

*COMMONWEALTH OF MASSACHUSETTS*

**MANDATED BENEFIT REVIEW**

**REVIEW AND EVALUATION OF PROPOSED LEGISLATION  
TO MANDATE COVERAGE FOR ECTODERMAL DYSPLASIA:**

**SENATE BILL 837**

**PROVIDED FOR:  
THE JOINT COMMITTEE ON FINANCIAL SERVICES**

**DIVISION OF HEALTH CARE FINANCE AND POLICY  
COMMONWEALTH OF MASSACHUSETTS**

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## EXECUTIVE SUMMARY

This report was prepared by the Division of Health Care Finance and Policy pursuant to the provisions of M.G.L. c. 3, § 38C. This section requires the Division to evaluate the impact of a mandated benefit bill referred by legislative committee for review, and to report back to the referring committee. The Division was requested to evaluate a bill pertaining to health insurance coverage for dentures and dental implants for individuals with ectodermal dysplasia, a rare genetic disease comprised of more than 170 closely related but different syndromes that sometimes manifests itself in absent or severely deformed teeth.

Proposed Senate Bill 837 would require “all health insurers,” except MassHealth, to provide coverage for dentures and dental implants that are medically necessary for the care and treatment of ectodermal dysplasia for all enrollees having a principal place of employment within the Commonwealth. We received coverage information from six large Massachusetts plans, which insure a majority of Massachusetts residents. None of these plans currently covers dentures and only one plan provides coverage for dental implants for severe dental abnormalities stemming from ectodermal dysplasia.

The severity of tooth loss in ED patients ranges from mild to severe. The average ED patient does not have treatment options other than implants or dentures, although mildly affected patients may benefit from crowns. Both dentures and implants provide improved chewing ability in adults and children. Dentures may be the only option for children with ED as implants are not medically advisable until the patient’s jaw matures. However, adults with severe dental abnormalities may not be suitable candidates for dentures for two reasons. First, ED patients may have extremely thin gums making it difficult to create well-fitting dentures. Second, the use of dentures does not protect the patient from the shrinkage of the alveolar ridge, which results in bone loss and a premature aged appearance in the face.

Given the wide range in the severity of tooth loss in patients with ED, stipulation in the bill to demonstrate medical necessity would minimize inappropriate utilization of implants. Utilization of this benefit is projected to be low given the low incidence of the disease \_ approximately 512 persons the first year in the mid- range scenario. Compass Inc. estimated the average five- year cost per ED patient to be \$8,192. The expected average annual increase in premiums across a five- year period as a result of mandating this benefit ranges from \$0.11 (i.e., 11 cents) to \$0.62, with a mid-range estimate of \$0.28.

## INTRODUCTION

This report addresses the use of dentures and dental implants to treat the symptoms of a rare genetic disease, ectodermal dysplasia. Not all individuals suffering from ectodermal dysplasia have dental abnormalities, and not all individuals with dental abnormalities would need or could anatomically support dental implants or dentures.

Dental implants and dentures are commonly used by individuals having dental abnormalities that result from disease or injury. Studies have found that a lack of natural teeth adversely affects the growth and development of the jaw. In cases where there is a complete absence of teeth, the bone that supports teeth may never develop, creating an unfavorable condition for wearing dentures or having dental implants. However, there is some evidence pointing to the efficacy of dental implants in preventing or decreasing bone loss in individuals whose jaw *can* support implants, allowing patients to lead a healthier life both orally and psychologically.

## OVERVIEW OF PROPOSED LEGISLATION

The Joint Committee on Insurance requested that the Division review and evaluate a bill pertaining to health insurance coverage for ectodermal dysplasia:

### *S. 837 An Act Mandating Coverage for Ectodermal Dysplasia*

The proposed bill would require all health insurers, including non-group plans, but excluding MassHealth to assure coverage for dentures and dental implants that are medically necessary for the care and treatment of ectodermal dysplasia. The discretion to choose the right type of dental prostheses is left to the individual and their dentist; however, use of the phrase “medically necessary” implies some right of the insurer to establish criteria for determining, in situations when either prosthesis is suitable, which can be chosen.

The legislation specifically mentions that Group Insurance Commission (GIC) members and retirees are meant to be included in this benefit, but because all GIC plans are self funded, it is unclear whether the legislature has jurisdiction to mandate this benefit for the GIC population. Currently GIC voluntarily complies with all state mandates. Because of uncertainty around legislative jurisdiction in this matter, the actuary calculated separately the GIC’s potential obligation under this mandate.

Enrollees have filed no coverage denial appeals with the Office of Patient Protection for the services covered under this bill.

## DEFINITIONS

***Alveolar ridge:*** An alveolar ridge is the bony arch of the upper and lower jaws that contain the teeth.

***Crown:*** They are tooth shaped caps and fit over a tooth concealing a badly damaged or decayed tooth.

***Dental implants:*** An implant is an artificial root that is placed in the jaw to hold a replacement tooth, denture, or partial denture. They replace one or more teeth.

**Dentures:** Dentures are a set of custom-made replacement teeth for any missing teeth. There are partial dentures, which take the place of few teeth and prevent the others from changing position, and complete dentures, which replace all or several missing teeth. Adjustment, repair, realignment and occasional remake of dentures are required because of growth and development of the jaw in growing patients.

**Ectoderm:** The outermost layer of tissue in a developing embryo from which develops the skin, hair, nails, teeth, sweat glands, nerve cells, parts of the eye and ear, and parts of some other organs. Each of the listed parts of the body is referred to as an ectodermal structure

**Fixed partial dentures or Bridge:** A dental bridge is a false tooth that replaces an area left by a missing tooth. They can reduce risk of gum disease and improve speech. Various types of bridges are available depending on the kind of procedure being performed.

**Overdentures:** Overdentures are essentially dentures that fit over few remaining natural teeth or may be fixed over implants where many or all teeth are missing.

## BACKGROUND

Ectodermal dysplasias (ED) are a group of more than 170<sup>1</sup> closely related but different syndromes in which there are congenital abnormalities of at least two ectodermal structures, i.e. hair (tends to be very sparse), teeth, nails, sweat glands (little or no sweating), cranial-facial structure, and eyes.<sup>2</sup> In two studies it was noted that among 154 listed ectodermal conditions, 111 present dental abnormalities.<sup>3</sup> The defect occurs when either one or both parents have a gene that carries the disease.

The estimated incidence of ED varies in the professional literature. Some studies estimate an incidence of 7 in 10,000 births<sup>4</sup> but the National Foundation of Ectodermal Dysplasias estimates an incidence of 2 in 10,000 births<sup>5</sup> for all types of ED. Among the various syndromes, hypohidrotic ED is the most common form, said to occur anywhere from 7 in 10,000 to 1 in 100,000 births.<sup>6</sup> About 90 percent of the patients are male with females being the carrier of the disease.<sup>7</sup> Another ED syndrome is hidrotic ED; however, as it is not associated with abnormal teeth,<sup>8</sup> it is not discussed in this report. There are other, even less common forms of ED, a few of which result in dental abnormalities affecting both males and females in equal numbers. However, as hypohidrotic ED is the most common type of ED, dental abnormalities as a result of ED are more prevalent in males than females.

