



**FACT SHEET**

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**TYPE 2 DIABETES AND OBESITY: TWIN EPIDEMICS**

**OVERVIEW**

- Type 2 diabetes accounts for 90-95% of the 29.1 million diabetes cases in the U.S.<sup>1</sup>
- Obesity is a major independent risk factor for developing the disease, and more than 90% of type 2 diabetics are overweight or have obesity<sup>2</sup>
- Modest weight loss, as little as 5% of total body weight, can help to improve type 2 diabetes in patients who are overweight or have obesity<sup>3</sup>
- Metabolic and bariatric surgery may result in resolution or improvement of type 2 diabetes independent of weight loss<sup>4</sup>

**PREVALENCE**

- 86 million Americans, or 37% of American adults 20 or older have prediabetes<sup>1</sup>
  - 15-30% of people with prediabetes will develop type 2 diabetes within 5 years
  - People with pre-diabetes are also at risk for heart disease and stroke<sup>5</sup>
- Diabetes affects 9.3% of the total U.S. population (29.1 million people)<sup>1</sup>
  - 20.1 million people have been diagnosed
  - 8.1 million people are unaware they suffer from the disease
  - About 90-95% of the diabetes population has type 2 diabetes
- Increases in type 2 diabetes cases across the country are associated with high obesity rates and rising age of population<sup>6</sup>
  - More than one-third (35.7%) of adults have obesity<sup>7</sup>
- African-Americans and the elderly are disproportionately affected by diabetes<sup>1</sup>
  - 13.2% of all African-Americans over 20 years old have diabetes, compared to 7.6% of whites
  - 25.9% of Americans age 65 and older have diabetes, compared to 12.3% of adults over 20

**HEALTH RISKS OF TYPE 2 DIABETES**

- People with diabetes have double the mortality risk of similar-aged people without diabetes, and the disease is the seventh leading cause of death in the U.S.<sup>8</sup>
- Diabetes is the leading cause of kidney failure, non-traumatic lower-limb amputations, new cases of blindness among adults, and it is associated with increased risk of:
 

• Heart disease and stroke	• Blindness
• High blood pressure	• Amputations
• Nervous system disease	• Dental disease
• Kidney disease	• Pregnancy complications

## **IMPACT OF METABOLIC & BARIATRIC SURGERY ON TYPE 2 DIABETES**

- Meta-analysis of 22,000 bariatric surgery patients in 136 studies (1990-2003) found 86% of patients saw improvement or resolution of type 2 diabetes and the mean excess weight loss was 61.2%<sup>13</sup>
- Gastric bypass may result in resolution or improvement of type 2 diabetes independent of weight loss by decreasing levels of ghrelin – appetite stimulating hormone secreted by the stomach<sup>14</sup>
- People with severe obesity who had gastric bypass surgery significantly reduced long-term mortality from diabetes by 92% and from “any cause” by 40%<sup>15</sup>

### *Surgical Treatment vs. Medical Therapy – Comparative Studies*

- Five-year follow-up data showed 50% of bariatric surgery patients maintain diabetes remission, compared to none of the patients treated with medical therapy alone<sup>16</sup>
- Meta-analysis of 796 participants in 11 studies comparing bariatric surgery to nonsurgical treatment for obesity found surgery results in greater weight loss and higher type 2 diabetes remission rates<sup>17</sup> (*BMJ*, 2013)
  - Studies with more than six months follow up showed surgical patients lost an average of 57 more pounds than participants in nonsurgical weight loss programs, and were 22 times more likely to see their type 2 diabetes abate
- Head-to-head studies comparing bariatric surgery to medical therapy found bariatric surgery superior to medical treatment in producing type 2 diabetes remission, even before weight loss
  - Cleveland Clinic study showed within one year, diabetes remission rates with bariatric surgery were about 40% (42% gastric bypass, 37% gastric sleeve) compared to about 12% for patients treated with the best pharmacotherapy available; patients had BMI between 27 and 43<sup>18</sup> (*NEJM*, 2012)
  - Catholic University/New York-Presbyterian/Weill Cornell Medical Center showed remission rates were about 85% for bariatric surgery (75% gastric bypass, 95% biliopancreatic diversion) and zero for medical therapy in patients with BMI greater than 35, after two years<sup>19</sup> (*NEJM*, 2012)
    - In surgical groups, both weight loss and preoperative BMI were not predictors of diabetes control, suggesting such surgical procedures may be independent of weight loss
- Cleveland Clinic study showed bariatric surgery is a highly effective and durable treatment for type 2 diabetes in patients with moderate and severe obesity up to three years after surgery<sup>20</sup>
  - Of patients who had gastric bypass, 37.5% maintained blood sugar control without the use of diabetic medications, compared to 24.5% of those who had sleeve gastrectomy and 5% of patients treated with medical therapy alone

