlbring, P., Lundgren, T., Tyrberg, M.J., & Lundgren, T. (2016). Brief acceptance and commitment therapy for psychotic inpatients: A randomized controlled feasibility trial in Sweden. *Nordic Psychology,* 1-16.

# Mobile crisis response

## Adult Mental Health: Serious Mental Illness

Benefit-cost estimates updated December 2017. Literature review updated May 2014.

Program Description: Mobile crisis interventions dispatch teams with mental health training (rather than the standard police response) to stabilize patients who are experiencing a psychiatric emergency. Two types of mobile crisis interventions were included in this analysis (1) an interdisciplinary team who was dispatched after individuals called a mental health hotline and (2) a 911 response team staffed by police and psychiatric nurses.

## Benefit-Cost Summary Statistics Per Participant

### Benefits to:

| | |
|---|---|
| Taxpayers | $1,190 |
| Participants | $10 |
| Others | $161 |
| Indirect | ($3) |
| Total benefits | $1,358 |
| Net program cost | ($1,196) |
| Benefits minus cost | $162 |

| | |
|---|---|
| Benefit to cost ratio | $1.14 |
| Benefits minus costs | $162 |
| Chance the program will produce benefits greater than the costs | 48 % |

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

## Detailed Monetary Benefit Estimates Per Participant

### Benefits from changes to:[1] Benefits to:

| | Participants | Taxpayers | Others[2] | Indirect[3] | Total |
|---|---|---|---|---|---|
| Crime | $0 | $476 | $0 | $238 | $715 |
| Health care associated with psychiatric hospitalization | $10 | $714 | $161 | $360 | $1,244 |
| Adjustment for deadweight cost of program | $0 | $0 | $0 | ($600) | ($600) |
| Totals | $10 | $1,190 | $161 | ($3) | $1,358 |

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

## Detailed Annual Cost Estimates Per Participant

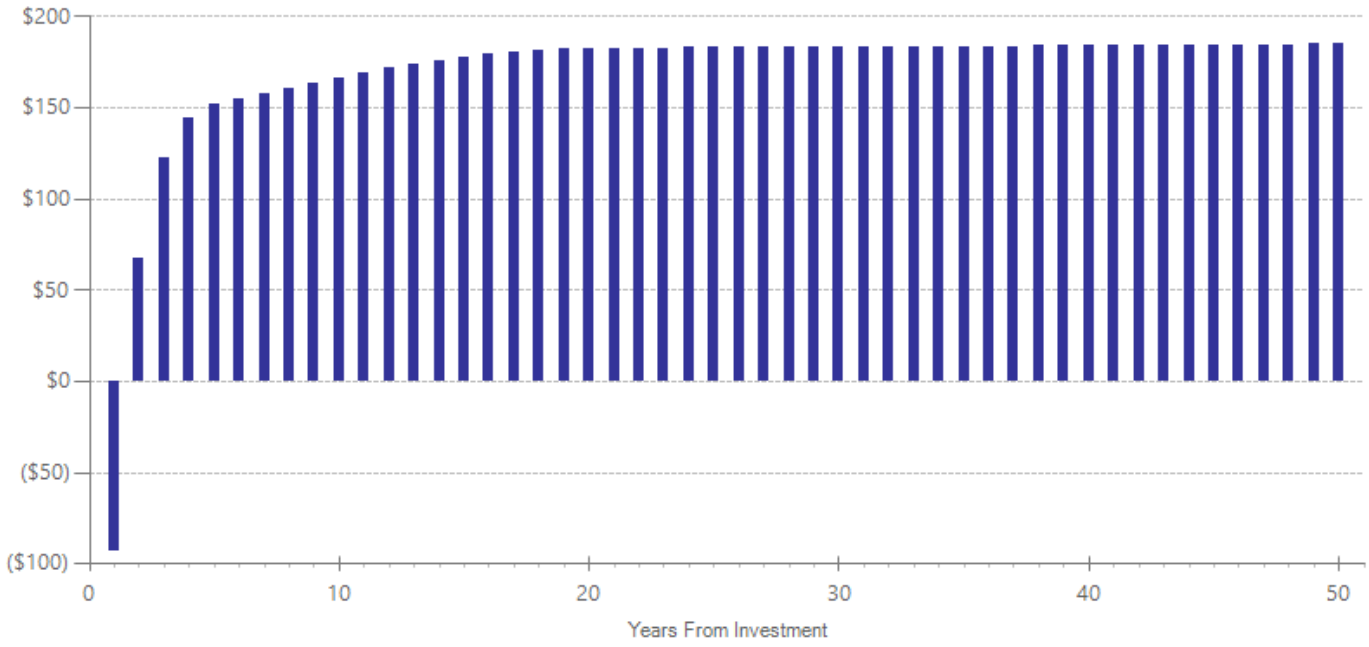
| | Annual cost | Year dollars | Summary | |
|---|---|---|---|---|
| Program costs | $1,124 | 2011 | Present value of net program costs (in 2016 dollars) | ($1,196) |
| Comparison costs | $0 | 2011 | Cost range (+ or -) | 10 % |

Per-participant staffing costs were computed by dividing the number of hours that psychiatric nurses staffed the response teams in Scott (2000) by the number of clients served by the response team. We multiplied those hours by the hourly rate of a psychiatric nurse, estimated using the individual adult treatment rate in Mercer, (2013). Behavioral health data book for the state of Washington for rates effective January 1, 2014.

Scott, R.L. (2000). Evaluation of a mobile crisis program: effectiveness, efficiency, and consumer satisfaction. *Psychiatric Services, 51*(9), 1153-1156.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

## Detailed Annual Cost Estimates Per Participant




The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

## Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Crime | 36 | 1 | 73 | -0.468 | 0.363 | 36 | 0.000 | 0.000 | 37 | -0.468 | 0.197 |
| Hospitalization (psychiatric) | 36 | 2 | 1173 | -0.420 | 0.216 | 36 | 0.000 | 0.000 | 37 | -0.420 | 0.052 |

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

## Citations Used in the Meta-Analysis


Guo, S., Biegel, D.E., Johnsen, J.A., & Dyches, H. (2001). Assessing the impact of community-based mobile crisis services on preventing hospitalization. *Psychiatric Services, 52*(2), 223-228.

Scott, R.L. (2000). Evaluation of a mobile crisis program: effectiveness, efficiency, and consumer satisfaction. *Psychiatric Services, 51*(9), 1153-1156.

# Primary care in behavioral health settings

## Adult Mental Health: Serious Mental Illness

Benefit-cost estimates updated December 2017. Literature review updated May 2014.

Program Description: These studies evaluated co-location of primary care in behavioral health settings (mental health and substance abuse treatment centers). That is, the primary care provider was located at, or adjacent to, the behavioral health facility. Of 11 studies, six were conducted in Veterans' Administration health facilities; two were conducted at Kaiser Permanente addiction centers; and three were conducted at other community addiction treatment centers.

## Benefit-Cost Summary Statistics Per Participant

### Benefits to:

| | |
|---|---|
| Taxpayers | $116 |
| Participants | ($117) |
| Others | $63 |
| Indirect | $83 |
| Total benefits | $146 |
| Net program cost | ($220) |
| Benefits minus cost | ($75) |

| | |
|---|---|
| Benefit to cost ratio | $0.66 |
| Benefits minus costs | ($75) |
| Chance the program will produce benefits greater than the costs | 50 % |

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

## Detailed Monetary Benefit Estimates Per Participant

| Benefits from changes to:[1] | Benefits to: | | | | |
|---|---|---|---|---|---|
| | Participants | Taxpayers | Others[2] | Indirect[3] | Total |
| Crime | $0 | $0 | $0 | $0 | $0 |
| Labor market earnings associated with smoking | ($147) | ($67) | $0 | ($4) | ($218) |
| Health care associated with smoking | ($5) | ($16) | ($19) | ($8) | ($48) |
| Property loss associated with alcohol abuse or dependence | $0 | $0 | $0 | $0 | $0 |
| Labor market earnings associated with illicit drug abuse or dependence | $28 | $13 | $0 | $114 | $155 |
| Health care associated with general hospitalization | $2 | $39 | $34 | $20 | $95 |
| Health care associated with psychiatric hospitalization | $2 | $130 | $29 | $65 | $225 |
| Health care associated with emergency department visits | $3 | $17 | $19 | $8 | $47 |
| Adjustment for deadweight cost of program | $0 | $0 | $0 | ($110) | ($110) |
| Totals | ($117) | $116 | $63 | $83 | $146 |

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

## Detailed Annual Cost Estimates Per Participant

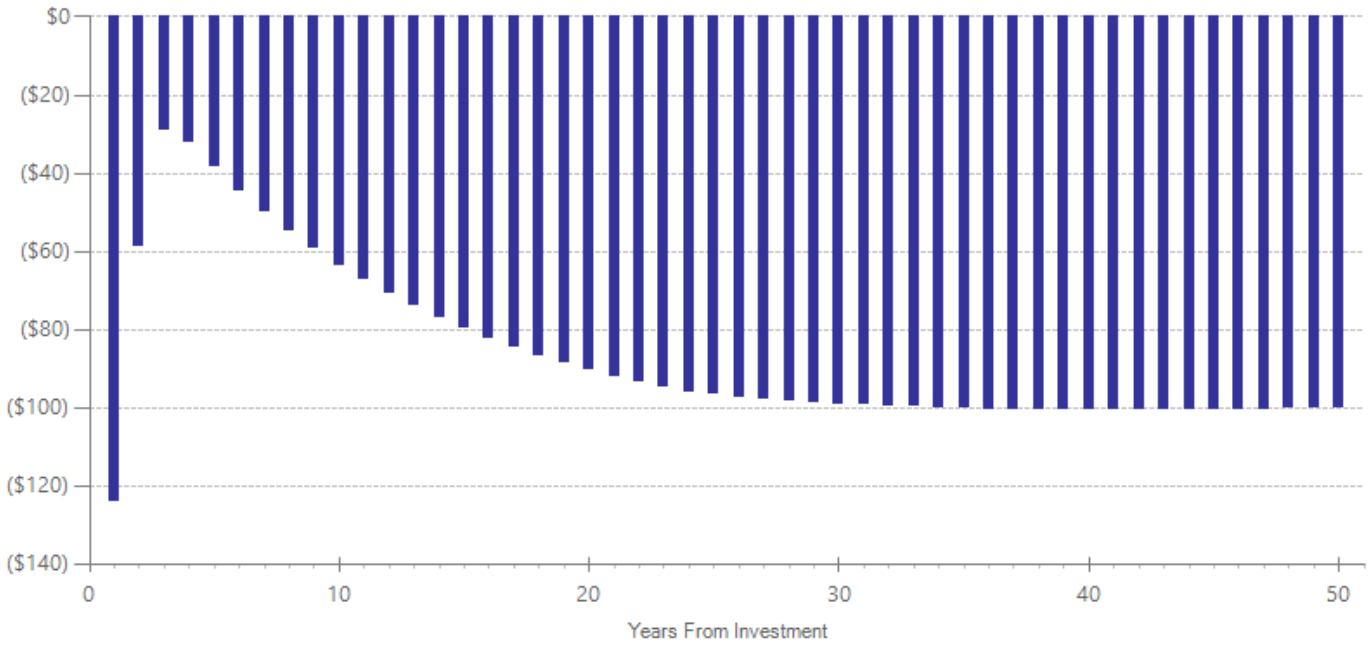
| | Annual cost | Year dollars | Summary | |
|---|---|---|---|---|
| Program costs | $217 | 2014 | Present value of net program costs (in 2016 dollars) | ($220) |
| Comparison costs | $0 | 2014 | Cost range (+ or -) | 20 % |

According to Saxon et al., (2006), patients in the clinics co-located at Veterans' Administration centers had an average of 1.1 more primary care visits than the comparison group in 12 months. Samet, et al. (2003) found those in a community clinic used 1.0 more primary care visits than the comparison group. For this combination location, assume an average of 1.05 visits per patient. We estimate additional cost of the program by multiplying 1.05 visits by the Medicaid enhanced payment rate for the longest primary care visit. See http://www.hca.wa.gov/medicaid/pages/aca_rates.aspx.

Saxon et al., (2006). Randomized trial of onsite versus referral primary medical care for veterans in addictions treatment. *Medical Care, 44*(4), 334-342.
Samet et al., (2003). Linking alcohol- and drug-dependent adults to primary medical care: A randomized controlled trial of a multi-disciplinary health intervention in a detoxification unit. *Addiction, 98*(4), 509-516.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

## Detailed Annual Cost Estimates Per Participant




The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

## Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Alcohol use disorder | 41 | 3 | 684 | -0.001 | 0.124 | 41 | 0.000 | 0.186 | 44 | -0.001 | 0.995 |
| Blood pressure^ | 41 | 2 | 1192 | -0.151 | 0.067 | 41 | n/a | n/a | n/a | -0.151 | 0.023 |
| Blood sugar (HbA1c)^ | 41 | 2 | 1072 | 0.164 | 0.104 | 41 | n/a | n/a | n/a | 0.164 | 0.117 |
| Cholesterol^ | 41 | 2 | 1515 | -0.013 | 0.121 | 41 | n/a | n/a | n/a | -0.013 | 0.915 |
| Death | 41 | 2 | 98 | -0.077 | 0.160 | 41 | 0.000 | 0.000 | 43 | -0.077 | 0.632 |
| Emergency department visits | 41 | 9 | 7320 | -0.077 | 0.043 | 41 | 0.000 | 0.000 | 42 | -0.077 | 0.073 |
| Hospitalization | 41 | 9 | 11301 | -0.052 | 0.044 | 41 | 0.000 | 0.000 | 42 | -0.052 | 0.235 |
| Hospitalization (psychiatric) | 41 | 1 | 59 | -0.068 | 0.293 | 41 | 0.000 | 0.000 | 42 | -0.068 | 0.818 |
| Illicit drug use disorder | 41 | 2 | 643 | -0.016 | 0.081 | 41 | 0.000 | 0.187 | 44 | -0.016 | 0.845 |
| Obesity | 41 | 1 | 435 | -0.002 | 0.194 | 41 | 0.000 | 0.086 | 43 | -0.002 | 0.992 |
| Primary care visits^ | 41 | 7 | 1361 | 0.235 | 0.157 | 41 | 0.000 | 0.000 | 42 | 0.235 | 0.136 |
| Regular smoking | 41 | 1 | 453 | 0.116 | 0.194 | 41 | 0.000 | 0.000 | 42 | 0.116 | 0.548 |

^WSIPP's benefit-cost model does not monetize this outcome.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

## Citations Used in the Meta-Analysis


Druss, B.G., Rohrbaugh, R.M., Levinson, C.M., & Rosenheck, R.A. (2001). Integrated medical care for patients with serious psychiatric illness: a randomized trial. *Archives of General Psychiatry, 58*(9), 861-8.