Abnormalities of the oral structure are associated with 80 percent<sup>9</sup> of the individuals with ED. The teeth may be absent altogether (anodontia), may be few in number (hypodontia), or there may be defects in the structure of the teeth (refer to pages 7 and 8 for further discussion).

Till and Marques reported that approximately 25 percent of ectodermal dysplasia children present complete absence of teeth, whereas 75 percent present some but not all missing teeth.<sup>10</sup> Dental abnormalities are often not obvious in newborns, but become evident during infancy or childhood.

## DIAGNOSIS OF ECTODERMAL DYSPLASIA

Due to the absence of diagnostic laboratory tests currently available to test for ED, a biopsy of the mucus membranes and/or biopsy of the skin may be performed to test for the presence of ED in individuals with signs of dental abnormalities.<sup>11</sup> Children with this syndrome are usually identified by their pediatric dentist and either treated by that clinician or referred to a tertiary children's center. Someone seeking dental implants as a result of dental abnormalities would be referred to a periodontist or prosthodontist<sup>12</sup> (a sub-specialist in

the restoration and replacement of the teeth) while someone needing full or partial dentures could be treated by a general dentist.

## **MEDICAL EFFICACY**

DHCFP is charged with reporting the following: 1) the expected impact of the benefit on the quality of patient care and the health status of the population, and 2) the results of any research demonstrating the medical efficacy of the treatment or service compared to alternative treatments or services, or *not* providing the treatment or service.

There are no studies that currently demonstrate the psychological impact of dental abnormalities in ED patients. However, the impact of dental abnormalities on the psychological development in young adults with ED is frequently cited in the literature.<sup>13,14</sup> Facial and/or physical (dental included) disfigurement can range from mild to severe, all or only some teeth can be missing or a tooth or teeth can appear pointed, widely spaced, malformed or conical in nature, or may have an excessive number of cavities due to absence of enamel. One expert consulted cited patients' social withdrawal, refusal to smile, and sensitivity to constant taunting that mark young ectodermal dysplasia patients.<sup>15</sup>

Individuals with the complete or partial loss of teeth have difficulty with speech and chewing. Absence of all or most teeth can also lead to underdevelopment of the jaws, compounding one's chewing difficulties and leading to an aged appearance in the face. For these various reasons, dentures or dental implants are often recommended.

While a delay in wearing dental prostheses may result in social withdrawal and related adjustment difficulties for some, early fitting of dentures (implants are rarely advised for children) does not necessarily guarantee either peer or self-acceptance for all ED patients.<sup>16</sup> These patients sometimes have, in addition to dental abnormalities, other facial and/or physical disfigurement, which could lead to adjustment difficulties (despite having dental prostheses) in adolescents and children.

### ***Efficacy of dental prostheses in children:***

The use of dental implants in children is controversial. The conventional treatment for children has been the use of dentures before skeletal and dental maturation. From a physiological standpoint, the conservation of bone may be the most important reason for the use of dental implants in growing children. However, studies<sup>17, 18</sup> have shown that dental implants may not be successful in children and infants, hence it is recommended that treatment use conventional prostheses (i.e., dentures or overdentures), as early as age 3, until the completion of all skeletal and dental growth (recommended age is 15-16 years<sup>19</sup>) at which time an implant-assisted treatment may begin.

### ***Efficacy of dentures as prostheses:***

Many studies have discussed the importance of dentures in ED patients, especially children<sup>20</sup>— although dentures might be best suited for individuals with a few natural teeth. Natural teeth can bear chewing pressure, reducing the pressure on the jaw and helping to preserve the bone.

Various types of dentures are available. An overdenture (a type of denture) is often recommended for children and adults with a few natural teeth as it helps reduce mobility of the remaining teeth and helps prevent bone loss. Complete dentures however, do not prevent bone loss and are uncomfortable because well fitting dentures are difficult to create for ED patients with severe teeth loss owing to the extremely thin alveolar ridge present. Table 1 (below) discusses some of the advantages and disadvantages of using dentures.

***Efficacy of dental implants as prostheses:***

The effectiveness of dental implants in ectodermal dysplasia patients has been demonstrated by a number of studies.<sup>21</sup> The overall cumulative success/non rejection rate is estimated to be 93.9 percent.<sup>22</sup> Implants can replace one tooth or an entire set of teeth and are successful in providing support to full or partial dentures.<sup>23</sup> The most important advantage to implants is that they help reduce bone loss. Ectodermal dysplasia patients often have underdeveloped alveolar ridges (jaw bones) so dentures cannot provide adequate support and can be difficult to maintain.

However, implants may not be suitable for all. Rejection occurs in about one in 20 implants. In addition, there is some debate on the efficacy of placing implants in individuals with a significant number of teeth lost in the lower jaw without damaging the nerves that run through the lower jaw.<sup>24</sup> Therefore, some studies<sup>25</sup> emphasize the need to offer proper treatment planning, and to allow the patient to make informed decisions before placing implants.

Table 1 (below) discusses some of the advantages and disadvantages of using implants.

**TABLE 1:<sup>26</sup> ADVANTAGES AND DISADVANTAGES ASSOCIATED WITH THE USE OF DENTURES AND DENTAL IMPLANTS**

	<b>Advantages</b>	<b>Disadvantages</b>
<b><i>Implants</i></b>	<ul style="list-style-type: none"><li>• Look and feel like natural teeth</li><li>• Prevent bone loss and gum recession</li><li>• Neighboring teeth are not altered to support the implant</li><li>• High success rate for most adults</li><li>• Durable and ‘feel’ like natural teeth</li><li>• More than 75% survive beyond 10 years</li></ul>	<ul style="list-style-type: none"><li>• Expensive when compared to dentures</li><li>• May not be suitable for all ED patients</li></ul>
<b><i>Dentures<sup>27</sup></i></b>	<ul style="list-style-type: none"><li>• Improve chewing capacity, speech, and provide support for facial muscles<sup>28</sup></li><li>• Not permanent and can be changed to suit the changing jaw structure in growing patients</li></ul>	<ul style="list-style-type: none"><li>• Do not prevent bone loss and gum recession</li><li>• No permanent fixture in the mouth</li><li>• Difficult to keep in place</li><li>• Need periodic alterations owing to the changes in the jaw</li><li>• Need to be remade every four years</li></ul>

***Alternate treatment***

Not all individuals with dental abnormalities will need dental implants or dentures. Individuals with malformed or disfigured teeth may have other less expensive options such as crowns.

Dental crowns, a common method of treating malformed teeth, are far more advantageous than dentures and implants for individuals with mild ectodermal dysplasia. Crowns preserve the natural teeth that help retain the jaw bone and avoid displacement of neighboring teeth. Depending on physician recommendation, this could be a less expensive alternative to implants with the average cost ranging from \$500 to \$900<sup>29</sup> or more per crown.

