

# **What is the best estimate of how quickly adults who currently smoke can expect to see an improvement in mental well-being or life satisfaction if they stop smoking?**

Adults who quit smoking can expect to see improvements in mental well-being and life satisfaction within 6 weeks to 3 months after quitting.

## **Abstract**

Adults who quit smoking show measurable improvements in mental well-being and life satisfaction within 6 weeks to 3 months, with benefits persisting or growing at later follow-ups. For example, one study using the Short Form-36 documented a 5.5-point increase in emotional well-being at 6 months and a 4.5-point increase at 12 months after quitting. Other studies report standardized mean differences for reductions in anxiety and depression ranging from -0.25 to -0.37 and odds ratios for depression symptoms of 0.34 (<3 months) to 0.24 ( 3 months). In addition, measures of stress, quality of life, and positive affect consistently show improvement, with one study noting a 19% lower risk of screening positive for psychological distress as early as 1 month after cessation. No study reported deterioration in mental health following smoking cessation. These findings indicate that adults who stop smoking can expect observable mental health benefits beginning as early as 6 weeks to 3 months after quitting.

## **Paper search**

Using your research question "What is the best estimate of how quickly adults who currently smoke can expect to see an improvement in mental well-being or life satisfaction if they stop smoking?", we searched across over 126 million academic papers from the Semantic Scholar corpus. We retrieved the 50 papers most relevant to the query.

## **Screening**

We screened in sources that met these criteria:

- **Adult Population:** Does the study include only adult participants (aged 18 or older) who were current smokers at baseline?
- **Complete Cessation:** Does the study measure complete smoking cessation (not just reduction or temporary abstinence)?
- **Mental Health Outcomes:** Does the study measure at least one of the following using validated measures: mental well-being, life satisfaction, or quality of life?
- **Study Design:** Is the study design longitudinal (RCT, prospective cohort study, systematic review, or meta-analysis)?
- **Temporal Measurement:** Does the study report specific timeframes between smoking cessation and outcome measurement?
- **Outcome Scope:** Does the study include mental well-being measures (not exclusively physical health outcomes)?
- **Population Health Status:** Is the study population free from severe mental illness or substance use disorders as primary conditions?

We considered all screening questions together and made a holistic judgement about whether to screen in each paper.

## Data extraction

We asked a large language model to extract each data column below from each paper. We gave the model the extraction instructions shown below for each column.

- **Study Design:**

Identify the type of study design used. Look in the methods section for specific details. Classify as:

- Cohort study
- Longitudinal study
- Prospective study
- Cross-sectional study

If multiple design elements are present, list all. If unclear, note "design not clearly specified".

Specific attention should be paid to whether the study tracked changes in mental well-being over time after smoking cessation.

- **Participant Characteristics:**

Extract the following details about participants:

- Total sample size
- Number of smokers vs. ex-smokers
- Age range or mean age
- Gender distribution
- Any specific inclusion/exclusion criteria related to mental health history

If percentages or ranges are provided, include those. If specific numbers are not clear, note "insufficient information".

Prioritize information about adult participants (18+ years old) as per the research question.

- **Mental Well-being Measurement Tools:**

List all specific instruments used to measure mental well-being or life satisfaction:

- Name of assessment tool (e.g., GHQ-30, SF-36)
- Specific subscales or components used
- Scoring method

If multiple tools were used, list all in order of primary to secondary importance. Include any standardized scoring interpretations provided in the study.

- **Time Points of Mental Well-being Assessment:**

Extract all time points when mental well-being was measured:

- Baseline measurement time
- Follow-up measurement times (exact weeks/months after smoking cessation)
- Duration of total follow-up period

Prioritize measurements that directly track changes after smoking cessation. If multiple time points exist, list chronologically.

- **Mental Well-being Outcomes:**

Extract quantitative results related to mental well-being changes:

- Statistical measures (mean changes, odds ratios, p-values)
- Direction of mental health changes (improved, declined, no change)
- Any statistically significant differences between smokers and ex-smokers

Include confidence intervals if reported. If results are complex, summarize the primary finding about mental well-being trajectory after smoking cessation.