Friedmann, P.D., Hendrickson, J.C., Gerstein, D.R., Zhang, Z., & Stein, M.D. (2006). Do Mechanisms That Link Addiction Treatment Patients to Primary Care Influence Subsequent Utilization of Emergency and Hospital Care?. *Medical Care, 44*(1), 8-15.

Kilbourne, A.M., Pirraglia, P.A., Lai, Z., Bauer, M.S., Charns, M.P., Greenwald, D., . . . Yano, E.M. (2011). Quality of general medical care among patients with serious mental illness: does colocation of services matter?. *Psychiatric Services, 62*(8), 922-928.

Laine, C., Hauck, W.W., & Turner, B.J. (2005). Availability of Medical Care Services in Drug Treatment Clinics Associated with Lower Repeated Emergency Department Use. *Medical Care, 43*(10), 985-995.

Parthasarathy, S., Mertens, J., Moore, C., & Weisner, C. (2003). Utilization and Cost Impact of Integrating Substance Abuse Treatment and Primary Care. *Medical Care, 41*(3), 357-367.

Pirraglia, P.A., Kilbourne, A.M., Lai, Z., Friedmann, P.D., & O'Toole, T.P. (2011). Colocated general medical care and preventable hospital admissions for veterans with serious mental illness. *Psychiatric Services, 62*(5), 554-557.

Saxon, A.J., Malte, C.A., Sloan, K.L., Baer, J.S., Calsyn, D.A., Nichol, P., . . . Kivlahan, D.R. (2006). Randomized Trial of Onsite Versus Referral Primary Medical Care for Veterans in Addictions Treatment. *Medical Care, 44*(4), 334-342.

Scharf, D.M, Eberhart, N.K., Horvitz-Lennon, M., R. Beckman, Han, B., Lovejoy, S., Pincus, H.A., Burnam, M.A. (2013). *Evaluation of the SAMHSA Primary and Behavioral ehalth Care Integration Program: Final report.* Rand Corporation. http://aspe.hhs.gov/daltcp/reports/2013/PBHCIfr.shtml

Umbricht-Schneiter, A., Ginn, D.H., Pabst, K.M., & Bigelow, G.E. (1994). Providing medical care to methadone clinic patients: referral vs on-site care. *American Journal of Public Health, 84*(2), 207-210.

Weisner, C., Mertens, J., Parthasarathy, S., Moore, C., & Lu, Y. (2001). Integrating primary medical care with addiction treatment: A randomized controlled trial. *JAMA : The Journal of the American Medical Association, 286*(14), 1715-1723.

Willenbring, M.L., & Olson, D.H. (1999). A randomized trial of integrated outpatient treatment for medically ill alcoholic men. *Archives of Internal Medicine, 159*(16), 1946-1952.

Willenbring, M.L., Olson, D.H., & Bielinski, J. (1995). Integrated Outpatient Treatment for Medically Ill Alcoholic Men: Results from a Quasi-Experimental Study. *Journal of Studies on Alcohol, 56*(3), 337.

# Primary care in behavioral health settings (community-based settings)

## Adult Mental Health: Serious Mental Illness

Benefit-cost estimates updated December 2017. Literature review updated May 2014.

Program Description: Behavioral health settings (mental health and substance abuse treatment centers) provide primary care for patients on site or nearby. This collection of studies evaluate this practice at community-based treatment centers.

## Benefit-Cost Summary Statistics Per Participant

### Benefits to:

| | |
|---|---|
| Taxpayers | ($27) |
| Participants | ($147) |
| Others | $34 |
| Indirect | ($122) |
| Total benefits | ($262) |
| Net program cost | ($274) |
| Benefits minus cost | ($536) |

| | |
|---|---|
| Benefit to cost ratio | ($0.96) |
| Benefits minus costs | ($536) |
| Chance the program will produce benefits greater than the costs | 25 % |

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

## Detailed Monetary Benefit Estimates Per Participant

### Benefits from changes to:[1] Benefits to:

| | Participants | Taxpayers | Others[2] | Indirect[3] | Total |
|---|---|---|---|---|---|
| Labor market earnings associated with smoking | ($148) | ($67) | $0 | ($4) | ($219) |
| Health care associated with smoking | ($5) | ($16) | ($19) | ($8) | ($48) |
| Health care associated with general hospitalization | $2 | $38 | $33 | $19 | $93 |
| Health care associated with emergency department visits | $3 | $17 | $20 | $9 | $49 |
| Labor market earnings associated with obesity | $0 | $0 | $0 | $0 | $0 |
| Adjustment for deadweight cost of program | $0 | $0 | $0 | ($138) | ($138) |
| Totals | ($147) | ($27) | $34 | ($122) | ($262) |

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

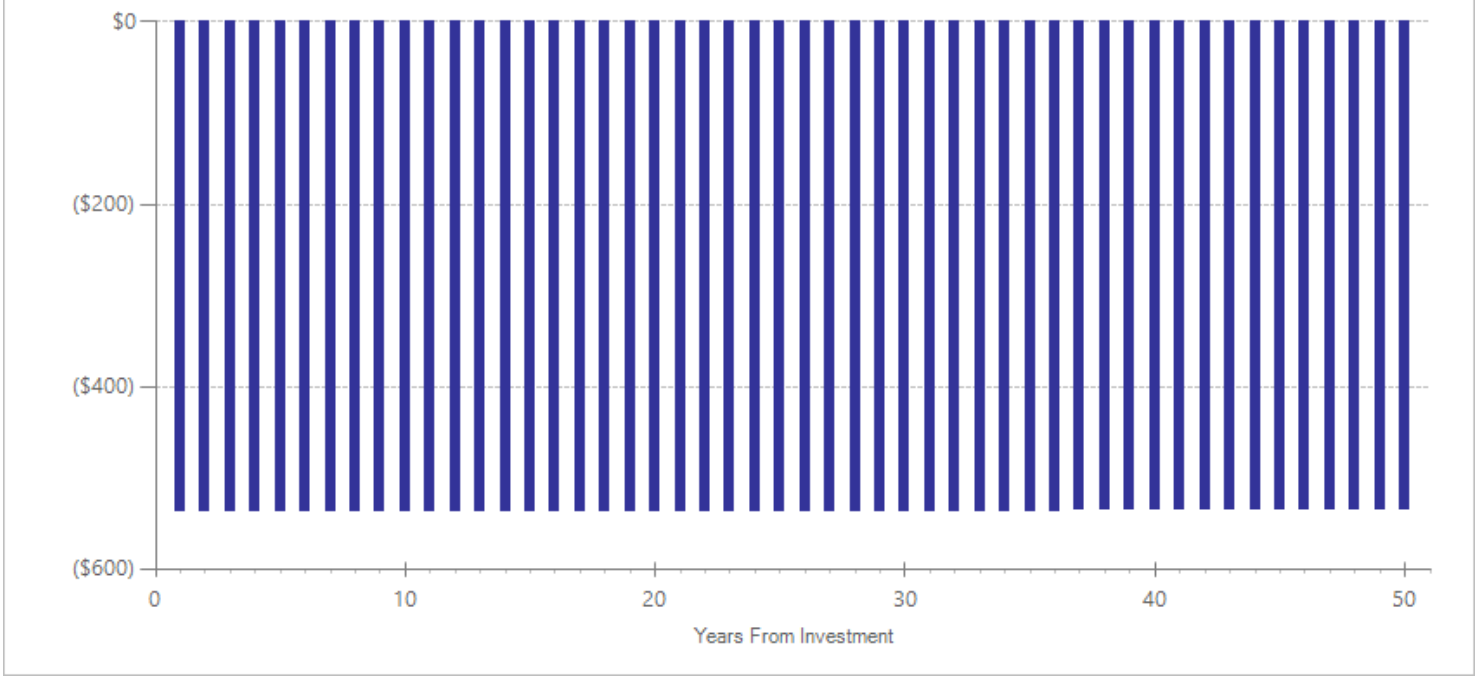
## Detailed Annual Cost Estimates Per Participant

| | Annual cost | Year dollars | Summary | |
|---|---|---|---|---|
| Program costs | $270 | 2014 | Present value of net program costs (in 2016 dollars) | ($274) |
| Comparison costs | $0 | 2014 | Cost range (+ or -) | 20 % |

According to Samet et al. (2003). Linking alcohol- and drug-dependent adults to primary medical care: A randomized controlled trial of a multi-disciplinary health intervention in a detoxification unit. *Addiction, 98*(4), 509-516, patients in the treatment group received an average of 1 more primary care visit in 12 months than did those in the comparison group. The average visit cost for primary care visit at Navos in Seattle (an example of a community-based treatment center) is $270 (per email from Paul Tagenfeldt to M. Miller, April 25, 2014).

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

## Detailed Annual Cost Estimates Per Participant




The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

## Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Blood pressure^ | 41 | 1 | 441 | -0.022 | 0.194 | 41 | n/a | n/a | n/a | -0.022 | 0.909 |
| Blood sugar (HbA1c)^ | 41 | 1 | 321 | -0.015 | 0.198 | 41 | n/a | n/a | n/a | -0.015 | 0.940 |
| Cholesterol^ | 41 | 1 | 370 | -0.188 | 0.196 | 41 | n/a | n/a | n/a | -0.188 | 0.338 |
| Emergency department visits | 41 | 6 | 6585 | -0.081 | 0.051 | 41 | 0.000 | 0.000 | 42 | -0.081 | 0.117 |
| Hospitalization | 41 | 4 | 852 | -0.052 | 0.092 | 41 | 0.000 | 0.000 | 42 | -0.052 | 0.572 |
| Obesity | 41 | 1 | 435 | -0.002 | 0.194 | 41 | n/a | n/a | n/a | -0.002 | 0.992 |
| Primary care visits^ | 41 | 5 | 944 | 0.111 | 0.197 | 41 | 0.000 | 0.000 | 42 | 0.111 | 0.020 |
| Regular smoking | 41 | 1 | 453 | 0.116 | 0.194 | 41 | 0.000 | 0.000 | 42 | 0.116 | 0.548 |

^WSIPP's benefit-cost model does not monetize this outcome.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

## Citations Used in the Meta-Analysis


Friedmann, P.D., Hendrickson, J.C., Gerstein, D.R., Zhang, Z., & Stein, M.D. (2006). Do Mechanisms That Link Addiction Treatment Patients to Primary Care Influence Subsequent Utilization of Emergency and Hospital Care?. *Medical Care, 44*(1), 8-15.

Laine, C., Hauck, W.W., & Turner, B.J. (2005). Availability of Medical Care Services in Drug Treatment Clinics Associated with Lower Repeated Emergency Department Use. *Medical Care, 43*(10), 985-995.

Scharf, D.M, Eberhart, N.K., Horvitz-Lennon, M., R. Beckman, Han, B., Lovejoy, S., Pincus, H.A., Burnam, M.A. (2013). *Evaluation of the SAMHSA Primary and Behavioral ehalth Care Integration Program: Final report.* Rand Corporation. http://aspe.hhs.gov/daltcp/reports/2013/PBHCIfr.shtml

Umbricht-Schneiter, A., Ginn, D.H., Pabst, K.M., & Bigelow, G.E. (1994). Providing medical care to methadone clinic patients: referral vs on-site care. *American Journal of Public Health, 84*(2), 207-210.

# Peer support: Substitution of a peer specialist for a non-peer on the treatment team

## Adult Mental Health: Serious Mental Illness

Benefit-cost estimates updated December 2017. Literature review updated May 2014.

Program Description: The programs examined in this analysis compared treatment teams with a peer specialist to treatment teams with a non-peer in a similar role. The treatment teams in this analysis provided services to individuals with severe mental illness, major depression or individuals receiving Veterans' Administration services for a psychiatric diagnosis.