## ORGANIZATIONS THAT SUBMITTED INFORMATION TO DHCFP

DHCFP developed a questionnaire for members of the Massachusetts Association of Health Plans (MAHP) to distribute to its members. MAHP returned the completed surveys to DHCFP on behalf of MAHP's member health plans. Blue Cross Blue Shield also returned the survey.

## CURRENT COVERAGE LEVELS WITHIN HEALTH INSURANCE

This bill proposes to mandate within a health insurance policy certain dental procedures and prostheses for ED patients. Traditionally, dental care has been very limited in scope within such policies because of the availability of dental insurance. Dental insurance, however, which far fewer individuals have than health insurance, primarily covers primary and secondary dental care with a relatively low limit (usually \$1,500 annually) imposed for annual allowable charges. In addition, while preventive dental services are often reimbursed at 100% of cost, more complex dental procedures that carry a higher cost are reimbursed at a substantially lower level.

Table 2 (below) displays the survey results from the five health plans. One of the five plans covers dental implants for individuals with severe teeth loss. None of the plans currently cover dentures for ED patients. In addition, due to the low incidence of ED, very few claims were received in a period of 2 years (2 to 3 claims were received for dental implants and 4 to 7 for dentures).

**TABLE 2: HEALTH PLAN RESPONSES ON COVERAGE LEVELS AND COST OF SERVICES**

<i>Questions</i>	<i>Plan 1</i>	<i>Plan 2</i>	<i>Plan 3</i>	<i>Plan 4</i>	<i>Plan 5</i>	<i>Plan 6</i>
Are <u>dental implants</u> a covered benefit?	No	Yes	No	No	No	No
Are dentures a covered benefit?	No	No	No	No	No	No
Are there any eligibility restrictions or guidelines for coverage?	N/A	Implants are covered for individuals with severe teeth loss	N/A	N/A	N/A	N/A
Is there a dollar limit on implants?	N/A	No	N/A	N/A	N/A	N/A
Number of claims paid in the last 3 years for dental implants:	None	None	None	None	None	N/A
Number of claims paid in the last 3 years for dentures:	None	None	None	None	1	N/A
Number of claims rejected for dental implants in the last <u>2</u> years:	3	None	None	2	None*	None
Number of claims rejected for dentures in the last 2 years:	7	N/A	None	4	None*	4

\*It is possible that additional claims were submitted for these diagnoses, but they were not identified specifically for members with this disorder.



## COST OF DENTURES AND DENTAL IMPLANTS

A dentist would evaluate which ectodermal structure of a particular patient was involved and to what extent, before a treatment plan could be developed. Then, depending on the patient's preferences, the funds available to him and the number of natural teeth present, a type of dental prostheses may be considered. An internet survey of the various retailers offering this product yielded the information in Table 3 summarizing the types of dental implants and dentures available and associated costs.

**TABLE 3: TYPE AND COST OF DENTURES AND DENTAL IMPLANTS**

<i>Types of dental prosthesis</i>	<i>Range of costs</i>	<i>Life expectancy</i>
<b>Types of dentures</b> a) Complete removable dentures b) Removable overdentures on natural teeth c) Partial removable dentures	a) \$981-\$1,900 b) \$850-\$5,000 c) Per tooth: \$800-\$3,000 (metal), \$709-\$1,347 (acrylic), or \$300-\$2,500 (plastic)	Dentures last from 5-10 years
<b>Types of dental implants</b> a) Single tooth implants (includes implanted root and crown) b) Implants supported overdentures and partial dentures (also known as bridges)	a) \$1,000-\$4,000 per implant (Maximum of \$80,000 for full mouth reconstruction.) b) Cost varies according to the number of implants used to provide support. Overdentures cost roughly \$10,000 <sup>30*</sup>	a) Implants can last for a life-time b) Overdentures- last 5-7 years or longer. Partial dentures - last 10-15 years or more

\*Includes both the cost of implant and dentures

## FINANCIAL IMPACT OF MANDATE

Compass Analytics performed an actuarial analysis to determine whether health insurance premiums would increase due to these proposed mandates. Please refer to Appendix I for Compass Analytics' entire report.

DHCFP is required by Section 3 of Chapter 300 of the Acts of 2002 to answer the following questions:

1. *To what extent will the proposed insurance coverage increase or decrease the cost of the treatment or service over the next five years?*

The proposed benefit would increase the cost of treatment in the next five years. The average 5-year total costs estimate by Compass Inc., is \$4.4 million (refer to Appendix I). None of the plans currently provide coverage for dentures and only one plan provides coverage for implants. Compass Health Analytics Inc. estimates an average of 20 percent of affected individuals remain untreated absent current insurance coverage. Moreover, due to the high costs of implants, many individuals, currently, forgo implants and opt for less expensive alternatives. Therefore passage of this mandate would likely cause both untreated

individuals and those who have opted for relatively inexpensive treatments to present for a reevaluation and, possibly, dental implants.

Furthermore, implant technology advances and maintenance of dental prostheses would increase costs over time.

2. *To what extent will the proposed coverage increase the appropriate or inappropriate use of the treatment or service over the next 5 years?*

Research has shown that dentures and dental implants help improve speech, chewing ability, and esthetics in individuals with congenital missing and deformed teeth (refer to page 5 and 6 on medical efficacy). In addition, studies show that the complete loss of teeth or visibly missing teeth due to illness at a young age likely result in psychosocial impairment and social withdrawal that might lead to the use of mental health services and/or limited career opportunities. An increase in utilization of dental prostheses is estimated within the first year of offering the mandate, given the likelihood of pent up demand among patients who have not been able to afford prostheses out of pocket. Compass Inc. estimates an average increase of 45 percent in utilization in the first year. Thereafter, an increase in utilization is estimated to be negligible owing to the low incidence of the condition (see Table 4).

**TABLE 4: SUMMARY OF PERSONS USING BENEFIT BY YEAR  
PROVIDED BY COMPASS INC**

	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>
<b>Low Impact Scenario</b>					
Affected persons	384	384	385	386	386
Percent treated	19%	17%	16%	15%	15%
Patients treated	75	66	61	59	57
<b>Middle Impact Scenario</b>					
Affected persons	512	512	513	514	515
Percent treated	27%	20%	18%	17%	16%
Patients treated	140	104	94	86	81
<b>High Impact Scenario</b>					
Affected persons	640	641	642	643	644
Percent treated	37%	23%	20%	18%	16%
Patients treated	239	150	129	115	106

Note: Person count is persons with form of ED associated with dental anomaly.  
Procedure count includes replacement procedures.

The bill does not specify the extent of the disease necessary for coverage under this mandate, so perhaps people suffering from relatively mild cases of dental abnormalities, (defective enamel or pegged teeth) might be eligible for the prostheses benefit. Also, while the bill states that the decision between obtaining dentures and obtaining dental implants would rest with the patient and his dentist, it further stipulates that medical necessity would need to be shown, which should have the effect of minimizing inappropriate use of these prostheses. Given the standard of medical necessity, Compass estimates 40 percent of ED adults to receive implant treatment.