## Results

### Characteristics of Included Studies

Study	Study Design	Population Size	Follow-up Duration	Mental Health Measures Used	Full text retrieved
Taylor et al., 2015	Prospective, longitudinal (secondary analysis of Randomized Controlled Trial data)	937 (589 smokers, 68 ex-smokers)	2 years (6 and 12 month follow-up)	Short Form-36 (emotional well-being subscale)	Yes
Taylor et al., "Change in mental health after smoking cessation"	Systematic review/meta-analysis of longitudinal studies	No mention found	7 weeks to 9 years	No mention found	No
Taylor et al., 2014	Systematic review/meta-analysis of longitudinal studies	No mention found	7 weeks to 9 years	No mention found	Yes
Jain, 2014	Systematic review/meta-analysis of longitudinal studies	No mention found	7 weeks to 9 years	No mention found	No
Taylor et al., 2021	Systematic review/meta-analysis (Cochrane)	>169,500	6 weeks (range not specified)	No mention found	No

Study	Study Design	Population Size	Follow-up Duration	Mental Health Measures Used	Full text retrieved
Croghan et al., 2005	Prospective, longitudinal cohort	206 (60 smokers, 146 ex-smokers)	1 year	Short Form-36 (mental composite, role limitations, social functioning, general health)	No
Shahab et al., 2013	Prospective, longitudinal cohort	3,645	18 months (3, 12 month focus)	Single-item depression/anxiety, EuroQol-5D	Yes
Levy et al., 2018	Prospective, longitudinal	1,357	6 months (1, 3, 6 month follow-up)	Short Form-1, Patient Health Questionnaire-4, EuroQol-5D-5L	No
Mino et al., 2000	Prospective, longitudinal cohort	191 (18 quitters, 173 smokers)	1 year (6, 12 month follow-up)	General Health Questionnaire-30	No
Sales et al., 2009	Prospective, longitudinal	60 (40 quitters, 20 non-quitters)	12 months	Short Form-36 (role-emotional, general health, vitality, mental health)	No

Study design:

- Systematic reviews/meta-analyses:4 studies.
- Prospective, longitudinal studies (including cohort studies):6 studies.

Population size:

- Reported in 6 studies:Ranged from 60 to 3,645 participants in primary studies; one systematic review/meta-analysis included over 169,500 participants.
- No mention found in 4 studies:All systematic reviews/meta-analyses except Taylor et al., 2021.

Follow-up duration:

- Systematic reviews/meta-analyses:7 weeks to 9 years (3 studies), or 6 weeks (1 study).
- Primary studies:6 months (1 study), 12 months (1 study), 1 year (2 studies), 18 months (1 study), and 2 years (1 study).

Mental health measures used:

- Short Form-36 (any subscale):3 studies.
- EuroQol-5D or EuroQol-5D-5L:2 studies.

- Other measures:Single-item depression/anxiety (1 study), Short Form-1 (1 study), Patient Health Questionnaire-4 (1 study), General Health Questionnaire-30 (1 study).
- No mention found in 4 studies:All systematic reviews/meta-analyses.
- Multiple measures:Two studies used more than one mental health measure.

**Summary:**

Most primary studies used prospective, longitudinal designs with sample sizes ranging from 60 to 3,645 and follow-up durations of 6 months to 2 years. The most common mental health measure was the Short Form-36, but a variety of other validated instruments were also used. We didn't find mention of mental health measures or population size in the systematic reviews/meta-analyses, except for one that reported over 169,500 participants.

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## Effects

### Mental Health Effects by Timeframe

#### Short-term Effects ( 3 months)

Study	Mental Health Measure	Effect Direction	Effect Magnitude	Population Type
Taylor et al., 2015	Short Form-36 emotional well-being	Improved	Mean difference 5.5 (95% Confidence Interval 1.6–9.4) at 6 months (unmatched); 3.4 (−2.2 to 8.9) after propensity score matching	Adult smokers, not under psychiatric care
Taylor et al., "Change in mental health after smoking cessation"	No mention found	Improved	Standardized mean differences: anxiety −0.37, depression −0.25, stress −0.27 ( 7 weeks)	Adults, general and clinical
Taylor et al., 2014	No mention found	Improved	Standardized mean differences: anxiety −0.37, depression −0.25, stress −0.27 ( 7 weeks)	Adults, general and clinical
Jain, 2014	No mention found	Improved	Standardized mean differences: anxiety −0.37, depression −0.25, stress −0.27 ( 7 weeks)	Adults, general and clinical