## Benefit-Cost Summary Statistics Per Participant

### Benefits to:

| | |
|---|---|
| Taxpayers | ($502) |
| Participants | ($266) |
| Others | ($686) |
| Indirect | ($189) |
| Total benefits | ($1,644) |
| Net program cost | $0 |
| Benefits minus cost | ($1,644) |

| | |
|---|---|
| Benefit to cost ratio | n/a |
| Benefits minus costs | ($1,644) |
| Chance the program will produce benefits greater than the costs | 24 % |

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

## Detailed Monetary Benefit Estimates Per Participant

### Benefits from changes to:[1] Benefits to:

| | Participants | Taxpayers | Others[2] | Indirect[3] | Total |
|---|---|---|---|---|---|
| Crime | $0 | ($405) | ($766) | ($201) | ($1,373) |
| Labor market earnings associated with alcohol abuse or dependence | ($280) | ($127) | $0 | ($4) | ($411) |
| Health care associated with alcohol abuse or dependence | ($1) | ($8) | ($8) | ($4) | ($22) |
| Property loss associated with alcohol abuse or dependence | $0 | $0 | ($1) | $0 | ($1) |
| Health care associated with psychiatric hospitalization | ($1) | ($48) | ($11) | ($23) | ($82) |
| Health care associated with emergency department visits | $16 | $86 | $100 | $43 | $245 |
| Totals | ($266) | ($502) | ($686) | ($189) | ($1,644) |

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

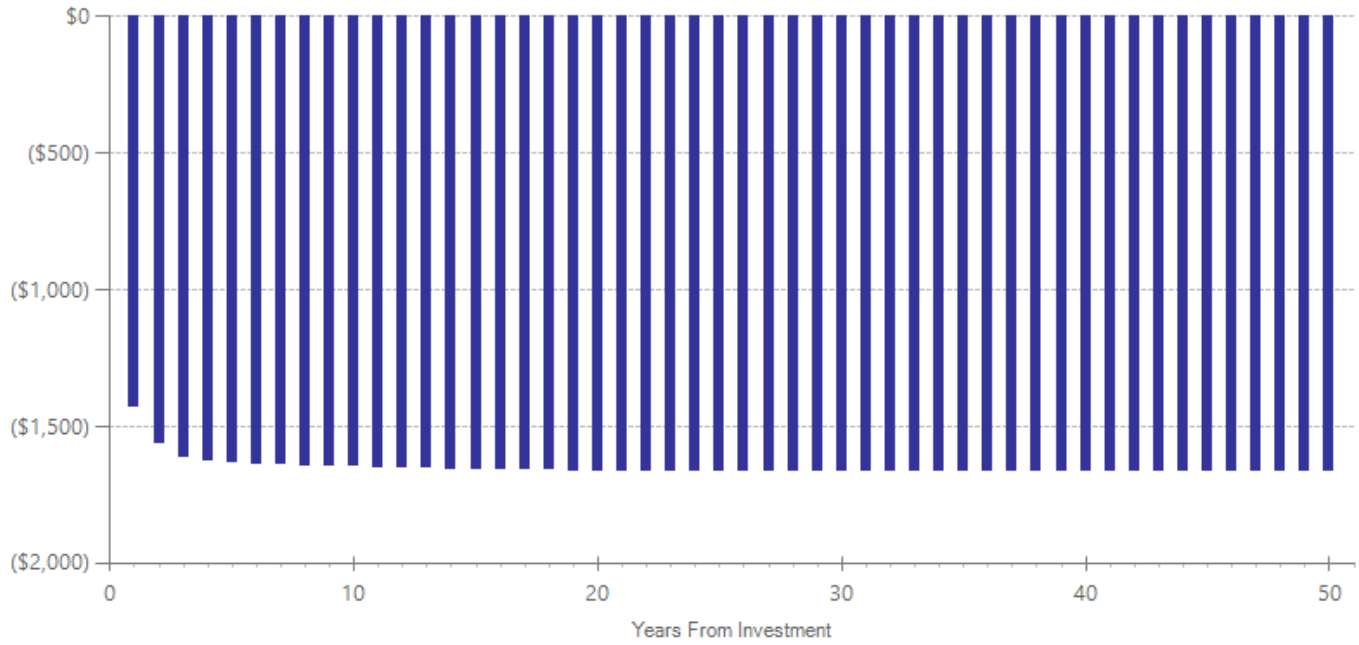
## Detailed Annual Cost Estimates Per Participant

| | Annual cost | Year dollars | Summary | |
|---|---|---|---|---|
| Program costs | $0 | 2012 | Present value of net program costs (in 2016 dollars) | $0 |
| Comparison costs | $0 | 2012 | Cost range (+ or -) | 10 % |

In all studies the peer specialists and non-peer staff had similar roles. Therefore, we did not impute a greater or lesser cost to peer support versus other providers—the net per-participant cost is zero.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

## Detailed Annual Cost Estimates Per Participant




The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

## Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Alcohol use disorder | 44 | 1 | 113 | 0.169 | 0.141 | 44 | 0.000 | 0.000 | 45 | 0.169 | 0.228 |
| Crime | 44 | 2 | 81 | 0.256 | 0.221 | 44 | 0.000 | 0.000 | 45 | 0.256 | 0.246 |
| Emergency department visits | 44 | 1 | 57 | -0.471 | 0.244 | 44 | 0.000 | 0.000 | 45 | -0.471 | 0.053 |
| Employment | 44 | 1 | 113 | -0.080 | 0.141 | 44 | 0.000 | 0.000 | 45 | -0.080 | 0.569 |
| Homelessness^ | 44 | 2 | 149 | 0.045 | 0.122 | 44 | 0.000 | 0.000 | 45 | 0.045 | 0.711 |
| Hospitalization (psychiatric) | 44 | 4 | 208 | 0.022 | 0.174 | 44 | 0.000 | 0.000 | 45 | 0.022 | 0.901 |
| Psychiatric symptoms^ | 44 | 6 | 338 | 0.050 | 0.131 | 44 | 0.000 | 0.000 | 45 | 0.050 | 0.701 |

^WSIPP's benefit-cost model does not monetize this outcome.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

## Citations Used in the Meta-Analysis


Bright, J.I., Baker, K.D., & Neimeyer, R.A. ( 1999). Professional and paraprofessional group treatments for depression: a comparison of cognitive-behavioral and mutual support interventions. *Journal of Consulting and Clinical Psychology, 67*(4), 491-501.

Chinman, M.J., Rosenheck, R., Lam, J.A., & Davidson, L. (2000). Comparing consumer and nonconsumer provided case management services for homeless persons with serious mental illness. *The Journal of Nervous and Mental Disease, 188*(7), 446-453.

Clarke, G.N., Herinckx, H.A., Kinney, R.F., Paulson, R.I., Cutler, D.L., Lewis, K., & Oxman, E. (2000). Psychiatric hospitalizations, arrests, emergency room visits, and homelessness of clients with serious and persistent mental illness: findings from a randomized trial of two ACT programs vs. usual care.*Mental Health Services Research, 2*(3),155-164.

Eisen, S.V., Schultz, M.R., Mueller, L.N., Degenhart, C., Clark, J.A., Resnick, S.G., Christiansen, C.L., ..., & Sadow, D. (2012). Outcome of a randomized study of a mental health peer education and support group in the VA. *Psychiatric Services, 63*(12), 1243-1246.

Felton, C.J., Stastny, P., Shern, D.L., Blanch, A., Donahue, S.A., Knight, E., & Brown, C. (1995). Consumers as peer specialists on intensive case management teams: Impact on client outcomes. *Psychiatric Services, 46*(10), 1037-1044.

Rivera, J.J., Sullivan, A.M., & Valenti, S.S. (2007). Adding consumer-providers to intensive case management: Does it improve outcome?. *Psychiatric Services 58*(6), 802-809.

Solomon, P. & Draine, J. (1995). The efficacy of a consumer case management team: 2-year outcomes of a randomized trial. *Journal of Mental Health Administration, 22*(2), 135-146.

# Peer support: Addition of a peer specialist to the treatment team

## Adult Mental Health: Serious Mental Illness

Benefit-cost estimates updated December 2017. Literature review updated May 2014.

Program Description: The programs examined in this analysis compared treatment teams with a peer specialist to treatment teams without a peer specialist. The treatment teams in this analysis provided services to individuals with serious mental illness or individuals receiving VA services for a psychiatric diagnosis.

## Benefit-Cost Summary Statistics Per Participant

### Benefits to:

| | |
|---|---|
| Taxpayers | $1,147 |
| Participants | $2,206 |
| Others | $35 |
| Indirect | ($1,690) |
| Total benefits | $1,698 |
| Net program cost | ($3,518) |
| Benefits minus cost | ($1,820) |

| | |
|---|---|
| Benefit to cost ratio | $0.48 |
| Benefits minus costs | ($1,820) |
| Chance the program will produce benefits greater than the costs | 26 % |

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

## Detailed Monetary Benefit Estimates Per Participant

### Benefits from changes to:[1] — Benefits to:

| | Participants | Taxpayers | Others[2] | Indirect[3] | Total |
|---|---|---|---|---|---|
| Crime | $0 | $1 | $2 | $0 | $3 |
| Labor market earnings associated with employment | $2,204 | $1,001 | $0 | $0 | $3,205 |
| Health care associated with psychiatric hospitalization | $2 | $145 | $33 | $73 | $252 |
| Adjustment for deadweight cost of program | $0 | $0 | $0 | ($1,763) | ($1,763) |
| Totals | $2,206 | $1,147 | $35 | ($1,690) | $1,698 |

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

## Detailed Annual Cost Estimates Per Participant

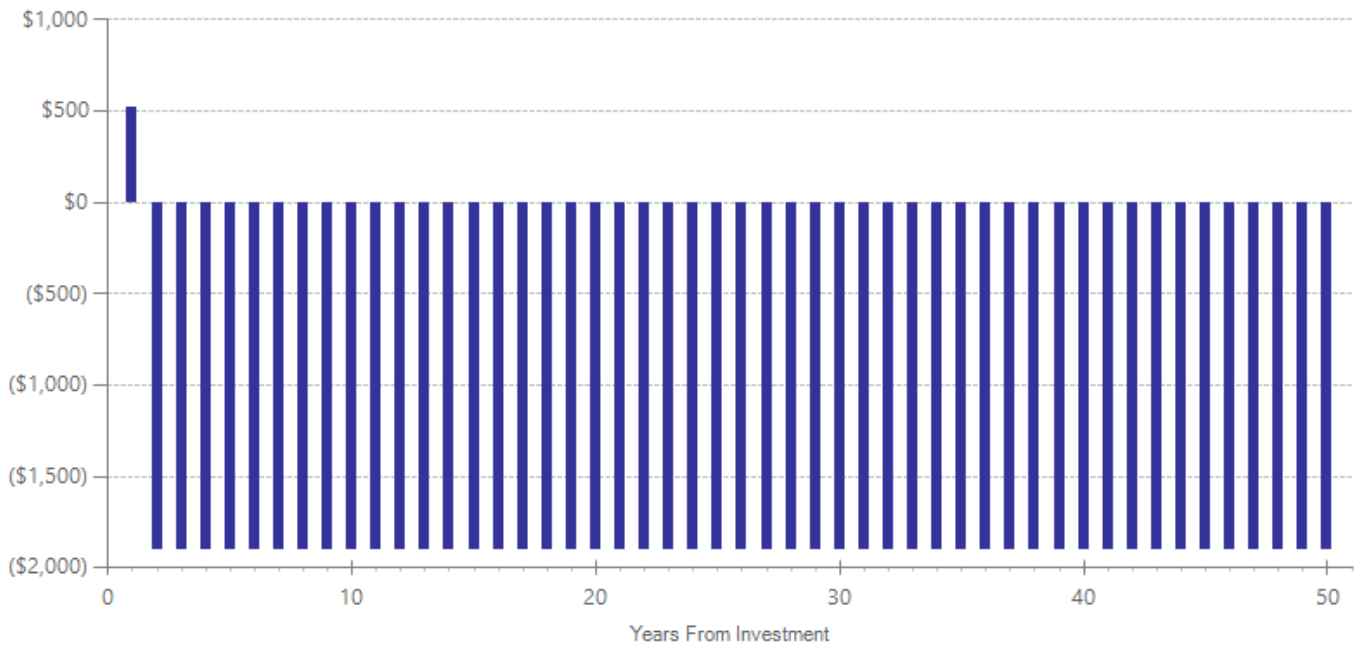
| | Annual cost | Year dollars | Summary | |
|---|---|---|---|---|
| Program costs | $1,842 | 2011 | Present value of net program costs (in 2016 dollars) | ($3,518) |
| Comparison costs | $0 | 2011 | Cost range (+ or -) | 10 % |

The cost of treatment is the weighted average cost of peer services provided in the studies included in this analysis. The average number of service hours is estimated from Eisen et al., 2012, Felton et al., 1995, and Sledge et al., 2011 is higher than the average number of encounters with a peer specialist in Washington State as reported in Mercer (2013). The cost per encounter was estimated using the peer specialist reimbursement cost reported in Mercer, (2013).

Felton et al., (1995). Consumers as peer specialists on intensive case management teams: Impact on client outcomes. *Psychiatric Services, 46*(10), 1037-1044.
Sledge et al., (2011). Effectiveness of peer support in reducing readmissions of persons with multiple psychiatric hospitalizations. *Psychiatric Services, 62*(5), 541-544.
Eisen et al., (2012). Outcome of a randomized study of a mental health peer education and support group in the VA. *Psychiatric Services, 63*(12), 1243-1246.
Mercer, (2013). Behavioral health data book for the state of Washington for rates effective January 1, 2014.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

## Detailed Annual Cost Estimates Per Participant




The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

## Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Crime | 46 | 1 | 36 | 0.000 | 0.243 | 46 | 0.000 | 0.000 | 47 | 0.000 | 1.000 |
| Employment | 46 | 1 | 78 | 0.386 | 0.133 | 46 | 0.000 | 0.000 | 47 | 0.386 | 0.004 |
| Global functioning^ | 46 | 1 | 78 | 0.685 | 0.135 | 46 | 0.000 | 0.000 | 47 | 0.685 | 0.001 |
| Homelessness^ | 46 | 1 | 36 | -0.138 | 0.243 | 46 | 0.000 | 0.000 | 47 | -0.138 | 0.569 |
| Hospitalization (psychiatric) | 46 | 7 | 2191 | -0.064 | 0.123 | 46 | 0.000 | 0.000 | 47 | -0.064 | 0.604 |
| Psychiatric symptoms^ | 46 | 3 | 274 | 0.044 | 0.080 | 46 | 0.000 | 0.000 | 47 | 0.044 | 0.552 |

^WSIPP's benefit-cost model does not monetize this outcome.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

## Citations Used in the Meta-Analysis


Chinman, M., Oberman, R.S., Hanusa, B.H., Cohen, A.N., Salyers, M.P., ... & Young, A.S. (2014). A cluster randomized trial of adding peer specialists to intensive case management teams in the veterans' health administration. *The journal of behavioral health services & research,* 1-13.

Craig, T., Doherty, I., Jamieson-Craig, R., Boocock, A., & Attafua, G. (2004). The consumer-employee as a member of a Mental Health Assertive Outreach Team I Clinical and social outcomes. *Journal of Mental Health, 13*(1), 59-69.

Eisen, S.V., Schultz, M.R., Mueller, L.N., Degenhart, C., Clark, J.A., Resnick, S.G., Christiansen, C.L., ..., & Sadow, D. (2012). Outcome of a randomized study of a mental health peer education and support group in the VA. *Psychiatric Services, 63*(12), 1243-1246.

Felton, C.J., Stastny, P., Shern, D.L., Blanch, A., Donahue, S.A., Knight, E., & Brown, C. (1995). Consumers as peer specialists on intensive case management teams: Impact on client outcomes. *Psychiatric Services, 46*(10), 1037-1044.