3. *To what extent will insurance coverage affect the number and types of providers of the mandated treatment or service over the next 5 years?*

Proposed S. 837 would require a dentist to screen for the pertinent disease. This most likely would be done in the course of a general dental exam, so it should not result in added general dental visits. Those with ED would need specialist care, but because the incidence of the syndrome is relatively low, it is not estimated that more dental specialists would be needed as a result of this mandate.

4. *To what extent will the mandated treatment or service serve as an alternative for more expensive or less expensive treatments or services?*

Individuals with dental abnormalities do not have many options for treatment besides dental prostheses. For individuals with complete or partial loss of teeth, there is no alternative treatment to dental implants or dentures. Individuals with malformed teeth could prefer either a relatively inexpensive crown to retain appearance or an implant- it is difficult to predict the preferences that people might hold.

5. *What are the effects of the mandated benefit on the cost of health care, particularly the premium, administrative expenses, and indirect costs of large and small employers, employees, and non-group purchasers?*

The proposed benefit would increase the cost of health insurance. As ED patients currently do not have coverage for prostheses in their health insurance, the number of people who have dental abnormalities from ED who make use of this benefit in the first few years after the passage of this mandate would be relatively high, but the absolute number of such individuals is relatively low. Moreover, since the incidence of this disease is low, the number of new enrollees who qualify every year thereafter will be negligible.

Although, a small proportion of enrollees qualify under this benefit, the costs associated with this group are significant (5-year average of \$4.4 million according to Compass Inc.). The average annual premium impact over 5-years is estimated to be 0.28 cents. While the costs incurred by insured members as a result of mandating this bill may be negligible, the opponents of mandated benefits are generally concerned with the increase in total costs (of all mandated benefits) to insured members.

In addition, ED patients with several missing teeth may have undeveloped jaw bones. In order to place implants a bone grafting procedure may be performed and/or a sinus position might need to be altered. While a bone grafting procedure for a single tooth can be performed in a dentist's office, a bone-grafting procedure for several missing teeth might need to be performed in a hospital, which could require an overnight stay. Several X-ray procedures might also be prescribed both before and after implant placement, which could result in higher costs (see question 1 for a discussion of costs).

6. *What are the potential benefits and savings to large and small employers, employees, and non-group purchasers?*

The potential benefit of passing this mandate would be to a specific enrollee who has this condition and has had to forgo treatment or has picked less expensive treatment because of its out-of-pocket expenditure. It is possible that an employer may benefit from an employee's improved appearance or self confidence stemming from better treatment of this disease.

7. *What is the effect of the proposed mandate on cost-shifting between private and public payers of health care coverage?*

One expert consulted suggested that some parents whose children have ED strive to enroll them in Medicaid as the only way for them to get the dental prostheses they need. But it is more likely that if such a child qualified for a public program, it would be because of a variety of other health needs or disabilities stemming from ED, rather than solely on the basis of his dental condition, unless his family income alone qualified him for MassHealth. Whether such a child with ED might shift back to employer sponsored health insurance (if, in fact, he has access to it) upon passage of this mandate, probably depends on many factors apart from this mandate.

8. *What is the cost to health care consumers of not mandating the benefit in terms of out-of-pocket costs for treatment or delayed treatment?*

Findings from the survey indicate that only one plan currently covers dental implants but none of the plans currently cover dentures for ED patients. Not mandating the benefit would mean that most people would have to pay out of pocket for implants and dentures. The average 5-year cost per ED patient treated, estimated by Compass Inc, is \$8,192. In the absence of coverage, patients may forgo or delay implant treatment (more likely to opt for dentures), which could result in further recession of the jaw bone making it more difficult and expensive to place implants.

9. *What is the effect on the overall cost of the health care delivery system in the Commonwealth?*

The cost of treating ED, especially for children, is high as there must be many modifications of treatment until the child attains adulthood and levels off in growth.

Passing this mandate would undoubtedly shift some of the cost of correcting this condition from the individual to insurers. In addition, it would most likely add to overall costs in the health care system, as most ED patients would avail themselves of corrective treatments they could not previously afford.

Another factor to consider is whether passage of this mandate would erode the traditional firewall that has existed between “health” (i.e. medical) insurance and dental insurance. While the absence or disfigurement of teeth is a dental condition, dental insurance is less prevalent than health insurance and usually imposes a very low annual ceiling on reimbursable costs. Therefore, expecting dental insurance to cover the expenses of correcting ectodermal dysplasia is unrealistic. If other severe dental conditions that are poorly served by dental insurance begin to migrate to coverage under medical insurance, that will even further increase the typical health insurance premium. On the other hand, it seems arbitrary that certain symptoms of ED, such as dehydration due to lack of sweat glands, would be routinely covered under one’s medical insurance, but that the dental manifestation of this condition would not be covered.

## **LEGISLATIVE ACTIVITY IN OTHER STATES**

The National Conference of State Legislatures is not aware of any states that mandate coverage for dental implants and dentures resulting from ectodermal dysplasia for any adult population. However, it is common for states to mandate coverage of surgical and nonsurgical treatments for congenital defects, which could include treatment for ectodermal dysplasia.

## ENDNOTES

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**Actuarial Assessment of Massachusetts Senate Bill No. 837  
Mandating Coverage for Ectodermal Dysplasia**

**Prepared for**

**Division of Health Care Finance and Policy  
Commonwealth of Massachusetts**

**Prepared by**

**Compass Health Analytics, Inc.**

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**Actuarial Assessment of Massachusetts Senate Bill No. 837  
Mandating Coverage for Ectodermal Dysplasia**

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## **Actuarial Assessment of Massachusetts Senate Bill No. 837 Mandating Coverage for Ectodermal Dysplasia**

### **Executive Summary**

Massachusetts Senate Bill No. 837 would require insurers to “provide coverage for dentures and dental implants that are medically necessary for the care and treatment of ectodermal dysplasia.” Compass Health Analytics, Inc. was engaged by the Commonwealth’s Division of Health Care Finance and Policy to develop an actuarial assessment of the likely increased healthcare costs resulting from the proposed mandate. The results are based on analysis using data provided by the Division to Compass.

Ectodermal dysplasia (ED) is a set of over 150 syndromes that display various combinations of characteristics including lack of – or underdeveloped – hair, nails, and sweat glands, as well as teeth. Regardless of whether people with ectodermal dysplasia receive treatment for medical symptoms that might arise from the condition, for example overheating due to lack of sweat glands, treatment for dental anomalies is generally not covered under health plans. Dental benefit plans typically limit reimbursement to about \$1,500 per year, not enough to cover the high cost of dental implants. As a result, claims data from Massachusetts insurers that would allow calculation of prevalence of those forms of ectodermal dysplasia that require dental treatment are not available, nor are data on the distribution of the severity of dental impairment (missing teeth).

With no historical claim data, Compass relied on information gathered by the Division from research literature and from practitioners to develop reasonable ranges of values for the key parameters that drive the cost estimates: (i) the incidence of ED, (ii) the distribution of the severity of missing teeth and the recommended treatment in the affected population, and (iii) the portion of adults receiving implants rather than dentures under the mandate.