Study	Mental Health Measure	Effect Direction	Effect Magnitude	Population Type
Taylor et al., 2021	No mention found	Improved	Standardized mean differences: anxiety -0.28, depression -0.30, stress -0.19 (6 weeks)	Adults, general and clinical
Croghan et al., 2005	Short Form-36 mental composite	Improved	We didn't find mention of effect magnitude for 3 months	Clinical, nicotine dependence
Shahab et al., 2013	Single-item depression/anxiety	Improved	Odds Ratio for depression symptoms: 0.34 (0.15–0.78) for <3 months quit	General, 35–65 years
Levy et al., 2018	Patient Health Questionnaire-4, Short Form-1, EuroQol-5D-5L	Improved	19% less likely to screen positive for distress (adjusted Relative Risk 0.68–0.93) at 1 month	Hospitalized smokers
Mino et al., 2000	General Health Questionnaire-30	Improved	p<0.04 at 6 months	Male smokers, Japan
Sales et al., 2009	Short Form-36	Improved	We didn't find mention of effect magnitude for 3 months	Self-referred smokers

#### Summary of short-term effects:

- Direction of effect: All 10 studies reported improved mental health outcomes after smoking cessation.
- Mental health measures: Short Form-36 (3 studies), Single-item depression/anxiety (1), Patient Health Questionnaire-4 (1), Short Form-1 (1), EuroQol-5D-5L (1), General Health Questionnaire-30 (1), and no mention found in 4 studies.
- Effect magnitude:
  - Standardized mean differences (4 studies): anxiety -0.28 to -0.37, depression -0.25 to -0.30, stress -0.19 to -0.27.
  - Mean difference (1 study): 5.5 (1.6–9.4) at 6 months; 3.4 (-2.2 to 8.9) after adjustment.
  - Odds Ratio (1 study): 0.34 (0.15–0.78) for depression symptoms for <3 months quit.
  - Adjusted Relative Risk (1 study): 0.68–0.93 for distress at 1 month.
  - p-value only (1 study): p<0.04 at 6 months.
  - We didn't find mention of effect magnitude for 2 studies.

- No mention found of studies reporting no change or worsening of mental health in the short term.
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### Medium to Long-term Effects (>3 months)

Study	Mental Health Measure	Effect Direction	Effect Magnitude	Population Type
Taylor et al., 2015	Short Form-36 emotional well-being	Improved	Mean difference 4.5 (0.6–8.5) at 12 months (adjusted)	Adult smokers, not under psychiatric care
Taylor et al., "Change in mental health after smoking cessation"	No mention found	Improved	Standardized mean differences: anxiety -0.37, depression -0.25, stress -0.27 (up to 9 years)	Adults, general and clinical
Taylor et al., 2014	No mention found	Improved	Standardized mean differences: anxiety -0.37, depression -0.25, stress -0.27 (up to 9 years)	Adults, general and clinical
Jain, 2014	No mention found	Improved	Standardized mean differences: anxiety -0.37, depression -0.25, stress -0.27 (up to 9 years)	Adults, general and clinical
Taylor et al., 2021	No mention found	Improved	Standardized mean differences: anxiety -0.28, depression -0.30, stress -0.19 (6 weeks); Odds Ratio for new mixed anxiety/depression 0.76 (0.66–0.86)	Adults, general and clinical
Croghan et al., 2005	Short Form-36 mental composite	Improved	p=0.009 at 1 year	Clinical, nicotine dependence
Shahab et al., 2013	Single-item depression/anxiety	Improved	Odds Ratio for depression symptoms: 0.24 (0.09–0.67) for 3 months quit	General, 35–65 years
Levy et al., 2018	Patient Health Questionnaire-4, Short Form-1, EuroQoL-5D-5L	Improved	19% less likely to screen positive for distress at 6 months	Hospitalized smokers

Study	Mental Health Measure	Effect Direction	Effect Magnitude	Population Type
Mino et al., 2000	General Health Questionnaire-30	Improved	p<0.01 at 1 year	Male smokers, Japan
Sales et al., 2009	Short Form-36	Improved	p=0.002 for mental health, p=0.004 for mental component at 12 months	Self-referred smokers

Summary of medium to long-term effects:

- Direction of effect: All 10 studies reported improved mental health outcomes after smoking cessation.
- Mental health measures: Short Form-36 (3 studies), Single-item depression/anxiety (1), Patient Health Questionnaire-4 (1), Short Form-1 (1), EuroQol-5D-5L (1), General Health Questionnaire-30 (1), and no mention found in 4 studies.
- Effect magnitude:
  - Standardized mean differences (4 studies): anxiety -0.28 to -0.37, depression -0.25 to -0.30, stress -0.19 to -0.27.
  - Odds Ratios (2 studies): 0.76 (0.66–0.86) for new mixed anxiety/depression; 0.24 (0.09–0.67) for depression symptoms after 3 months quit.
  - Mean difference (1 study): 4.5 (0.6–8.5) at 12 months.
  - Percent difference (1 study): 19% less likely to screen positive for distress at 6 months.
  - p-values only (3 studies): p=0.009 at 1 year; p<0.01 at 1 year; p=0.002 and p=0.004 at 12 months.
  - Time points for effect measurement ranged from 6 weeks to up to 9 years.
- No mention found of studies reporting no improvement or worsening of mental health after smoking cessation in the medium to long term.

## Specific Mental Health Outcomes

### Depression and Anxiety

- Systematic reviews and meta-analyses (Taylor et al., 2014; Jain, 2014; Taylor et al., 2021): Consistently reported significant reductions in depression and anxiety symptoms among quitters, with standardized mean differences ranging from -0.25 to -0.37 for depression and anxiety.
- Shahab et al., 2013: Found lower odds of depression symptoms and prescriptions in quitters at both <3 months (Odds Ratio 0.34, 0.15–0.78) and 3 months (Odds Ratio 0.24, 0.09–0.67), with no mention found of an increase in anxiety.
- Taylor et al., 2015 and Croghan et al., 2005: Observed improved mental health scores in quitters, with effect sizes attenuated but still positive after adjustment.
- No mention found of evidence of increased depression or anxiety after cessation, including in those with a history of these disorders, among the included studies.

## **Quality of Life and Well-being**

- Systematic reviews:  
Reported improvements in psychological quality of life and positive affect, with standardized mean differences of 0.22 (0.09–0.36) and 0.40 (0.09–0.71), respectively.
- Croghan et al., 2005, Levy et al., 2018, and Sales et al., 2009:  
All reported significant improvements in Short Form-36 or EuroQol-5D quality of life domains among quitters at 6–12 months.
- No mention found of reduced social quality of life; some studies suggest a small improvement.

## **Stress and Psychological Distress**

- Systematic reviews/meta-analyses and Taylor et al., 2021:  
Reported significant reductions in stress symptoms (standardized mean difference -0.19 to -0.27).
  - Levy et al., 2018:  
Found a 19% reduction in likelihood of screening positive for psychological distress at 1 and 6 months in quitters.
  - Mino et al., 2000:  
Observed significant decreases in General Health Questionnaire-30 scores ( $p<0.04$  at 6 months,  $p<0.01$  at 1 year) in quitters.
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## **Discussion**

Summary of evidence from included studies:

- Consistency of effect:  
All included studies reported improved mental health outcomes after smoking cessation, including reductions in depression, anxiety, and stress, as well as enhancements in quality of life and positive affect.
- Timeframe of improvement:  
Improvements were observed as early as 6 weeks to 3 months after cessation and were sustained or increased at 6 and 12 months.
- Magnitude of improvement:
  - Standardized mean differences for negative mental health outcomes ranged from -0.19 to -0.40.
  - Standardized mean differences for positive outcomes ranged from 0.11 to 0.40.
  - Some effect sizes for mental health improvement after cessation were comparable to or greater than those seen with antidepressant treatment, according to systematic reviews.
- No mention found of harm:  
Among the included studies, we didn't find mention of harm to mental health from quitting, and some studies reported reduced risk of depression, including in those with a history of mental health disorders.

Limitations of the included studies:

- Heterogeneity:
  - Measurement tools, follow-up durations, and population characteristics varied across studies.
  - Some studies excluded those with severe psychiatric illness, which may limit generalizability to this subgroup.

- Risk of bias:
  - Some studies had potential for confounding and incomplete reporting.
  - For several studies, only abstracts were available, limiting the detail of findings.

Generalizability:

- The consistency of findings across study designs, populations, and settings strengthens confidence in the generalizability of the results to adults who smoke, though caution is warranted for those with severe psychiatric illness due to limited data.

Best estimate from current evidence:

- Adults who quit smoking can expect to see improvements in mental well-being and life satisfaction within 6 weeks to 3 months, with benefits sustained or increasing at 6 and 12 months, based on the included studies. Among these studies, we didn't find mention of harm to mental health from quitting, and some reported reduced risk of depression.

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