Gordon, R.E., Edmunson, E., Bedell, J. & Goldstein, N. (1979). Reducing rehospitalization of state mental patients. *Journal of the Florida Medical Association, 66*(9), 927-933.

Landers, G.M., & Zhou, M. (2011). An analysis of relationships among peer support, psychiatric hospitalization, and crisis stabilization. *Community Mental Health Journal, 47*(1), 106-112.

Min, S.Y., Whitecraft, J., Rothbard, A.B., & Salzer, M.S. (2007). Peer support for persons with co-occurring disorders and community tenure: a survival analysis. *Psychiatric Rehabilitation Journal, 30*(3), 207-213.

Resnick, S.G., & Rosenheck, R.A. (2008). Integrating peer-provided services: a quasi-experimental study of recovery orientation, confidence, and empowerment. *Psychiatric Services : a Journal of the American Psychiatric Association, 59*(11), 1307-1314.

Sledge, W.H., Lawless, M., Sells, D., Wieland, M., O'Connell, M.J., & Davidson, L. (2011). Effectiveness of peer support in reducing readmissions of persons with multiple psychiatric hospitalizations. *Psychiatric Services, 62*(5), 541-544.

Tracy, K., Burton, M., Nich, C., & Rounsaville, B. (2011). Utilizing peer mentorship to engage high recidivism substance-abusing patients in treatment. *The American Journal of Drug and Alcohol Abuse, 37*(6), 525-531.

# Critical Time Intervention for serious mental illness

## Adult Mental Health: Serious Mental Illness

Benefit-cost estimates updated December 2017. Literature review updated September 2016.

Program Description: Critical time intervention is a short-term program which supports particularly vulnerable patients transitioning from inpatient psychiatric treatment to outpatient care. This is done by providing them with a social worker, peer mentor or other system of support to help them at the beginning of the integration process. Critical time intervention is provided in conjunction with other kinds of treatment and is designed to increase treatment adherence and reduce recidivism, homelessness, and re-hospitalization. Critical Time Intervention has been used to treat a wide variety of vulnerable patients; however, we explore the impact of Critical Time Intervention on treatment of subjects with severe psychosis.

## Benefit-Cost Summary Statistics Per Participant

### Benefits to:

| | |
|---|---|
| Taxpayers | $2,253 |
| Participants | $31 |
| Others | $507 |
| Indirect | ($1,785) |
| Total benefits | $1,006 |
| Net program cost | ($5,837) |
| Benefits minus cost | ($4,831) |

| | |
|---|---|
| Benefit to cost ratio | $0.17 |
| Benefits minus costs | ($4,831) |
| Chance the program will produce benefits greater than the costs | 14 % |

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

## Detailed Monetary Benefit Estimates Per Participant

### Benefits from changes to:[1] Benefits to:

| | Participants | Taxpayers | Others[2] | Indirect[3] | Total |
|---|---|---|---|---|---|
| Health care associated with psychiatric hospitalization | $31 | $2,253 | $507 | $1,126 | $3,916 |
| Adjustment for deadweight cost of program | $0 | $0 | $0 | ($2,911) | ($2,911) |
| Totals | $31 | $2,253 | $507 | ($1,785) | $1,006 |

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

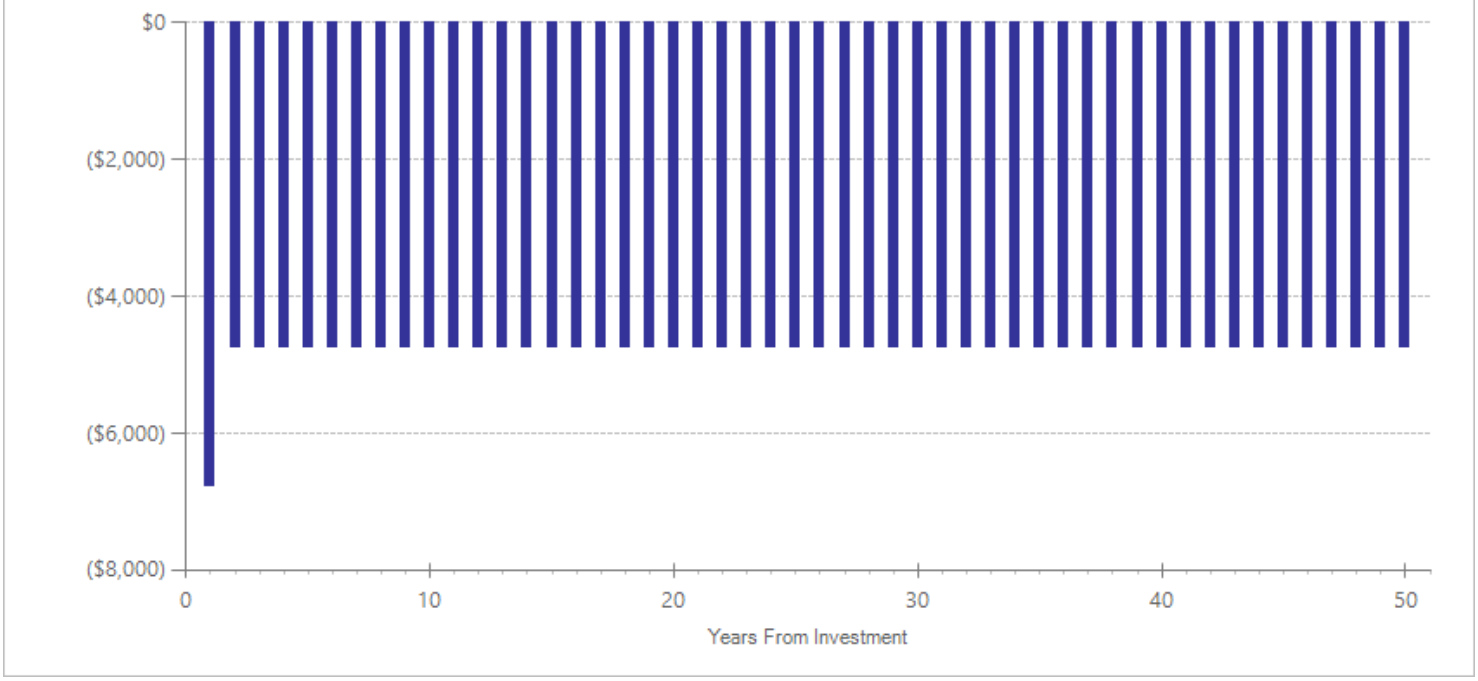
## Detailed Annual Cost Estimates Per Participant

| | Annual cost | Year dollars | Summary | |
|---|---|---|---|---|
| Program costs | $3,769 | 1992 | Present value of net program costs (in 2016 dollars) | ($5,837) |
| Comparison costs | $0 | 1992 | Cost range (+ or -) | 10 % |

Per-participant costs for critical time intervention is based on the figures published in Jones, K., Colson, P. W., Holter, M. C., Lin, S., Valencia, E., Susser, E., & Wyatt, R.J. (2003). Cost-effectiveness of critical time intervention to reduce homelessness among persons with mental illness. Psychiatric Services, 54(6), 884-90.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

## Detailed Annual Cost Estimates Per Participant




The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

## Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Homelessness^ | 38 | 2 | 125 | -1.059 | 0.249 | 39 | 0.000 | 0.118 | 40 | -1.059 | 0.001 |
| Hospitalization (psychiatric) | 38 | 1 | 77 | -1.331 | 0.670 | 39 | 0.000 | 0.118 | 40 | -1.331 | 0.047 |
| Psychiatric symptoms^ | 38 | 1 | 38 | -0.320 | 0.231 | 39 | 0.000 | 0.118 | 40 | -0.320 | 0.166 |
| Psychosis symptoms (negative)^ | 38 | 1 | 38 | -0.572 | 0.234 | 39 | 0.000 | 0.118 | 40 | -0.572 | 0.014 |
| Psychosis symptoms (positive)^ | 38 | 1 | 38 | 0.091 | 0.230 | 39 | 0.000 | 0.118 | 40 | 0.091 | 0.691 |

^WSIPP’s benefit-cost model does not monetize this outcome.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

## Citations Used in the Meta-Analysis


Herman, D., Opler, L., Felix, A., Valencia, E., Wyatt, R. J., & Susser, E. (2000). A critical time intervention with mentally ill homeless men: impact on psychiatric symptoms. *The Journal of Nervous and Mental Disease, 188*(3), 135-140.

Herman, D.B., Conover, S., Gorroochurn, P., Hinterland, K., Hoepner, L., & Susser, E.S. (2011). Randomized trial of critical time intervention to prevent homelessness after hospital discharge. *Psychiatric Services, 62*(7), 713-719.

Susser, E., Valencia, E., Conover, S., Felix, A., Tsai, W.Y., & Wyatt, R.J. (1997). Preventing recurrent homelessness among mentally ill men: A 'critical time' intervention after discharge from a shelter. *American Journal of Public Health, 87*(2), 256-262.

Tomita, A., & Herman, D.B. (2012). The impact of critical time intervention in reducing psychiatric rehospitalization after hospital discharge. *Psychiatric Services, 63*(9), 935-937.

# Forensic Assertive Community Treatment (FACT)

## Adult Mental Health: Serious Mental Illness

Benefit-cost estimates updated December 2017. Literature review updated May 2014.

Program Description: Forensic Assertive Community Treatment (FACT) is an adaptation of Assertive Community Treatment (ACT) for individuals with involvement in the criminal justice system. In this analysis the study population included individuals with serious mental illness who were identified as candidates for FACT in jail.

## Benefit-Cost Summary Statistics Per Participant

### Benefits to:

| | |
|---|---|
| Taxpayers | $549 |
| Participants | $6 |
| Others | $364 |
| Indirect | ($6,192) |
| Total benefits | ($5,274) |
| Net program cost | ($12,926) |
| Benefits minus cost | ($18,200) |

| | |
|---|---|
| Benefit to cost ratio | ($0.41) |
| Benefits minus costs | ($18,200) |
| Chance the program will produce benefits greater than the costs | 0 % |

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

## Detailed Monetary Benefit Estimates Per Participant

### Benefits from changes to:[1] Benefits to:

| | Participants | Taxpayers | Others[2] | Indirect[3] | Total |
|---|---|---|---|---|---|
| Crime | $0 | $143 | $272 | $72 | $487 |
| Health care associated with psychiatric hospitalization | $6 | $406 | $91 | $204 | $707 |
| Adjustment for deadweight cost of program | $0 | $0 | $0 | ($6,468) | ($6,468) |
| Totals | $6 | $549 | $364 | ($6,192) | ($5,274) |

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

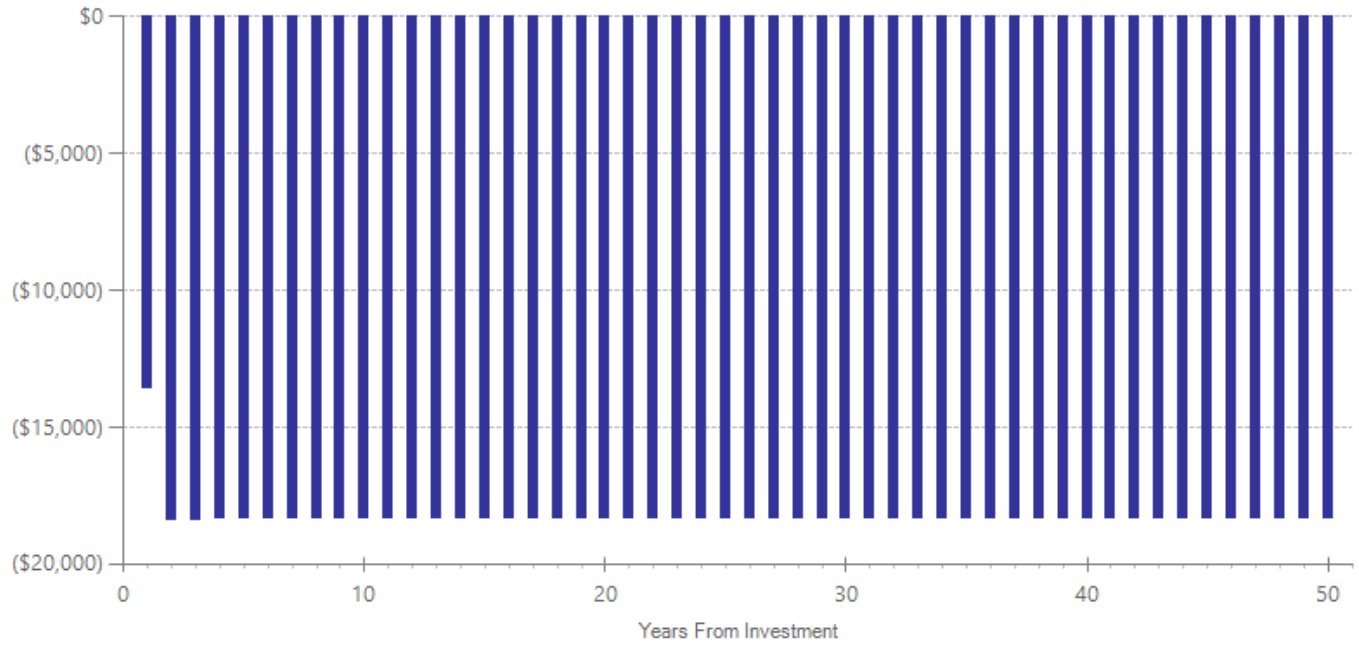
## Detailed Annual Cost Estimates Per Participant

| | Annual cost | Year dollars | Summary | |
|---|---|---|---|---|
| Program costs | $14,000 | 2013 | Present value of net program costs (in 2016 dollars) | ($12,926) |
| Comparison costs | $4,482 | 2013 | Cost range (+ or -) | 10 % |

Specific cost data are not available for FACT. We estimated the cost of FACT using the annual per-patient costs of ACT in Washington State (Washington State Department of Social & Health Services, 2013). We also assumed that the comparison group in the FACT study would have similar costs to the comparison group in the ACT studies that we reviewed. The cost of the comparison group in these studies was estimated by reducing the cost of the ACT intervention by a factor of 3.12 because the comparison group caseloads were higher than ACT caseloads by this factor in the ACT studies that we reviewed. Washington State Department of Social & Health Services. (2013). 2013 program description, Washington Program for Assertive Community Treatment. Retrieved from https://fortress.wa.gov/dshs/adsaapps/about/programs/MH%20Program%20for%20Assertive%20Community%20Treatment.docx.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

## Detailed Annual Cost Estimates Per Participant




The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the “break-even” point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

## Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Crime | 41 | 1 | 72 | -0.111 | 0.173 | 41 | 0.000 | 0.000 | 42 | -0.111 | 0.524 |
| Hospitalization (psychiatric) | 41 | 1 | 72 | -0.211 | 0.174 | 41 | 0.000 | 0.000 | 42 | -0.211 | 0.226 |

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

## Citations Used in the Meta-Analysis


Cusack, K.J., Morrissey, J.P., Cuddeback, G.S., Prins, A., & Williams, D.M. (2010). Criminal justice involvement, behavioral health service use, and costs of forensic assertive community treatment: a randomized trial. *Community Mental Health Journal, 46*(4), 356-363.