Compass has estimated low, middle, and high cost scenarios; a summary of these estimates by year appears in Exhibit E1. The right-most column shows the mean annual premium change over the 5 years and the total dollar impact. Uncertainty surrounding the incidence of ED and the average number of missing teeth – and the resulting treatment cost – leads to a relatively wide range between the low and high values for the cost of the mandate. In addition, the interpretation of the proposed mandate’s standard of “medically necessary” – and the extent to which more expensive implant treatments are provided – is an important determinant of the cost of the mandate.

**Exhibit E1**  
**Summary of Cost Impact Scenarios for Ectodermal Dysplasia Mandate**

	2006	2007	2008	2009	2010	5-Year
<b>Low Scenario</b>						
Change in Annual Premium	\$ 0.14	\$ 0.11	\$ 0.10	\$ 0.09	\$ 0.09	\$ 0.11
Dollar Impact (000s)	\$ 463	\$ 337	\$ 315	\$ 305	\$ 295	\$ 1,716
<b>Mid-Range Scenario</b>						
Change in Annual Premium	\$ 0.46	\$ 0.27	\$ 0.24	\$ 0.21	\$ 0.20	\$ 0.28
Dollar Impact (000s)	\$ 1,475	\$ 880	\$ 754	\$ 677	\$ 629	\$ 4,415
<b>High Scenario</b>						
Change in Annual Premium	\$ 1.24	\$ 0.63	\$ 0.48	\$ 0.41	\$ 0.36	\$ 0.62
Dollar Impact (000s)	\$ 3,956	\$ 2,022	\$ 1,553	\$ 1,306	\$ 1,163	\$ 10,001

**Proposed Legal Requirement**

Proposed Senate Bill 837 would require all health insurers, except Medicare, MassHealth, and other governmental programs, to provide to all individual subscribers and members within the Commonwealth and to all group members having a principal place of employment within the Commonwealth “coverage for dentures and dental implants that are medically necessary for the care and treatment of ectodermal dysplasia”. The relevant insured population consists of commercially fully-insured individuals less than 65 years of age, including those in both employer-sponsored plans and direct-purchase policies.

**Overview of Impact Calculation**

With no historical claim data upon which to base an estimate of the impact of this mandate, Compass used research provided by the Division to determine ranges of key parameters entered in a model of how the insured population with ectodermal dysplasia would use the mandated benefit. The major steps in the calculations follow, with more detailed discussion of key assumptions in the next section.

- 1) Estimate the Massachusetts insured population covered by the mandate.
- 2) Estimate the percentage of the population with ED and potentially requiring dental treatment. Apply the percentage to the insured population to calculate the affected population.
- 3) Segment the affected population into the demographic groups for which treatment will differ significantly, i.e., into adults and children under 18.

- 4) For each age group, estimate the percentage not already treated. Apply the percentage to calculate the people needing treatment in each age group.
- 5) For these previously untreated people in each age group, estimate the percentage that will receive treatment with implants vs. dentures. (Children generally do not receive implants.) Apply these percentages to the number of people needing treatment to calculate the number of treatments of each type.
- 6) Estimate the average cost for implant and denture treatments and apply the cost to the people in each age group choosing that form of treatment.
- 7) For people in each age group who had treatment prior to the mandate, estimate the expected frequency and cost of replacements. Growing children need replacements more frequently, and even some treated after the mandate takes effect will need replacements within the timeframe of this analysis.
- 8) Estimate the degree to which costs will be disproportionately heavier in the first year as people seek treatment as soon as it becomes mandated.
- 9) Calculate summary ratios required for this analysis: the average cost per treatment per year, and the impact of the mandated benefit on the premium, administrative expenses, and indirect costs of the relevant insurers.

Compass extended the costs over a five-year timeframe (2006-2010) by calculating the number of people needing and seeking treatment (or replacement) in each year. Finally, Compass used a range of values in the major parameters to arrive at low-, mid-, and high-cost scenarios. Exhibit I summarizes the ranges used for the assumptions that have the largest influence on the estimated mandate impact; these are discussed in detail below.

## **Discussion of Major Assumptions**

Below we describe in more detail the major assumption made in the above calculations.

### *Insured Population*

Compass developed population projections for this analysis, estimating the commercially fully-insured individuals in Massachusetts under 65 years of age. Exhibit II displays the estimates. Appendix A contains a detailed description of the sources and calculations used for the population estimates<sup>1</sup>.

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<sup>1</sup> According to the Division, it is not clear whether federal law pre-empts the legislature's authority to require the Group Insurance Commission, as a self-insured plan, to include this benefit. However, if the mandate applies, and assuming that the low to high range of incidence and treatment costs for ED are the same for the GIC-covered population as in the population covered by the mandate, we estimate that the cost of the coverage would amount to \$75,000 to \$450,000 over the course of 5 years.

### *Congenital Incidence of ED*

Ectodermal dysplasia (ED) is a set of over 150 syndromes that display various combinations of characteristics including lack of – or underdeveloped – hair, nails, and sweat glands, as well as teeth. Most people with ectodermal dysplasia probably receive treatment for symptoms that might arise from the condition, for example overheating due to a lack of sweat glands. But the condition is rare enough (and/or so rarely identified as the primary reason for a medical problem) that one large health plan that volunteered to review its claims data found only one distinctly coded ED diagnosis.

The Division turned to medical literature to attempt to determine the incidence or prevalence of the condition. The search confirmed its rarity, but some variation appeared among the rates cited in available sources. The staff at the National Foundation for Ectodermal Dysplasia, an ED research and advocacy group, cited an incidence of 2 per 10,000 births for all forms of ED, which we will take as the midpoint for our estimate. The Division's research indicated that roughly 80% of persons with ED have a form that affects the teeth; thus our analysis will use a value of 1.6 per 10,000, with low and high values of 1.2 and 2.0 per 10,000.

Web-based research turned up a very wide range of other incidence values as well, ranging from 7 per 100,000 to 7 per 10,000 births, and wide enough to raise some suspicion about how the values have been interpreted and reported. For that reason Compass chose to use the National Foundation's value as the starting point. The analysis assumes that all people with the condition are likely to be identified and the appropriate treatment determined.

### *Relative Prevalence within Insured Population*

To translate the incidence of congenital ED in the general population to the prevalence for the insured population subject to this bill, we need to consider factors that might cause incidence and prevalence to differ: These might include:

- Mortality – ED is not generally associated with early death (although there may be some risks from related characteristics such as underdeveloped sweat glands). If it were, the prevalence among the insured population would be lower than the congenital incidence.
- Gender – Many forms of ED occur disproportionately in males. If the insured population were skewed by gender it would affect the prevalence of ED therein. (A population skewed towards females would have a lower ED rate.)

If anything, the prevalence of the condition in the relevant insured population would be lower than the congenital incidence, so to be conservative we will use the congenital incidence. Compared to the potential variation in other assumptions in this analysis, the potential variation here is small.

### *Severity of Dental Impairment*

Ectodermal dysplasia can result in misshapen or missing teeth, and those patients missing teeth may be missing almost all or only a few. We have no data describing a statistically valid distribution of the severity of dental impairment in the ED population. The Division has however provided studies and anecdotal evidence confirming that a wide range of tooth anomalies indeed occurs, providing us with enough confidence to infer that not all people with ED will need full-mouth restorations.

