*In about 10% of cases.

## Diagnostic Evaluation

Traditionally, the diagnosis of CF was based on the presence of one or more characteristic features (chronic sinopulmonary disease, gastrointestinal or nutritional abnormalities, salt loss syndromes, genital abnormalities in males), a history of CF in a sibling or a positive newborn screen plus laboratory confirmation of an abnormality in the CFTR gene or protein. However, more than 2000 mutations have now been identified in the CFTR gene, not all of which result in CF (Barrio, 2015).

Newer diagnostic methods make it possible to screen newborns for CF. Universal newborn screening for CF is now available in all states in the United States. The newborn screening test consists of an immunoreactive trypsinogen (IRT) analysis performed on a dried spot of blood, which may be followed by direct analysis of DNA for the presence of the ΔF508 mutation or other mutations on the same dried blood spot. A positive screen indicates persistent hypertrypsinogenemia and does not diagnose CF but identifies infants at risk of CF. Further testing is needed to confirm or rule out CF. Benefits of early screening and detection include preventing under nutrition of identified infants to optimize lung function. A disadvantage of newborn screening is parental anxiety associated with a false-positive result. Children who were identified and treated early in infancy with aggressive nutritional support had improved height and weight well into adolescence. An in utero diagnosis of CF is also possible based on detection of two CF mutations in the fetus.

The consistent finding of abnormally high sodium and chloride concentrations in the sweat is a unique characteristic of CF. Parents may report that their infant tastes "salty" when they kiss him or her. The quantitative sweat chloride test (pilocarpine iontophoresis) remains the best diagnostic tool for CF and involves stimulating the production of sweat with a special device (involves stimulation with 3-mA electric current), collecting the sweat on filter paper, and measuring the sweat electrolytes. The quantitative analysis requires a sufficient volume of sweat (>75 mg). Two separate samples are collected to ensure the reliability of the test for any individual. Normally, sweat chloride content is less than 40 mEq/L, with a