Dodge, K.A., &The Conduct Problems Prevention Research Group. (1993). *Effects of intervention on children at high risk for conduct problems.* Paper presented at the biennial meeting of the Society for Research in Child Development, New Orleans.

# Supported housing for chronically homeless adults

## Adult Mental Health: Serious Mental Illness

Benefit-cost estimates updated December 2017. Literature review updated December 2014.

Program Description: These programs provide permanent supportive housing to chronically homeless single adults. Most of the studies reviewed here used the Housing First model which provides independent apartments with no specific requirements for abstinence or treatment. Programs typically provide intensive case management and services. Housing is in independent apartments—participants hold the lease but receive subsidies to pay rent. Supported housing is associated with significant reductions in homelessness which we are unable to monetize at this time. To test the sensitivity of our benefit-cost results to this known limitation of our model, we examined a recent comprehensive benefit-cost study of housing vouchers (Carlson et al., 2011). Our benefit-cost results would not change significantly if we had included the benefits of providing housing estimated by this study. Carlson, D., Haveman, R., Kaplan, T., & Wolfe, B. (2011). The benefits and costs of the Section 8 housing subsidy program: A framework and estimates of firstyear effects.  Journal of Policy Analysis and Management, 30  (2), 233-255.

### Benefit-Cost Summary Statistics Per Participant

**Benefits to:**

| | |
|---|---|
| Taxpayers | $287 |
| Participants | $90 |
| Others | $149 |
| Indirect | ($7,615) |
| Total benefits | ($7,089) |
| Net program cost | ($15,451) |
| Benefits minus cost | ($22,540) |

| | |
|---|---|
| Benefit to cost ratio | ($0.46) |
| Benefits minus costs | ($22,540) |
| Chance the program will produce benefits greater than the costs | 0 % |

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

## Detailed Monetary Benefit Estimates Per Participant

| Benefits from changes to:[1] | Benefits to: | | | | |
|---|---|---|---|---|---|
| | Participants | Taxpayers | Others[2] | Indirect[3] | Total |
| Crime | $0 | $0 | $1 | $0 | $1 |
| Labor market earnings associated with alcohol abuse or dependence | $80 | $36 | $0 | $1 | $117 |
| Property loss associated with alcohol abuse or dependence | $0 | $0 | $0 | $0 | $0 |
| Labor market earnings associated with illicit drug abuse or dependence | ($3) | ($1) | $0 | $0 | ($5) |
| Health care associated with illicit drug abuse or dependence | $0 | ($1) | ($1) | ($1) | ($4) |
| Health care associated with general hospitalization | $5 | $94 | $81 | $47 | $227 |
| Health care associated with psychiatric hospitalization | $2 | $126 | $28 | $63 | $219 |
| Health care associated with emergency department visits | $7 | $34 | $40 | $17 | $98 |
| Adjustment for deadweight cost of program | $0 | $0 | $0 | ($7,742) | ($7,742) |
| Totals | $90 | $287 | $149 | ($7,615) | ($7,089) |

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

## Detailed Annual Cost Estimates Per Participant

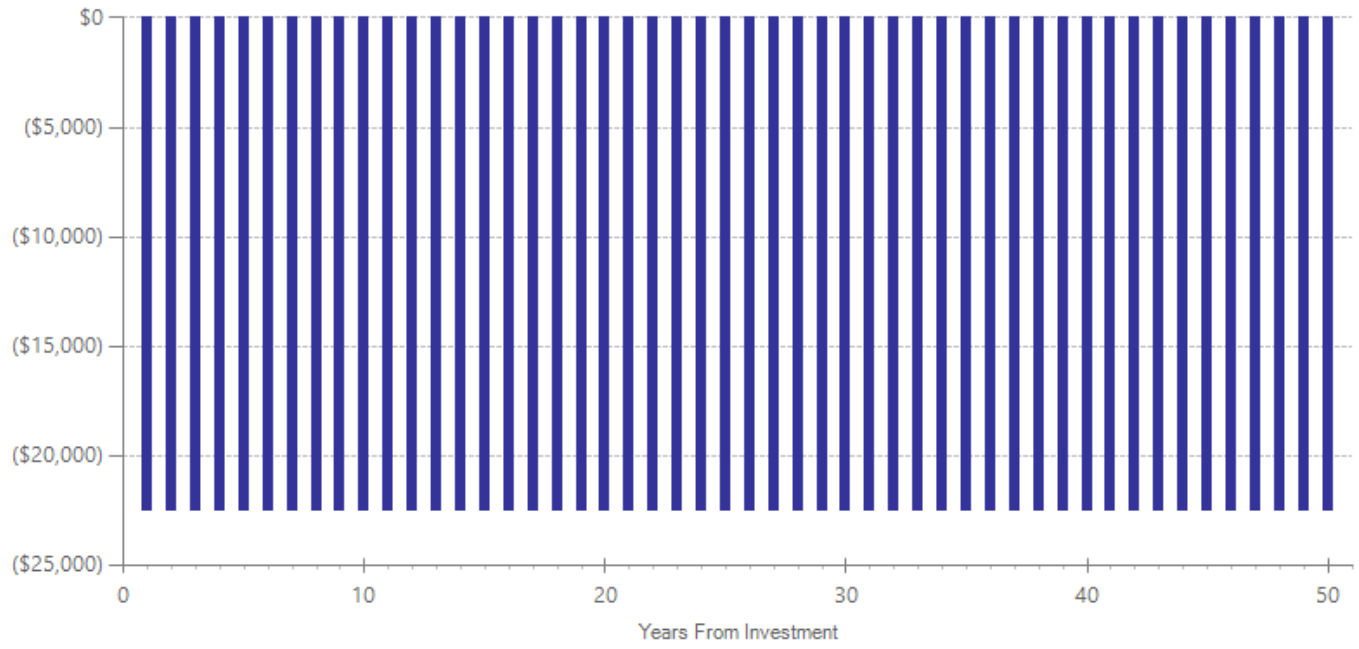
| | Annual cost | Year dollars | Summary | |
|---|---|---|---|---|
| Program costs | $13,950 | 2009 | Present value of net program costs (in 2016 dollars) | ($15,451) |
| Comparison costs | $0 | 2009 | Cost range (+ or -) | 10 % |

Per-participant costs are based on the annual cost of a program in Seattle described in Srebnik et al. (2013). Analysis of supported housing in New York (Culhane et al., 2002) indicated the average length of stay was nine months, so we multiply the annual cost of the Seattle program by 0.75.

Srebnik et al., (2013). A pilot study of the impact of housing first-supported housing for intensive users of medical hospitalization and sobering services. *American Journal of Public Health, 1039*(2), 316-21. Culhane et al., (2002) Public service reductions associated with placement of persons with severe mental illness in supportive housing. *Housing Policy Debate, 13*(1), 107-163.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

## Detailed Annual Cost Estimates Per Participant




The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the "break-even" point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

## Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Alcohol use disorder | 40 | 2 | 478 | -0.051 | 0.144 | 40 | 0.000 | 0.000 | 41 | -0.051 | 0.723 |
| Crime | 40 | 8 | 3833 | -0.083 | 0.047 | 40 | 0.000 | 0.000 | 41 | -0.083 | 0.077 |
| Emergency department visits | 40 | 5 | 570 | -0.164 | 0.064 | 40 | 0.000 | 0.000 | 41 | -0.164 | 0.011 |
| Employment | 40 | 3 | 514 | 0.179 | 0.111 | 40 | 0.000 | 0.000 | 41 | 0.192 | 0.183 |
| Homelessness^ | 40 | 10 | 4467 | -0.505 | 0.023 | 40 | 0.000 | 0.000 | 41 | -0.505 | 0.001 |
| Hospitalization | 40 | 7 | 2490 | -0.129 | 0.054 | 40 | 0.000 | 0.000 | 41 | -0.129 | 0.016 |
| Hospitalization (psychiatric) | 40 | 4 | 2727 | -0.058 | 0.028 | 40 | 0.000 | 0.000 | 41 | -0.058 | 0.036 |
| Illicit drug use disorder | 40 | 1 | 332 | 0.062 | 0.105 | 40 | 0.000 | 0.000 | 41 | 0.062 | 0.553 |
| Primary care visits^ | 40 | 3 | 733 | 0.157 | 0.052 | 40 | 0.000 | 0.000 | 41 | 0.157 | 0.003 |

^WSIPP's benefit-cost model does not monetize this outcome.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

## Citations Used in the Meta-Analysis


Basu, A., Kee, R., Sadowski, L.S., & Buchanan, D. (2012). Comparative cost analysis of housing and case management program for chronically ill homeless adults compared to usual care. *Health Services Research,* 47, 523-543.

Cheng, A.L., Lin, H., Kasprow, W., & Rosenheck, R.A. (2007). Impact of supported housing on clinical outcomes: Analysis of a randomized trial using multiple imputation technique. *The Journal of Nervous and Mental Disease, 195*(1), 83-88.

Culhane, D.P., Metraux, S., & Hadley, T. (2002). Public service reductions associated with placement of homeless persons with severe mental illness in supportive housing. *Housing Policy Debate, 13*(1), 107-163.

Gilmer, T.P., Stefancic, A., Ettner, S.L., Manning, W.G., & Tsemberis, S. (2010). Effect of full-service partnerships on homelessness, use and costs of mental health services, and quality of life among adults with serious mental illness. *Archives of General Psychiatry, 67*(6), 645-52.

Gulcur, L., Stefancic, A., Shinn, M., Tsemberis, S., & Fischer, S. (2003). Housing, hospitalization, and cost outcomes for homeless individuals with psychiatric disabilities participating in continuum of care and housing first programmes. *Journal of Community and Applied Social Psychology, 13*(2), 171-186.

Johnson, G., Kuehnle, D., Parkinson, S., Sesa, S., & Tseng, Y. (2014). *Resolving long-term homelessnes: A randomized controled trial examining the 36 month costs, benefits, and social outcomes from the journey to Social Inclusion Pilot Program.* Sacred Heart Mission, St. Kilda.

Johnson, G., Kuehnle, D., Parkinson, S., Sesa, S., & Tseng, Y. (2012). *Resolving long-term homelessnes: A randomized controled trial examining the 24 month costs, benefits, and social outcomes from the ourney to Social Inclusion Pilot Program.* Sacred Heart Mission, St. Kilda.

Larimer, M.E., Malone, D.K., Garner, M.D., Atkins, D.C., Burlingham, B., Lonczak, H.S., et al. (2009). Health care and public service use and costs before and after provision of housing for chronically homeless persons with severe alcohol problems. *JAMA, 301*(13), 1349-1357.

Lipton, F.R., Nutt, S., & Sabatini, A. (1988). Housing the homeless mentally ill: A longitudinal study of a treatment approach. *Hospital & Community Psychiatry, 39*(1), 40-45.

Mares, A., Rosenheck, R.A. (2007) *HUD/HHS/VA Collaborative to Help End Chronic Homelessness National Performance Outcomes Assessment Preliminary Client Outcomes Report.* West Haven, CT: VA Northeast Program Evaluation Center.

Rosenheck, R., Kasprow, W., Frisman, L., & Liu-Mares, W. (2003). Cost-effectiveness of supported housing for homeless persons with mental illness. *Archives of General Psychiatry, 60*(9), 940-951.

Sadowski, L.S., Kee, R.A., VanderWeele, T.J., & Buchanan, D. (2009). Effect of a housing and case management program on emergency department visits and hospitalizations among chronically ill homeless adults: A randomized trial. *JAMA, 301*(17), 1771-1778.

Shern, D.L., Felton, C.J., Hough, R.L., Lehman, A.F., Goldfinger, S., Valencia, E., ... (1997). Housing outcomes for homeless adults with mental illness: Results from the second-round McKinney program. *Psychiatric Services, 48*(2), 239-241.

Srebnik, D., Connor, T., & Sylla, L. (2013). A pilot study of the impact of housing first-supported housing for intensive users of medical hospitalization and sobering services. *American Journal of Public Health, 1039*(2), 316-21.

# Assertive community treatment (ACT)

## Adult Mental Health: Serious Mental Illness

Benefit-cost estimates updated December 2017. Literature review updated May 2014.

Program Description: Assertive community treatment (ACT) is a treatment and case management approach that includes the following key elements: a multidisciplinary team that includes a medication prescriber, direct service provided by team members, caseloads that are shared between team members, services provided in locations convenient for the patient, and low patient-to-staff ratios. The studies reviewed in this analysis compared ACT to treatment as usual or other forms of case management. ACT is associated with significant reductions in homelessness, for which the current WSIPP benefit-cost model does not estimate monetary benefits. To test the sensitivity of our benefit-cost results to this known limitation, we examined a recent comprehensive benefit-cost study of housing vouchers (Carlson et al., 2011). Our benefit-cost results would not change significantly if we had included the benefits of providing housing estimated by this study. Carlson, D., Haveman, R., Kaplan, T., & Wolfe, B. (2011). The benefits and costs of the Section 8 housing subsidy program: A framework and estimates of firstyear effects.  Journal of Policy Analysis and Management, 30  (2), 233-255.