The Division cited a French study of 16 patients with ED, ranging from those whose teeth were misshapen to some with no teeth at all. Within the group the average patient was missing nine or 10 teeth, suggesting that some teeth would be available as support for bridges, etc. and reducing the number of implants needed. Bone grafts were recommended in several cases. For purposes of this analysis, we assumed a range of average number of missing teeth from 8 to 12.

### *Type and Cost of Treatment*

The cost of dental treatment for ED can vary widely depending on the severity of missing teeth or tooth anomalies, and on the treatment provided – implants are much more expensive than dentures. Using the Division's cost data, the cost of a full restoration using implants can easily exceed \$40,000, while dentures will typically cost under \$5,000, although they need to be replaced more often. But implants offer advantages over regular dentures: longer device lifespan, talking/chewing function, and better preservation of jaw bone mass.

To estimate the cost of implant treatment, Compass started with component cost ranges provided by the Division, \$1000 to \$4000 per implant, confirming the range and a midpoint of approximately \$2000 with an internet survey of retailers similar to those the Division researched.<sup>2</sup> Implant work may require adjunctive services such as bone grafts which we estimated add approximately five thousand dollars to the treatment. Finally, Compass used the average number of missing teeth from the study above, to arrive at a cost of approximately \$25,000. Variation in the mean number of missing teeth and in the mean cost of the implants (\$1600 to \$2400) and bone work create a relatively large total treatment cost spread of \$17K to \$33K. (Remember that the ranges identified by the Division represent extremes, not the mean values in the high and low cost scenarios. The Division cites a figure of \$80,000 for a full mouth reconstruction and while this limit is theoretically possible to reach, it does not represent even the worst-case mean.) Treatment approaches and costs can vary widely, and as a double check, Compass

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<sup>2</sup> One useful summary site is from the state of Minnesota: <http://www.health.state.mn.us/htac/dental.htm>.

estimated costs using a second approach from the Division's data, i.e., fewer implants supporting more elaborate overdentures; the magnitude of the results were similar.

The Division cites a cost range for traditional dentures, depending on the type, of anywhere from \$800 to \$5000. Compass narrowed the ranges to create acceptable low-mid-high means again with an internet survey. For example, the Minnesota Department of Health site<sup>3</sup> cited a study showing traditional denture treatments (for patients with existing problems with prosthetics) varying from a mean of \$1200 without pre-prosthetic surgery to a mean of \$3800 with surgery. As a mean, Compass chose \$2300, with low and high case means of \$1500 and \$3000 respectively.

Without constraint by insurers, it might be reasonable to expect a majority of adult patients and their dentists to prefer the more long-lasting and expensive implant treatment. However insurers may argue that the standard of "medically necessary" in the bill means that implants are not necessary when dentures are available, unless the patient has special conditions that clearly make implants necessary, e.g., the patient could not wear or properly care for dentures or had a risk of significant bone loss that implants could mitigate.

Given the possibility of this interpretation, Compass assumed that 30 to 50 percent of adults would receive implant treatment. We also estimate some adult denture wearers would upgrade to implants. Implants are rarely used in children, whose facial bones are still growing.

Some people with ED newly covered by the benefit may forgo dental treatment entirely, even with the benefit. Implant procedures carry with them all of the negatives associated with going to the dentist. Others may not wish to incur the copayments or deductibles in a health benefit plan. For purposes of the analysis, we are assuming these percentages to be small (5 to 20 percent).

### *Previously Treated Patients*

If a person with ED has not been treated prior to the mandate, he or she may seek (initial) treatment, thereby increasing the cost impact of the mandate, particularly in the first year. Because the plans subject to the mandate do not include MassHealth, most members are probably not indigent, and therefore Compass estimated that most adults with ED had been previously treated in some form, with the remaining untreated proportion ranging from 10 to 30 percent.

In this analysis, even previously treated persons are assumed to affect the cost of the mandate since they will still need maintenance or (eventually) replacement, and may upgrade from dentures to implants. The cost calculation incorporates an estimate of the maintenance costs for people treated prior to the mandate. The analysis uses data on useful life provided by the Division to estimate the frequency of replacements. Implants

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<sup>3</sup> <http://www.health.state.mn.us/htac/dental.htm>.

last a lifetime – or close to it – but the bridges, crown, etc. they support, as well as regular dentures, require periodic replacement. The analysis assumes an average life of 8 to 12 years.

Growing children require more frequent denture replacements – every two or three years. Given the 5-year timeframe of this analysis, the estimate assumes that children treated in the first two to three years after the passage of the mandate will need replacements before the end of the 5-year analysis timeframe.

### *First-year Demand*

Given the cost of treatment, particularly with implants, we can assume that some people with ED have not been treated in the past and are likely to take advantage of the benefit.<sup>4</sup> Furthermore they may do so in the first year, creating a “bubble” of patients that would diminish as the backlog was processed. This bubble effect has little impact on the overall cost of the mandate over the five-year span, but it does affect the year-to-year timing. We assume that 30% to 60% of the patients taking up the benefit will be treated the first year; the number seeking initial treatment in each subsequent year will decline as the pool of untreated people decreases.

A complex dental procedure such as implants can take months or even years to complete. In general this does not affect the analysis; a given year will include charges from procedures started in the previous year and will exclude charges for procedures that continue on into the following year, and we can assume they balance. However, since the first year will have few costs from procedures started previously, the “bubble” will be somewhat attenuated.

Note we have not limited the potential cost of the impact resulting from a limit in the supply of practitioners. That is, we have assumed a supply of practitioners adequate to meet the demand, which is reasonable given the relatively small number of cases of ED compared to the overall demand for dental prostheses.

Exhibit III displays the estimated number of persons treated per year.

### *Calculation of Premium Costs*

Premium levels were calculated first, by dividing the projected claims costs by the projected enrollments in the insured populations.

In addition to the incremental medical care costs previously discussed, the overall impact of a mandate on the costs of health insurance in the Commonwealth includes two other

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<sup>4</sup> These may be people with no treatment at all prior to the mandate, or people with dentures prior to the mandate that decide to use the benefit to obtain implants.

components: incremental administrative expenses and incremental margins. A detailed description of the calculation of these two components is contained in Appendix B.

Incremental administrative expenses would be incurred for activities associated with the implementation of the mandate such as modifications to benefit plan materials, claims processing system changes, training/communication material for staff, etc. Because this mandate is targeted at health insurers but involves mostly dental providers and will involve relatively few claims, we would expect ED claim processing to differ somewhat from routine claim processing. Insurers would be likely to sub-contract with dental insurance providers to carry out the required administrative processes. However, we do not have enough information to assume it will cause a material change in the historical ratios driving the approach outlined in Appendix B.

Incremental margin is required in order for the insurer to maintain adequate reserve levels as required by the Massachusetts Division of Insurance. Required reserves are based on the claim levels for the insurer, and since the mandate would increase claim levels, it would increase required reserve levels and therefore incrementally increase the total dollars of margin required to meet those reserve levels.