### *Long-Term Results of Surgical Treatment*

- 24% of patients who have bariatric surgery experience complete, long-term – five years or more – remission of their type 2 diabetes; 26% experience partial remission and 34% improve from baseline<sup>21</sup> (*Annals of Surgery*, 2013)
- Six years after surgery, 62% of gastric bypass patients with severe obesity – BMI 35 or higher – experienced type 2 diabetes remission, compared to 6-8% in control groups<sup>22</sup> (*JAMA*, 2012)
- Ten years after intervention, 7% of surgery patients have type 2 diabetes, compared to 24% of nonsurgically treated patients<sup>23</sup>
- Fifteen years after bariatric surgery 30.4% of bariatric surgery patients maintained remission of their diabetes, compared 6.5% of a control group<sup>24</sup>

### *Surgery in Patients with Lower BMIs and Type 2 Diabetes*

- Compared to nonsurgical treatments, bariatric surgery for patients with mild-to-moderate obesity (BMI≥30-35) and type 2 diabetes produces better intermediate glucose outcomes one-to-two years following treatment<sup>25</sup> (*JAMA*, 2013)
- Improvements in glycemic control are maintain for up to five years after bariatric surgery<sup>26</sup> (*JAMA Surgery*, 2015)
  - 36% of patients maintained complete remission
  - 28% of patients maintained partial remission
    - Compared to patient treated with medical therapy alone
      - 1.2% achieved complete remission
      - 1.6% achieved partial remission
- Laparoscopic gastric band surgery is a more effective treatment than nonsurgical therapy<sup>27</sup> (*Annals of Internal Medicine*, 2006)
  - After two years, only 3% of surgical patients continued to have metabolic syndrome, compared to 24% of non-surgical patients, who were treated with very-low-calorie diets, pharmacotherapy and lifestyle change

### **COSTS ASSOCIATED WITH TYPE 2 DIABETES**

- Total costs of diagnosed diabetes rose 41% in five years, from \$174 billion in 2007 to \$245 billion in 2012<sup>28</sup>
- More than 1-in-5 health care dollars in the U.S. are spent on diabetes care with half directly attributable to treatment<sup>29</sup>
  - Indirect costs, including absenteeism, reduced work productivity, inability to work and lost workers due to premature death, account for \$68.6 billion
- Diabetes patients incur average medical costs of \$7,900 for treatment; total medical expenses are 2.3 times higher than for people without diabetes<sup>30</sup>
- Metabolic surgery has been shown to be associated with reductions in overall health care costs in patients with type 2 diabetes<sup>31</sup>
  - Annual health care costs decreased 34.2% after two years and by 70.5% after three years
  - Associated with elimination of diabetes medication in nearly 85% of patients two years after surgery

### **GUIDELINES & RECOMMENDATIONS**

- Joint statement from 45 international professional organizations, including the American Diabetes Association (ADA), the International Diabetes Federation (IDF) and the ASMBS, endorses evidence-based guidelines recommending metabolic surgery as a standard treatment option for people with diabetes, including people who have mild obesity and fail to respond to conventional treatment<sup>32</sup> (*Diabetes Care*, 2016)
- Joint statement by the ADA and the American Heart Association recommends bariatric surgery be considered for adults who have a BMI greater than 35 and an obesity-related co-morbidity, in particular if a patient's diabetes is difficult to control with lifestyle and pharmacologic therapy<sup>33</sup> (*Diabetes Care* 2015)
- 2011 statement from International Diabetes Federation said surgery was "effective, safe and cost-effective therapy" for patients with obesity and type 2 diabetes, noting it significantly improves glycemic control in severely obese patients with the disease<sup>34</sup> (*Diabetes Medicine*, 2011)

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