### Benefit-Cost Summary Statistics Per Participant

**Benefits to:**

| | |
|---|---|
| Taxpayers | $523 |
| Participants | ($515) |
| Others | $324 |
| Indirect | ($8,767) |
| Total benefits | ($8,436) |
| Net program cost | ($18,260) |
| Benefits minus cost | ($26,696) |

| | |
|---|---|
| Benefit to cost ratio | ($0.46) |
| Benefits minus costs | ($26,696) |
| Chance the program will produce benefits greater than the costs | 11 % |

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2016). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our Technical Documentation.

## Detailed Monetary Benefit Estimates Per Participant

| Benefits from changes to:[1] | Benefits to: | | | | |
|---|---|---|---|---|---|
| | Participants | Taxpayers | Others[2] | Indirect[3] | Total |
| Crime | $0 | $91 | $171 | $46 | $307 |
| Labor market earnings associated with alcohol abuse or dependence | ($520) | ($236) | $0 | ($7) | ($764) |
| Property loss associated with alcohol abuse or dependence | ($1) | $0 | ($2) | $0 | ($2) |
| Health care associated with illicit drug abuse or dependence | ($9) | ($47) | ($46) | ($24) | ($126) |
| Health care associated with general hospitalization | $2 | $27 | $23 | $14 | $65 |
| Health care associated with psychiatric hospitalization | $9 | $663 | $149 | $339 | $1,161 |
| Health care associated with emergency department visits | $5 | $25 | $29 | $12 | $70 |
| Adjustment for deadweight cost of program | $0 | $0 | $0 | ($9,148) | ($9,148) |
| Totals | ($515) | $523 | $324 | ($8,767) | ($8,436) |

[1]In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

[2]"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

[3]"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

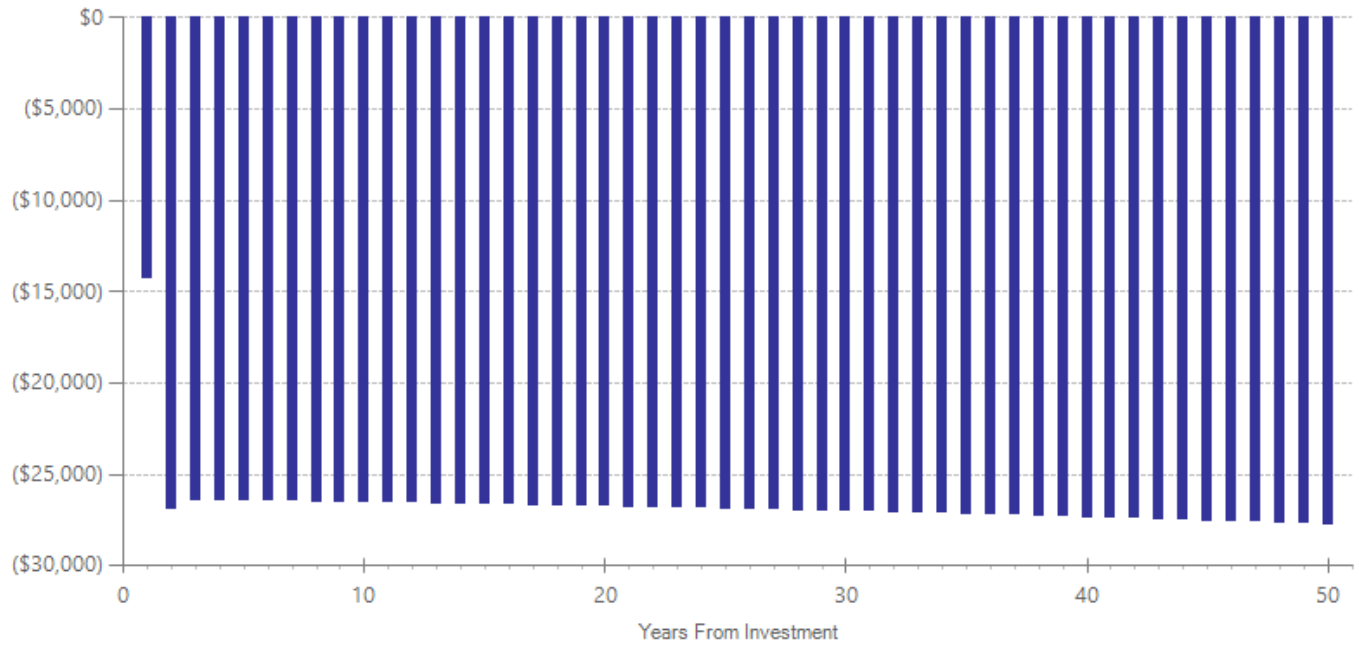
## Detailed Annual Cost Estimates Per Participant

| | Annual cost | Year dollars | Summary | |
|---|---|---|---|---|
| Program costs | $14,000 | 2013 | Present value of net program costs (in 2016 dollars) | ($18,260) |
| Comparison costs | $4,482 | 2013 | Cost range (+ or -) | 10 % |

The annual per-patient cost of ACT in Washington State was used to approximate the program costs (Washington State Department of Social & Health Services, 2013). Since the comparison groups in the included studies had an average caseload that was 3.12 times as high as the ACT caseload, we estimated the costs of the comparison group by reducing the ACT costs by this factor. Washington State Department of Social & Health Services. (2013). *2013 program description, Washington Program for Assertive Community Treatment*.

The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our Technical Documentation.

## Detailed Annual Cost Estimates Per Participant




The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in non-discounted dollars to simplify the "break-even" point from a budgeting perspective. If the dollars are negative (bars below $0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach $0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above $0, the benefits of the program exceed the initial investment.

## Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Alcohol use disorder | 40 | 4 | 272 | 0.103 | 0.108 | 42 | 0.000 | 0.000 | 43 | 0.103 | 0.338 |
| Crime | 40 | 7 | 810 | -0.026 | 0.065 | 42 | 0.000 | 0.000 | 43 | -0.026 | 0.688 |
| Emergency department visits | 40 | 3 | 555 | -0.043 | 0.218 | 42 | 0.000 | 0.000 | 43 | -0.043 | 0.845 |
| Global functioning^ | 40 | 5 | 237 | 0.142 | 0.096 | 42 | 0.000 | 0.000 | 43 | 0.142 | 0.139 |
| Homelessness^ | 40 | 8 | 638 | -0.228 | 0.098 | 42 | 0.000 | 0.000 | 43 | -0.228 | 0.020 |
| Hospitalization | 40 | 4 | 598 | -0.014 | 0.110 | 42 | 0.000 | 0.000 | 43 | -0.014 | 0.898 |
| Hospitalization (psychiatric) | 40 | 22 | 2294 | -0.178 | 0.074 | 42 | 0.000 | 0.118 | 43 | -0.178 | 0.016 |
| Illicit drug use disorder | 40 | 4 | 249 | 0.048 | 0.108 | 42 | 0.000 | 0.000 | 43 | 0.048 | 0.658 |
| Psychiatric symptoms^ | 40 | 11 | 582 | -0.050 | 0.061 | 42 | 0.000 | 0.000 | 43 | -0.050 | 0.414 |

^WSIPP's benefit-cost model does not monetize this outcome.

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## Citations Used in the Meta-Analysis


Audini, B., Marks, I. M., Lawrence, R.E., Connolly, J., & Watts, V. (1994). Home-based versus out-patient/in-patient care for people with serious mental illness. *The British Journal of Psychiatry : the Journal of Mental Science, 165*(2), 204-210.

Bond, G.R., Miller, L.D., Krumwied, R.D., & Ward, R.S. (1988). Assertive case management in three CMHCs: A controlled study. *Hospital and Community Psychiatry, 39*(4), 411-418.

Bond, G.R., Witheridge, T.F., Dincin, J., Wasmer, D., Webb, J., & DeGraaf-Kaser, R. (1990). Assertive community treatment for frequent users of psychiatric hospitals in a large city: a controlled study. *American Journal of Community Psychology, 18*(6), 865-891.

Bush, C.T., Langford, M.W., Rosen, P., & Gott, W. (1990). Operation outreach: Intensive case management for severely psychiatrically disabled adults. *Hospital and Community Psychiatry, 41*(6), 647-649.

Chandler, D., Meisel, J., Hu, T. W., McGowen, M., & Madison, K. (1996). Client outcomes in a three-year controlled study of an integrated service agency model. *Psychiatric Services, 47*(12), 1337-1343.

Clarke, G. N., Herinckx, H. A., Kinney, R. F., Paulson, R. I., Cutler, D. L., Lewis, K., & Oxman, E. (2000). Psychiatric hospitalizations, arrests, emergency room visits, and homelessness of clients with serious and persistent mental illness: findings from a randomized trial of two ACT programs vs. usual care. *Mental Health Services Research, 2*(3),155-164.

Drake, R. E., McHugo, G. J., Clark, R. E., Teague, G. B., Xie, H., Miles, K., & Ackerson, T. H. (1998). Assertive community treatment for patients with co-occurring severe mental illness and substance use disorder: A clinical trial. *American Journal of Orthopsychiatry, 68*(2), 201-215.

Essock, S.M., & Kontos, N. (1995). Implementing assertive community treatment teams. *Psychiatric Services, 46*(7), 679-683.

Essock, S.M., Mueser, K.T., Drake, R.E., Covell, N.H., McHugo, G.J., Frisman, L.K., Kontos, N.J., . . . Swain, K. (2006). Comparison of ACT and standard case management for delivering integrated treatment for co-occurring disorders. *Psychiatric Services, 57*(2), 185-196.

Fekete, D.M., Bond, G.R., McDonel, E.C., Salyers, M.P., Chen, A., & Miller, L. (1998). Rural assertive community treatment: a field experiment. *Psychiatric Rehabilitation Journal, 21*(4), 371-379.

Hamernik, E., & Pakenham, K. I. (1999). Assertive Community Treatment for persons with severe mental disorders: A controlled treatment outcome study. *Behaviour Change, 16*(4), 259-268.

Harrison-Read, P., Lucas, B., Tyrer, P., Ray, J., Shipley, K., Simmonds, S., . . . Hickman, M. (2002). Heavy users of acute psychiatric beds: Randomized controlled trial of enhanced community management in an outer London borough. *Psychological Medicine, 32*(3), 403-416.

Jerrell, J.M. (1995). Toward managed care for persons with severe mental illness: implications from a cost-effectiveness study. *Health Affairs, 14*(3), 197-207.

Killaspy, H., Bebbington, P., Blizard, R., Johnson, S., Nolan, F., Pilling, S., & King, M. (2006). The REACT study: randomised evaluation of assertive community treatment in north London. *British Medical Journal,* 7545, 815-818.

Killaspy, H., Kingett, S., Bebbington, P., Blizard, R., Johnson, S., Nolan, F., Pilling, S., . . . King, M. (2009). Randomised evaluation of assertive community treatment: 3-year outcomes. *The British Journal of Psychiatry, 195*(1), 81-82.

Korr, W.S., & Joseph, A. (1995). Housing the Homeless Mentally Ill: Findings from Chicago. *Journal of Social Service Research, 21*(1), 53-68.

Lehman, A.F., Dixon, L.B., Kernan, E., DeForge, B.R., & Postrado, L.T. (1997). A randomized trial of assertive community treatment for homeless persons with severe mental illness. *Archives of General Psychiatry, 54*(11), 1038-1043.

Morrissey, J.P., Domino, M.E., & Cuddeback, G.S. (2013). Assessing the effectiveness of recovery-oriented ACT in reducing state psychiatric hospital use. *Psychiatric Services, 64*(4), 303-311.

Morse, G.A., Calsyn, R.J., Allen, G., Tempelhoff, B., & Smith, R. (1992). Experimental comparison of the effects of three treatment programs for homeless mentally ill people. *Hospital and Community Psychiatry, 43*(10), 1005-1010.

Morse, G.A., Calsyn, R.J., Klinkernberg, W.D., Trusty, M.L., Gerber, F., . . . Ahmad, L. (1997). Three Types of Case Management for Homeless Mentally ifi Persons. *Psychiatric Services, 48*(4), 497-503.

Morse, G.A., Calsyn, R.J., Dean, K.W., Helminiak, T.W., Wolff, N., Drake, R.E., Yonker, R.D., . . . McCudden, S. (2006). Treating homeless clients with severe mental illness and substance use disorders: Costs and outcomes. *Community Mental Health Journal, 42*(4), 377-404.

Rosenheck, R., Neale, M., Leaf, P., Milstein, R., & Frisman, L. (1995). Multisite experimental cost study of intensive community care. *Schizophrenia Bulletin, 21*(1), 129-140.

Rosenheck, R., Kasprow, W., Frisman, L., & Liu-Mares, W. (2003). Cost-effectiveness of supported housing for homeless persons with mental illness. *Archives of General Psychiatry, 60*(9), 940-951.

Salkever, D., Domino, M.E., Burns, B.J., Santos, A.B., Deci, P.A., Dias, J., Wagner, H.R., . . . Paolone, J. (1999). Assertive community treatment for people with severe mental illness: the effect on hospital use and costs. *Health Services Research, 34*(2), 577-601.

Sytema, S., Wunderink, L., Bloemers, W., Roorda, L., & Wiersma, D. (2007). Assertive community treatment in the Netherlands: a randomized controlled trial. *Acta Psychiatrica Scandinavica, 116*(2), 105-112.

Test, M.A., Knoedler, W.H., Allness, D.J., et al. (1991). Long-term community care through an assertive continuous treatment team,. In. Schultz, C.T (Ed.), *Advances in Neuropsychiatry and Psychopharmacology: Schizophrenia Research, Vol. 1* (pp.239-246).

Test, M.A., Knoedler, W.H., Allness, D.J., Burke, S.S., Brown, R.L., & Wallisch, L.S. (1991). Long-term community care through an assertive continuous treatment team. In Schultz, C.T. (Ed.), *Advances in Neuropsychiatry and Psychopharmacology: Schizophrenia Research, Vol. 1* (pp.239-246). New York, NY: Raven Press, Publishers.

# Medicaid Health Homes

## Adult Mental Health

Literature review updated December 2014.