## **Results**

The results of the analysis are displayed in Exhibit IV. The estimated impact for the full 5 years ranges from \$1.7 million to \$10.0 million, with a mid-range estimate of \$4.4 million. The average annual premium impact across the 5-year period would range from \$0.11 to \$0.62, with a mid-range estimate of \$0.28.

Because of the need to address a backlog of untreated people, first year costs will be the highest and annual costs will decline from there. The impact in 2006 is estimated to range from \$0.5 million to \$4.0 million, with a mid-range estimate of \$1.5 million. On an annual per member per year basis, the comparable numbers are low and high estimates of \$0.14 and \$1.24, with a mid-range estimate of \$0.46. At some point beyond 2010, annual costs will rise again as the wave of devices installed early on requires more maintenance.

The key pieces of information that would allow the estimated ranges to be narrowed are better information on the incidence of ED, a narrower distribution of dental impairment and treatment costs among people with ED, more information on the percentage of persons with ED previously treated, and better information on whether patients will receive implants over dentures.



## Exhibits

**Exhibit I**  
**Summary of Assumptions**

<b>Parameter</b>	<u>Low</u>	<u>Middle</u>	<u>High</u>
Prevalence (per thousand)	0.12	0.16	0.20
Average implant cost	\$ 16,900	\$ 24,500	\$ 33,300
Average denture cost	\$ 1,500	\$ 2,300	\$ 3,000
Adults previously untreated	10.0%	20.0%	30.0%
Adults receiving implants	30.0%	40.0%	50.0%
Adults treated in the first year	30.0%	45.0%	60.0%
Adults never choosing treatment	20.0%	10.0%	5.0%
Admin cost ratio	4.4%	6.6%	8.9%

**Exhibit II**  
**Insured Population Projections**

	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>
Employer - FI	2,922,233	2,927,500	2,932,667	2,938,033	2,943,300
Direct (Individual)	279,100	275,500	276,100	276,700	277,200
Total	3,201,333	3,203,000	3,208,767	3,214,733	3,220,500

**Exhibit III**  
**Summary of Persons Using Benefit by Year**

	2006	2007	2008	2009	2010
<b>Low Impact Scenario</b>					
Affected persons	384	384	385	386	386
Pct treated	19%	17%	16%	15%	15%
Patients treated	75	66	61	59	57
<b>Middle Impact Scenario</b>					
Affected persons	512	512	513	514	515
Pct treated	27%	20%	18%	17%	16%
Patients treated	140	104	94	86	81
<b>High Impact Scenario</b>					
Affected persons	640	641	642	643	644
Pct treated	37%	23%	20%	18%	16%
Patients treated	239	150	129	115	106

Note: Person count is persons with form of ED associated with dental anomaly.  
 Procedure count includes replacement procedures.

**Exhibit IV**  
**Summary of Cost Impact Scenarios for Ectodermal Dysplasia Mandate**

<b>Low Scenario</b>	2006	2007	2008	2009	2010	5-Year
Per Patient Impact*	\$ 5,929	\$ 4,907	\$ 4,987	\$ 4,919	\$ 4,965	\$ 5,176
Monthly Premium Impact - Claims	\$ 0.0116	\$ 0.0084	\$ 0.0078	\$ 0.0076	\$ 0.0073	\$ 0.0085
Administration Premium Impact	\$ 0.0005	\$ 0.0004	\$ 0.0003	\$ 0.0003	\$ 0.0003	\$ 0.0004
Total Monthly Premium Impact	\$ 0.0121	\$ 0.0088	\$ 0.0082	\$ 0.0079	\$ 0.0076	\$ 0.0089
Dollar Impact - Claims (000s)	\$ 444	\$ 323	\$ 302	\$ 292	\$ 283	\$ 1,644
Administration (000s)	\$ 19	\$ 14	\$ 13	\$ 13	\$ 12	\$ 72
Total Impact (000s)	\$ 463	\$ 337	\$ 315	\$ 305	\$ 295	\$ 1,716
<b>Mid-Range Scenario</b>	2006	2007	2008	2009	2010	5-Year
Per Patient Impact*	\$ 9,891	\$ 7,908	\$ 7,504	\$ 7,366	\$ 7,302	\$ 8,192
Monthly Premium Impact - Claims	\$ 0.0360	\$ 0.0215	\$ 0.0184	\$ 0.0165	\$ 0.0153	\$ 0.0215
Administration Premium Impact	\$ 0.0024	\$ 0.0014	\$ 0.0012	\$ 0.0011	\$ 0.0010	\$ 0.0014
Total Monthly Premium Impact	\$ 0.0384	\$ 0.0229	\$ 0.0196	\$ 0.0175	\$ 0.0163	\$ 0.0229
Dollar Impact - Claims (000s)	\$ 1,384	\$ 826	\$ 707	\$ 635	\$ 590	\$ 4,141
Administration (000s)	\$ 92	\$ 55	\$ 47	\$ 42	\$ 39	\$ 274
Total Impact (000s)	\$ 1,475	\$ 880	\$ 754	\$ 677	\$ 629	\$ 4,415
<b>High Scenario</b>	2006	2007	2008	2009	2010	5-Year
Per Patient Impact*	\$ 15,169	\$ 12,406	\$ 11,022	\$ 10,437	\$ 10,081	\$ 12,420
Monthly Premium Impact - Claims	\$ 0.0946	\$ 0.0483	\$ 0.0370	\$ 0.0311	\$ 0.0276	\$ 0.0477
Administration Premium Impact	\$ 0.0084	\$ 0.0043	\$ 0.0033	\$ 0.0028	\$ 0.0025	\$ 0.0042
Total Monthly Premium Impact	\$ 0.1030	\$ 0.0526	\$ 0.0403	\$ 0.0339	\$ 0.0301	\$ 0.0519
Dollar Impact - Claims (000s)	\$ 3,633	\$ 1,857	\$ 1,426	\$ 1,199	\$ 1,068	\$ 9,183
Administration (000s)	\$ 323	\$ 165	\$ 127	\$ 107	\$ 95	\$ 817
Total Impact (000s)	\$ 3,956	\$ 2,022	\$ 1,553	\$ 1,306	\$ 1,163	\$ 10,001

\*Per patient refers to patients with ectodermal dysplasia treated with a dental procedure (including repair/replacement)

## Appendices

## Appendix A

### *Development of Population Estimates*

#### *Overview of Population Projection Model*

Compass maintains a Massachusetts population projection model to support its efforts to analyze the cost impact of various mandates enacted by the Massachusetts legislature. This model projects the Massachusetts population at the following level of detail:

- By year through 2010
- By gender
- By age grouping
  - Less than 18
  - 18-64
  - 65 or greater
- By insurance status for under 65 population
  - Uninsured
  - Insured by employer-sponsored fully insured plan
  - Insured by employer-sponsored self-insured plan
  - Insured by direct-purchase policy
  - Insured by MassHealth
  - Insured by other Medicaid programs

For analysis of the ectodermal dysplasia mandate, the following categories were required:

- Individuals under 65 years of age covered by employer-sponsored fully insured plans
- Individuals under 65 covered by direct-purchase plans.