Program Description: A Medicaid health home offers coordinated care to individuals with multiple chronic health conditions, including mental health and substance use disorders. The health home builds linkages to community supports and resources as well as enhances coordination and integration of primary and behavioral healthcare to better meet the needs of people with multiple chronic illnesses. The model aims to improve healthcare quality while also reducing costs. Health homes provide comprehensive case management, care coordination, health promotion, and transitional care when moving from inpatient to other settings (SAMHSA Health Home Fact Sheet, http://www.integration.samhsa.gov/integrated-care-models/Health_Homes_Fact_Sheet_FINAL.pdf).

### Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Emergency department visits | 47 | 1 | 205 | -0.073 | 0.099 | 49 | -0.073 | 0.099 | 51 | -0.073 | 0.463 |
| Global functioning | 47 | 1 | 27 | 0.340 | 0.265 | 49 | 0.340 | 0.265 | 51 | 0.340 | 0.199 |
| Hospitalization (psychiatric) | 47 | 1 | 205 | -0.220 | 0.099 | 49 | -0.220 | 0.099 | 51 | -0.220 | 0.027 |
| Primary care visits | 47 | 1 | 205 | 0.472 | 0.127 | 49 | 0.472 | 0.127 | 51 | 0.472 | 0.001 |
| Psychiatric symptoms | 47 | 1 | 27 | 0.173 | 0.264 | 49 | 0.173 | 0.264 | 51 | 0.173 | 0.512 |

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## Citations Used in the Meta-Analysis


Druss, B.G., von, E.S.A., Compton, M.T., Rask, K.J., Zhao, L., & Parker, R.M. (2010). A randomized trial of medical care management for community mental health settings: the Primary Care Access, Referral, and Evaluation (PCARE) study. *The American Journal of Psychiatry, 167*(2), 151-9.

Druss, B.G., von Esenwein, S.A., Compton, M.T., Zhao, L., & Leslie, D.L. (2011). Budget impact and sustainability of medical care management for persons with serious mental illnesses. *The American Journal of Psychiatry, 168*(11), 1171-1178.

Kilbourne, A.M., Post, E.P., Nossek, A., Drill, L., Cooley, S., & Bauer, M.S. (2008). Improving medical and psychiatric outcomes among individuals with bipolar disorder: A randomized controlled trial. *Psychiatric Services, 59*(7), 760-768.

# Assisted outpatient treatment

## Adult Mental Health

Literature review updated November 2015.

Program Description: Assisted outpatient treatment (AOT) is a legal alternative to involuntary inpatient commitment whereby the court may order the patient to participate in outpatient care. In the studies of AOT included in our analysis, patients could receive an AOT order if there was evidence that the person might not follow up with community outpatient care. In some locations, the AOT order allowed early release from the psychiatric hospital.

### Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Crime | n/a | 1 | 172 | 0.013 | 0.169 | 45 | 0.000 | 0.000 | 46 | 0.013 | 0.941 |
| Global functioning | n/a | 1 | 166 | -0.056 | 0.110 | 45 | 0.000 | 0.000 | 46 | 0.110 | 0.612 |
| Hospitalization (psychiatric) | n/a | 6 | 9547 | 0.044 | 0.013 | 45 | 0.000 | 0.000 | 46 | 0.044 | 0.001 |
| Psychiatric emergency services | n/a | 1 | 78 | 0.181 | 0.164 | 45 | 0.000 | 0.000 | 46 | 0.181 | 0.268 |
| Psychiatric symptoms | n/a | 2 | 242 | -0.004 | 0.088 | 45 | 0.000 | 0.000 | 46 | -0.004 | 0.967 |

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

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## Citations Used in the Meta-Analysis


Burns, T., Rugkasa, J., Molodynski, A., Dawson, J., Yeeles, K., Vazquez-Montes, M., Voysey, M., ... Priebe, S. (2013). Community treatment orders for patients with psychosis (OCTET): a randomised controlled trial. *Lancet (london, England), 381*(9878), 1627-33.

Castells-Aulet, L., Hernandez-Viadel, M., Jimenez-Marots, J., Canete-Nicolas, C., Bellido-Rodriguez. C., Calabuig-Crespo, R., Asensio-Pascual, P., Lera-Calatayud, G. (2014) Impact of involuntary out-patient commitment on reducing hospital services: 2-year follow-up. *Psychiatric Bulletin, 38,* 1-4.

Phelan, J.C., Sinkewicz, M., Castille, D.M., Huz, S., & Link, B.G. (2010). Effectiveness and outcomes of assisted outpatient treatment in New York State. *Psychiatric Services, 61*(2), 137-143.

Preston, N.J., Kisely, S., & Xiao, J. (2002). Assessing the outcome of compulsory psychiatric treatment in the community: epidemiological study in Western Australia. *Bmj, 324,* 7348.

Segal, S.P., & Burgess, P.M. (2006). Conditional release: a less restrictive alternative to hospitalization? *Psychiatric Services,* 57*(*11), 1600-6.

Steadman, H.J., Gounis, K., Dennis, D., Hopper, K., Roche, B., Swartz, M., & Robbins, P.C. (2001). Assessing the New York City involuntary outpatient treatment program. *Psychiatric Services, 52*(11), 1533.

Swanson, J.W. (2001). Can involuntary outpatient commitment reduce arrests among persons with severe mental illness? *Violence & Abuse Abstracts, 7(*4), 259-371.

Swartz, M.S., Swanson, J.W., Wagner, H.R., Burns, B.J., Hiday, V.A., & Borum, R. (1999). Can involuntary outpatient commitment reduce hospital recidivism? Findings from a randomized trial with severely mentally ill individuals. *The American Journal of Psychiatry,* 156*(*12), 1968-75.

# Collaborative primary care for dementia (older adult population)

## Adult Mental Health

Literature review updated February 2018.

Program Description: Collaborative primary care for older adults with dementia integrates primary care with specialist and community services to treat patients with diagnosed or probable dementia, including Alzheimer's disease. A multidisciplinary team that includes at least a care manager and primary care physician—but may integrate other specialists or community providers—conducts an initial assessment and administers an individualized, measurement-based treatment plan. Care managers may be health care professionals (e.g., nurse practitioners) or non-medical staff (e.g., social workers). Treatment may take place in the home, in primary care or specialist clinics, virtually, or in a combination of such settings. Interventions may include components for caregivers, but primary outcomes concern older adults with dementia. Interventions are typically 12 to 18 months in duration.

### Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Cognitive functioning | 79 | 1 | 84 | -0.029 | 0.168 | 80 | n/a | n/a | n/a | -0.029 | 0.864 |
| Death | 79 | 1 | 84 | -0.028 | 0.223 | 80 | n/a | n/a | n/a | -0.028 | 0.901 |
| Health care costs* | 79 | 1 | 202 | 0.053 | 0.360 | 80 | n/a | n/a | n/a | 0.053 | 0.882 |
| Hospitalization | 79 | 1 | 170 | -0.152 | 0.202 | 80 | n/a | n/a | n/a | -0.152 | 0.452 |

*The effect size for this outcome indicates percentage change, not a standardized mean difference effect size.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

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## Citations Used in the Meta-Analysis


Callahan, C.M., Boustani, M.A., Unverzagt, F.W., Austrom, M.G., Damush, T.M., Perkins, A.J., . . . Hendrie, H.C. (2006). Effectiveness of collaborative care for older adults with Alzheimer Disease in primary care: A randomized controlled trial. *Jama: The Journal of the American Medical Association, 295*(18), 2148-2157.

Duru, O.K., Ettner, S.L., Vassar, S.D., Chodosh, J., & Vickrey, B.G. (2009). Cost evaluation of a coordinated care management intervention for dementia. *American Journal of Managed Care, 15*(8), 521-528.

# Integrated Dual Disorder Treatment

## Adult Mental Health

Literature review updated September 2016.

Program Description: Integrated Dual Disorder Treatment is one of many approaches to treating persons diagnosed with both serious mental illness and substance abuse or dependence. This particular model involves multidisciplinary teams composed of case managers, psychologists, psychiatrists or other professional to manage medication, and a substance abuse counselor. The treatment is provided in an outpatient mental health treatment setting and involves assertive outreach and a staged approach dependent on the client's readiness to change. The intervention is designed to be of indefinite duration. More information on this intervention is available at: http://store.samhsa.gov/product/Integrated-Treatment-for-Co-Occurring-Disorders-Evidence-Based-Practices-EBP-KIT/SMA08-4367.

## Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Alcohol use disorder | 38 | 1 | 75 | 0.119 | 0.203 | 41 | 0.000 | 0.118 | 42 | 0.119 | 0.558 |
| Crime | 38 | 1 | 123 | -0.378 | 0.185 | 39 | 0.000 | 0.118 | 40 | -0.378 | 0.040 |
| Homelessness | 38 | 1 | 46 | -0.105 | 0.298 | 40 | 0.000 | 0.118 | 41 | -0.105 | 0.725 |
| Hospitalization | 38 | 1 | 46 | 0.406 | 0.299 | 40 | 0.000 | 0.118 | 41 | 0.406 | 0.174 |
| Hospitalization (psychiatric) | 38 | 2 | 169 | -0.091 | 0.242 | 40 | 0.000 | 0.118 | 41 | -0.091 | 0.707 |
| Illicit drug use disorder | 38 | 1 | 45 | 0.086 | 0.243 | 41 | 0.000 | 0.118 | 42 | 0.086 | 0.725 |
| Psychiatric symptoms | 38 | 2 | 151 | 0.024 | 0.155 | 41 | 0.000 | 0.118 | 42 | 0.024 | 0.879 |
| Substance misuse | 38 | 1 | 46 | 0.301 | 0.298 | 40 | 0.000 | 0.118 | 41 | 0.301 | 0.314 |

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

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## Citations Used in the Meta-Analysis


Drake, R.E., McHugo, G.J., Clark, R.E., Teague, G.B., Xie, H., Miles, K., & Ackerson, T.H. (1998). Assertive community treatment for patients with co-occurring severe mental illness and substance use disorder: A clinical trial. *American Journal of Orthopsychiatry, 68*(2), 201-215.

Mangrum, L.F., Spence, R.T., & Lopez, M. (2006). Integrated versus parallel treatment of co-occurring psychiatric and substance use disorders. *Journal of Substance Abuse Treatment, 30*(1), 79-84.

Morse, G.A., Calsyn, R.J., Dean, K.W., Helminiak, T.W., Wolff, N., Drake, R.E., Yonker, R.D., . . . McCudden, S. (2006). Treating homeless clients with severe mental illness and substance use disorders: Costs and outcomes. *Community Mental Health Journal, 42*(4), 377-404.

# Motivational interviewing to enhance treatment engagement for serious mental illness

## Adult Mental Health

Literature review updated September 2016.

Program Description: Motivational interviewing is a brief, several-session treatment given prior to another form of psychotherapy in order to increase treatment effectiveness. Motivational interviewing seeks to resolve subject ambivalence to treatment and increase the likelihood that the subject will adhere to the treatment plan by positively engaging the subject through exploratory questioning. Motivational interviewing has been used with a variety of populations; however, in this review we examine the impact of motivational interviewing on treatment of subjects with severe psychosis.

### Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Anxiety disorder | 34 | 1 | 25 | -0.656 | 0.357 | 34 | 0.000 | 0.118 | 35 | -0.656 | 0.066 |
| Engagement/Retention | 34 | 2 | 89 | 0.767 | 0.202 | 34 | 0.000 | 0.118 | 35 | 0.767 | 0.001 |
| Global functioning | 34 | 1 | 39 | 0.235 | 0.390 | 34 | 0.000 | 0.118 | 35 | 0.235 | 0.546 |
| Psychiatric symptoms | 34 | 1 | 39 | -0.242 | 0.390 | 34 | 0.000 | 0.118 | 35 | -0.242 | 0.534 |

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## Citations Used in the Meta-Analysis


Kemp, R., Kirov, G., Everitt, B., Hayward, P., & David, A. (1998). Randomised controlled trial of compliance therapy. 18-month follow-up. *The British Journal of Psychiatry : the Journal of Mental Science, 172,* 413-419.

Swanson, A.J., Pantalon, M.V., & Cohen, K.R. (1999). Motivational interviewing and treatment adherence among psychiatric and dually diagnosed patients. *Journal of Nervous and Mental Disease, 187*(10), 630-635.

Westra, H., & Dozois, D. (2006). Preparing clients for cognitive behavioral therapy: A randomized pilot study of motivational interviewing for anxiety. *Cognitive Therapy and Research, 30*(4), 481-498.

# Integrated treatment for first-episode psychosis

## Adult Mental Health

Literature review updated September 2016.

Program Description: Studies in this review examined integrated treatment approaches for adolescents and young adults experiencing a first episode of psychosis. Intervention periods lasted between 9 and 24 months. Integrated treatment typically included making 3-4 of the following components available to patients: Assertive community treatment and case management, cognitive behavioral therapy for psychosis, social skills training, and family support/psychoeducation. Both treatment and comparison groups were offered anti-psychotic medication as indicated. In this review, integrative treatment is compared with treatment as usual through community mental health clinics.

### Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Global functioning | 27 | 4 | 737 | 0.034 | 0.154 | 29 | 0.025 | 0.145 | 30 | 0.034 | 0.827 |
| Hospitalization (psychiatric) | 27 | 4 | 654 | -0.230 | 0.134 | 29 | -0.171 | 0.181 | 30 | -0.230 | 0.085 |
| Mental health recovery | 27 | 1 | 66 | 0.468 | 0.275 | 29 | 0.348 | 0.370 | 30 | 0.468 | 0.089 |
| Psychiatric symptoms | 27 | 3 | 498 | -0.298 | 0.085 | 29 | -0.221 | 0.187 | 30 | -0.298 | 0.001 |
| Psychosis symptoms (negative) | 27 | 3 | 498 | -0.168 | 0.084 | 29 | -0.125 | 0.124 | 30 | -0.168 | 0.046 |
| Psychosis symptoms (positive) | 27 | 3 | 498 | -0.292 | 0.148 | 29 | -0.217 | 0.217 | 30 | -0.292 | 0.049 |

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## Citations Used in the Meta-Analysis


Craig, T.K.J., Garety, P., Power, P., Rahaman, N., Colbert, S., Fornells-Ambrojo, M., & Dunn, G. (2004). The Lambeth Early Onset (LEO) Team: Randomised controlled trial of the effectiveness of specialised care for early psychosis. *British Medical Journal, 329*(7474), 1067.

Petersen, L., Jeppesen, P., Thorup, A., Abel, M.-B., Ohlensclaeger, J., Christensen, T. O. . . . Nordentoft, M. (2005). A randomised multicentre trial of integrated versus standard treatment for patients with a first episode of psychotic illness. *British Medical Journal, 331*(7517), 602-605.

Ruggeri, M., Bonetto, C., Lasalvia, A., Fioritti, A., de Girolamo, G., Santonastaso, P. . . . GET UP Group. (2015). Feasibility and effectiveness of a multi-element psychosocial intervention for first-episode psychosis: Results from the cluster-randomized controlled GET UP PIANO trial in a catchment area of 10 million inhabitants. *Schizophrenia Bulletin, 41*(5), 1192-1203.

Srihari, V.H., Tek, C., Kucukgoncu, S., Pollard, J., Saksa, J., Walsh, B.C. . . . Ozkan, B. (2015). First-episode services for psychotic disorders in the U.S. public sector: A pragmatic randomized controlled trial. *Psychiatric Services, 66* (7), 705-712.

# Integrated treatment for prodromal psychosis

## Adult Mental Health

Literature review updated September 2016.

Program Description: Studies in this review examined integrated treatment approaches for help-seeking adolescents and young adults identified as being prodromal, or at high-risk for developing psychosis. The primary purpose of treatment was to prevent or delay onset of psychosis. Integrated treatment lasted between 12 and 24 months. Treatment approaches included several of the following components: assertive community treatment, cognitive behavioral therapy, social skills training, family group psychoeducation, and computer-based cognitive remediation. In this review, integrated treatment is compared with non-specific supportive therapy.

### Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Psychosis onset | 25 | 2 | 105 | -0.595 | 0.276 | 26 | -0.442 | 0.426 | 27 | -0.595 | 0.031 |

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## Citations Used in the Meta-Analysis


Bechdolf, A., Wagner, M., Ruhrmann, S., Harrigan, S., Putzfeld, V., Pukrop, R., Brockhaus-Dumke, A., . . . Klosterkotter, J. (2012). Preventing progression to first-episode psychosis in early initial prodromal states. *The British Journal of Psychiatry, 200*(1), 22-29.

Nordentoft, M., Thorup, A., Petersen, L., Øhlenschlaeger, J., Melau, M., Christensen, T. Ø., . . . Jeppesen, P. (2006). Transition rates from schizotypal disorder to psychotic disorder for first-contact patients included in the OPUS trial. A randomized clinical trial of integrated treatment and standard treatment. *Schizophrenia Research, 83*(1), 29-40.

# Telemedicine for depression in primary care

## Adult Mental Health

Literature review updated December 2016.

Program Description: We reviewed studies of the effectiveness of telemedicine for the treatment of depression in primary care settings. Our analysis included studies that evaluated outcomes for individuals randomly assigned to telemedicine for behavioral health or usual care, which typically included in-person psychiatric treatment. Subjects in reviewed studies received behavioral health services through a remote link while present in a clinical setting, which does not include home-based communication.

### Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Major depressive disorder | 43 | 3 | 153 | -0.444 | 0.159 | 43 | -0.231 | 0.195 | 45 | -0.460 | 0.005 |

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

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## Citations Used in the Meta-Analysis


Moreno, F.A., Chong, J., Dumbauld, J., Humke, M., & Byreddy, S. (2012). Use of standard Webcam and internet equipment for telepsychiatry treatment of depression among underserved Hispanics. *Psychiatric Services, 63*(12), 1213-1217.

Nelson, E.L., Barnard, M., & Cain, S. (2003). Treating childhood depression over videoconferencing. *Telemedicine Journal and E-Health, 9*(1), 49-55.

Ruskin, P.E., Silver-Aylaian, M., Kling, M.A., Reed, S.A., Bradham, D.D., Hebel, J.R., . . . Hauser, P. (2004). Treatment outcomes in depression: comparison of remote treatment through telepsychiatry to in-person treatment. *The American Journal of Psychiatry, 161*(8), 1471-1476.

# Telemedicine for posttraumatic stress disorder (PTSD) in primary care

## Adult Mental Health

Literature review updated December 2016.

Program Description: We reviewed studies of the effectiveness of telemedicine for the treatment of posttraumatic stress disorder (PTSD) in primary care settings. Our analysis included studies that evaluated outcomes for individuals randomly assigned to telemedicine for behavioral health or usual care, which typically included in-person psychiatric treatment. Subjects in reviewed studies received behavioral health services through a remote link while present in a clinical setting, which does not include home-based communication.

### Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Post-traumatic stress | 52 | 4 | 272 | -0.253 | 0.086 | 52 | -0.253 | 0.086 | 53 | -0.253 | 0.003 |

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## Citations Used in the Meta-Analysis


Fortney, J.C., Pyne, J.M., Kimbrell, T.A., Hudson, T.J., Robinson, D.E., Schneider, R., . . . Schnurr, P.P. (2015). Telemedicinebased collaborative care for posttraumatic stress disorder: a randomized clinical trial. *Jama Psychiatry, 72*(1), 58- 67.

Frueh, B.C., Monnier, J., Yim, E., Grubaugh, A.L., Hamner, M.B., & Knapp, R.G. (2007). A randomized trial of telepsychiatry for post-traumatic stress disorder. *Journal of Telemedicine and Telecare, 13*(3), 142-147.

Morland, L.A., Mackintosh, M.-A., Morland, L.A., Greene, C.J., Rosen, C.S., Rosen, C.S., . . . Frueh, B.C. (2014). Cognitive processing therapy for posttraumatic stress disorder delivered to rural veterans via telemental health: A randomized noninferiority clinical trial. *Journal of Clinical Psychiatry, 75*(5), 470-476.

Morland, L.A., Mackintosh, M.-A., Rosen, C.S., Willis, E., Resick, P., Chard, K., & Frueh, B.C. (2015). Telemedicine versus inperson delivery of cognitive processing therapy for women with posttraumatic stress disorder: A randomized noninferiority trial. *Depression and Anxiety, 32*(11), 811-820.

# Wellness Recovery Action Plan (WRAP)

## Adult Mental Health

Literature review updated December 2014.

Program Description: Wellness Recovery Action Plan is a group-based intervention for persons with mental illness, delivered weekly for eight to ten weeks. The program teaches participants to focus on key elements of recovery (hope, self-advocacy, support) in daily life and teaches participants to organize a list of activities to use to help them feel better when they are experiencing mental health difficulties.

### Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Anxiety disorder | 46 | 1 | 251 | -0.070 | 0.088 | 46 | 0.000 | 0.000 | 47 | -0.070 | 0.424 |
| Hope | 46 | 1 | 309 | 0.139 | 0.176 | 46 | 0.000 | 0.000 | 47 | 0.139 | 0.429 |
| Mental health recovery | 46 | 3 | 381 | 0.072 | 0.076 | 46 | 0.000 | 0.000 | 47 | -0.070 | 0.340 |
| Patient self-advocacy | 46 | 1 | 251 | 0.090 | 0.143 | 46 | 0.000 | 0.000 | 47 | 0.099 | 0.489 |
| Psychiatric symptoms | 46 | 3 | 381 | -0.141 | 0.121 | 46 | 0.000 | 0.000 | 47 | -0.141 | 0.245 |

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## Citations Used in the Meta-Analysis


Cook, J.A., Copeland, M.E., Floyd, C.B., Jonikas, J.A., Hamilton, M.M., Razzano, L., Carter, T.M., ... Boyd, S. (2012). A randomized controlled trial of effects of Wellness Recovery Action Planning on depression, anxiety, and recovery. *Psychiatric Services, 63*(6), 541-7.

Cook, J.A., Jonikas, J.A., Hamilton, M.M., Razzano, L.A., Grey, D.D., MacFarlane, R.T., Carter, T.M., ... Boyd, S. (2012). Results of a randomized controlled trial of mental illness self-management using wellness recovery action planning. *Schizophrenia Bulletin, 38*(4), 881-891.

Cook, J.A., Jonikas, J.A., Hamilton, M.M., Goldrick, V., Steigman, P.J., Grey, D.D., Burke, L., ... Copeland, M.E. (2013). Impact of Wellness Recovery Action Planning on Service Utilization and Need in a Randomized Controlled Trial. *Psychiatric Rehabilitation Journal, 36*(4), 250-257.

Fukui, S., Starnino, V.R., Susana, M., Davidson, L.J., Cook, K., Rapp, C.A., & Gowdy, E.A. (2011). Effect of Wellness Recovery Action Plan (WRAP) participation on psychiatric symptoms, sense of hope, and recovery. *Psychiatric Rehabilitation Journal, 34* (3), 214-22.

Jonikas, J.A., Grey, D.D., Copeland, M.E., Razzano, L.A., Hamilton, M.M., Floyd, C.B., Hudson, W.B., ... Cook, J.A. (2013). Improving propensity for patient self-advocacy through wellness recovery action planning: results of a randomized controlled trial. *Community Mental Health Journal, 49*(3), 260-9.

# Individual Placement and Support for first episode psychosis

## Adult Mental Health: Serious Mental Illness

Literature review updated August 2017.

Program Description: Individual Placement and Support (IPS) has been used with adults with serious mental illness to assist clients in obtaining competitive employment. In recent years IPS has been modified for persons experiencing their first episode of psychosis and, depending on the person's preference, the program focuses on employment or return to school.

### Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Labor market activity | 24 | 1 | 44 | 0.759 | 0.322 | 25 | n/a | n/a | n/a | 0.759 | 0.018 |

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

## Citations Used in the Meta-Analysis

Major, B.S., Hinton, M.F., Flint, A., Chalmers-Brown, A., McLoughlin, K., & Johnson, S. (2010). Evidence of the effectiveness of a specialist vocational intervention following first episode psychosis: a naturalistic prospective cohort study. *Social Psychiatry and Psychiatric Epidemiology, 45*(1), 1-8.

# Cognitive behavioral therapy (CBT) for prodromal psychosis

## Adult Mental Health: Serious Mental Illness

Literature review updated September 2016.

Program Description: Studies in this review examined cognitive behavioral therapy in help-seeking adolescents and young adults identified as being prodromal, or at high-risk for developing psychosis. The primary purpose of treatment was to prevent or delay onset of psychosis. Treatments typically involved offering six months of weekly individual therapy, and focused on stress management, helping patients understand and cope with symptoms, and crisis management. In this review, cognitive behavioral therapy is compared with either assessment and monitoring only, or non-specific supportive therapy.

### Meta-Analysis of Program Effects

| Outcomes measured | Treatment age | No. of effect sizes | Treatment N | Adjusted effect sizes and standard errors used in the benefit-cost analysis | | | | | | Unadjusted effect size (random effects model) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First time ES is estimated | | | Second time ES is estimated | | | | |
| | | | | ES | SE | Age | ES | SE | Age | ES | p-value |
| Anxiety disorder | 21 | 2 | 101 | -0.195 | 0.246 | 22 | -0.145 | 0.255 | 23 | -0.195 | 0.427 |
| Global functioning | 21 | 3 | 142 | 0.121 | 0.229 | 22 | 0.090 | 0.225 | 23 | 0.121 | 0.597 |
| Hospitalization (psychiatric) | 21 | 1 | 59 | -0.326 | 0.397 | 22 | -0.242 | 0.415 | 23 | -0.326 | 0.411 |
| Major depressive disorder | 21 | 2 | 116 | 0.101 | 0.663 | 22 | 0.075 | 0.623 | 23 | 0.101 | 0.878 |
| Psychiatric symptoms | 21 | 3 | 180 | -0.287 | 0.172 | 22 | -0.213 | 0.230 | 23 | -0.287 | 0.096 |
| Psychosis onset | 21 | 5 | 344 | -0.653 | 0.275 | 22 | -0.485 | 0.452 | 23 | -0.653 | 0.018 |
| Psychosis symptoms (negative) | 21 | 2 | 46 | 0.165 | 0.290 | 22 | 0.122 | 0.287 | 23 | 0.165 | 0.571 |
| Psychosis symptoms (positive) | 21 | 2 | 54 | -0.311 | 0.294 | 22 | -0.231 | 0.327 | 23 | -0.311 | 0.290 |

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our Technical Documentation.

## Citations Used in the Meta-Analysis


Addington, J., Epstein, I., Liu, L., French, P., Boydell, K M., & Zipursky, R.B. (2011). A randomized controlled trial of cognitive behavioral therapy for individuals at clinical high risk of psychosis. *Schizophrenia Research,* 125(1), 54-61.

Ising, H.K., Kraan, T.C., Rietdijk, J., Dragt, S., Klaassen, R.M., Boonstra, N., Nieman, D.H., . . . van der Gaag, M. (2016). Four-year follow-up of cognitive behavioral therapy in persons at ultra-high risk for developing psychosis: The Dutch Early Detection Intervention Evaluation (EDIE-NL) Trial. *Schizophrenia Bulletin, 42*(5), 1243-1252.

McGorry, P.D., Nelson, B., Phillips, L.J., Yuen, H.P., Francey, S.M., Thampi, A., Berger, G.E., . . . Yung, A.R. (2013). Randomized controlled trial of interventions for young people at ultra-high risk of psychosis: twelve-month outcome. *The Journal of Clinical Psychiatry, 74*(4), 349-356.

Morrison, A.P., French, P., Walford, L., Lewis, S.W., Kilcommons, A., Green, J., et al. (2004). Cognitive therapy for the prevention of psychosis in people at ultra-high risk: Randomised controlled trial. *The British Journal of Psychiatry, 185*(4), 291-297.

Morrison, A.P., French, P., Stewart, S.L., Birchwood, M., Fowler, D., Gumley, A.I., Jones, P.B., . . . Dunn, G. (2012). Early detection and intervention evaluation for people at risk of psychosis: multisite randomised controlled trial. *BMJ, 344.*

van der Gaag, M., Nieman, D.H., Rietdijk, J., Dragt, S., Ising, H.K., Klaassen, R.M., Koeter, M., . . . Linszen, D.H. (2012). Cognitive behavioral therapy for subjects at ultrahigh risk for developing psychosis: a randomized controlled clinical trial. *Schizophrenia Bulletin, 38*(6), 1180-8.

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