#### *Detailed Description of Population Projection Model*

The population projections for this analysis were developed by reference to various reports, tables, and other data sources at the following web sites:

- Massachusetts Division of Health Care Finance and Policy (“MADHCFP”)
- United States Census Bureau (“Census Bureau”)
- Massachusetts Institute of Social and Economic Research (“MISER”)
- Kaiser Family Foundation
- Centers for Medicare and Medicaid Services (“CMS”)

The first step was to determine the actual Massachusetts population split by age group. According to the Massachusetts “Quickfacts” exhibit on the Census Bureau website, the Massachusetts population in 2003 was 6,433,000. The current population was allocated

by age by referring to percentages in the Quickfacts exhibit for “Persons Under 18 Years Old” and “Persons 65 Years Old and Over” for 2000. The current population was allocated by gender by referring to a report on the Census Bureau web site entitled: “Population Projections for States by Selected Age Groups and Sex: 1995-2020”. From this report, the female percentage, by age category, of the projected population could be determined.

To project future populations, we used a population projection on the MISER website, which projected the Massachusetts population by gender and quinquennial age category out to 2010 and 2020. The growth rates implicit in the MISER projections for 2010 reflected the slowing in growth seen in recent years and appeared to be a suitable basis for projecting to 2010.

The MISER projections for 2010 included age and gender detail, which we used to allocate the projected 2010 population. The allocation by age and gender for intermediate years was based on interpolation of the 2003 allocation derived from 2003 Census data and the 2010 MISER projections.

The final step was to determine the insurance status for the projected population. To do this, we referred to several sources:

- 1.) Historical Health Insurance Tables HI-5 and HI-6 on the Census Bureau web site show a split of the Massachusetts population by health insurance status. Table HI-5 is for Children under 18 and Table HI-6 is for People Under Age 65.
- 2.) From the MADHCFP web site, we referred to a report entitled “Health Insurance Status of Massachusetts Residents (Fourth Edition)” with a publication date of November 2004. Table 1 of this report indicates that 3.2% of Massachusetts residents ages 0-18 are uninsured, the same rate as in 2002. The same table indicates that 10.6% of the non-elderly adult population of Massachusetts was uninsured in 2004, an increase over 9.2% in 2002.
- 3.) Table A-2 of a report entitled “Health Insurance Coverage in the United States: 2002” on the Census Bureau web site shows information on the nature of health insurance coverage in 2002. This detail is available at the national and regional level, but not at the state level. From this report, an estimate of the portion of insured Massachusetts residents covered by individual or direct-purchased health insurance policies (whether purchased in the non-group market or, for sole proprietors, in the small group market) can be determined. This estimate was made by assuming that direct-purchase health insurance is less prevalent in Massachusetts than in the Northeast region. In general, in the New England states, individual health insurance is more heavily regulated, resulting in more costly policies owing to community rating requirements. As a result, enrollment in individual or direct-purchase policies tends to be lower. This presumption is consistent with estimates of direct purchased health insurance on both the Kaiser and Census Bureau web sites.



- 4.) Overall Medicaid enrollment statistics were taken from the Kaiser Family Foundation State Health Facts Online web site. MassHealth enrollment statistics were taken from a Section 1115 fact sheet found on the CMS web site.
- 5.) A MADHCFP report entitled “Source of Insurance Coverage for Massachusetts Residents (2002)” shows that 61% of the entire population of Massachusetts is covered by employer-sponsored plans.
- 6.) We relied on a MADHCFP study that determined that 27% of the insured population covered by employer-sponsored plans was covered by self-funded plans that were exempt from the requirements of these mandates.

The population and insurance status estimates from these various sources were not always consistent and judgment was required to resolve these discrepancies. With the data from these sources, we determined the insurance status as follows:

- 1.) We started with the distribution of the population by health insurance status for Massachusetts for 2002 as defined by the Historical Health Insurance Tables HI-5 and HI-6.
- 2.) Tables HI-5 and HI-6 appear to overcount the uninsured population and undercount the Medicaid population, based on the other statistics referred to above. Adjustments were made to correct for these discrepancies.
- 3.) The direct-purchase insured population reported in Historical Health Insurance Table HI-6 was adjusted upwards to better align with the estimates for the Northeast region according to the Census Bureau’s “Health Insurance Coverage in the United States: 2002”. This adjustment also enhances the consistency of the rest of the assumed distribution with the other data sources.
- 4.) Seventy three percent of the enrollment in employer-sponsored was assumed to be fully insured and the remaining 27% was assumed to be self-insured.
- 5.) Incremental shifts in the distribution were assumed based on past trends and expectations of future changes.

## Appendix B

### *Development of Administrative Cost Estimates*

The incremental administrative costs associated with a mandate consist of two components:

- 1.) Incremental Administrative Expenses
- 2.) Incremental Margins

Estimates of the impact of these adjustments were derived by reviewing financial statement data for the major health carriers operating in Massachusetts.

The low scenario includes 3% for incremental pre-tax margin and 1.2% for incremental administrative expenses, or a total of 4.2%. Our high scenario includes 6% for incremental pre-tax margin and 4.2% for incremental expenses, or a total of 10.2%.

Based on financial statement data, it appears that overall administrative expenses for the major Massachusetts health plans range from 8 to 12% of revenue. Different health carriers will have different administrative expense structures. It is conceivable that administrative expenses could be higher for a smaller insurer with less economies of scale. For this analysis, we assumed overall administrative expense ratios of 8% - 14% of revenue. Mandates affect only a small proportion of these administrative expenses.

For this analysis, we assumed that the proportion of administrative expenses that will be affected by mandates will range from 15% to 30%. So, for example, if administrative expenses are 10% and the proportion affected by a mandate is 20%, we assume that 2% of total expenses are affected.

Therefore, the low impact will be 1.2% (15% of 8%) and the high impact will be 4.2% (30% of 14%). In each case, this factor will only apply to the incremental medical claim expense estimated earlier in this report, which is itself a tiny percentage of the overall healthcare premium.

All health carriers are required by state insurance regulators to maintain adequate ratios of net worth to premium, as measured by the risk-based capital (RBC) formula. Therefore, health carriers must earn margins sufficient to maintain net worth at acceptable levels. The actual level depends on enrollment growth, trend levels and management discretion, among other factors.

In addition, it is assumed that all health carriers are subject to federal income taxation. Therefore, the residual margin after payment of federal taxes must be sufficient to maintain adequate net worth levels, as determined by the RBC formula.

In this analysis, it is assumed that the minimum pre-tax margin would be 3%. Because of RBC requirements, a health plan cannot set pre-tax margins any lower and reasonably

expect to maintain adequate net worth in today's trend environment. We further assumed that some carriers might choose to set margins of as much as 6%, so that net worth adequacy can be enhanced.

The analysis also assumes that the majority of health carriers in Massachusetts are non-profits and are not subject to state premium taxes. The impact of the mandate would be greater for a plan that pays premium taxes, as an appropriate provision would have to be made in the pricing.