

Health and Productivity Analysis

Presented to

NASA

Report Generated May 17, 2010

Outline

- I. **Project Goals**
- II. **Analytic Parameters**
- III. **Executive Summary**
- IV. **Health Status**
 - Health Status Comparisons
 - Risk Factor Prevalence
 - Chronic Condition Prevalence
- V. **Aggregate Impact**
 - Risk Factor Prevalence & Productivity Loss
 - Risk Factors: Related Impact on Job Performance
 - Aggregate Presenteeism Costs for Selected Risk Factors
 - Chronic Condition Prevalence & Productivity Loss
 - Chronic Conditions: Related Impact on Job Performance
 - Aggregate Presenteeism Costs for Selected Chronic Conditions
- VI. **Individual Impact**
 - Criteria for Specific Health Problems
 - Health Problem Impact
 - Combination of Health Problems
 - Refining the Financial Impact
- VII. **Key Findings and Recommendations**
- VIII. **Appendix**
 - Data Dictionary
 - Project Teams

Project Goals

Link Health Assessment data with presenteeism data* in order to:

- Support the business case for health promotion.
- Identify risk factors showing the most association with productivity.

These prior goals are supported by addressing the following questions:

- What are the significant health problems associated with productivity loss for NASA?
- What are the associated health-related productivity costs for these significant health concerns?
- How does NASA's experience compare to other organization's experience?

**Measured through the Work Limitations Questionnaire (WLQ).*

Analytic Parameters

Date Range for Health Assessment/WLQ Results:

- The data from NASA's Health Assessment campaign (December 29, 2008 through December 15, 2009) were used for this analysis.

Population Assessed in Analysis:

- The focus of this analysis was on NASA's active, full-time Civil Servant population who completed the Health Assessment (n=2,125).
- This population was defined as individuals in the Civil Servant workforce groups.
- An average annual salary of \$107,429 was used for Health Assessment respondents' to calculate productivity costs.

Analytic Parameters (cont'd)

Scoring Methodology:

- An estimate of work loss due to health-related issues is represented by the *% Productivity Loss* measure throughout this analysis.
- *Productivity costs* were calculated using an average annual salary provided by NASA (\$107,429).
- Productivity loss is further assessed through examining Health Assessment respondents' answers to specific WLQ questions. This loss is shown along four job performance areas: Time, Physical Demands, Mental-Interpersonal Demands, and Output Demands.

Executive Summary

Top Productivity Drainers:

- Chronic Pain is associated with the highest level of productivity loss, but due to very low prevalence has low cost impact.
- Nutrition risk and Emotional Health risk have the highest overall impact with both high prevalence and high productivity loss.
- Exercise risk, Weight risk and Blood Pressure risk are next in terms of overall impact.

Top Actionable Health Problems:

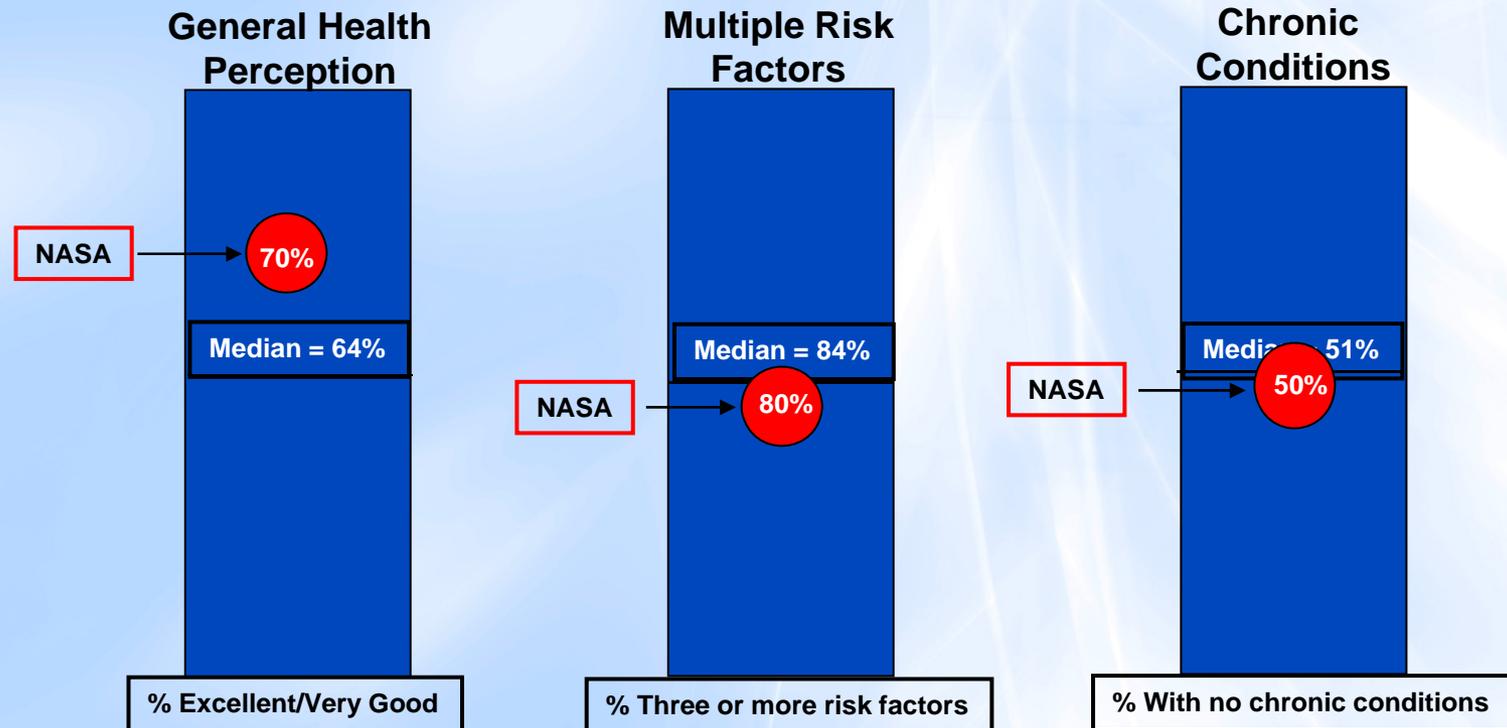
- Lowering the prevalence of Emotional Health risk with an average productivity loss of \$616/employee/year, would provide the greatest cost impact.
- Exercise had the next highest average productivity “loss” per employee at \$183/employee/year.
- Employee engagement in, and success at, practicing healthier behaviors, can lead to reductions in health-related productivity costs. Among the top health problems impacting productivity, there is a potential opportunity savings of from \$.78 to \$7 per employee (based on .5% reduction in prevalence).

Health Status

Health Status Comparisons

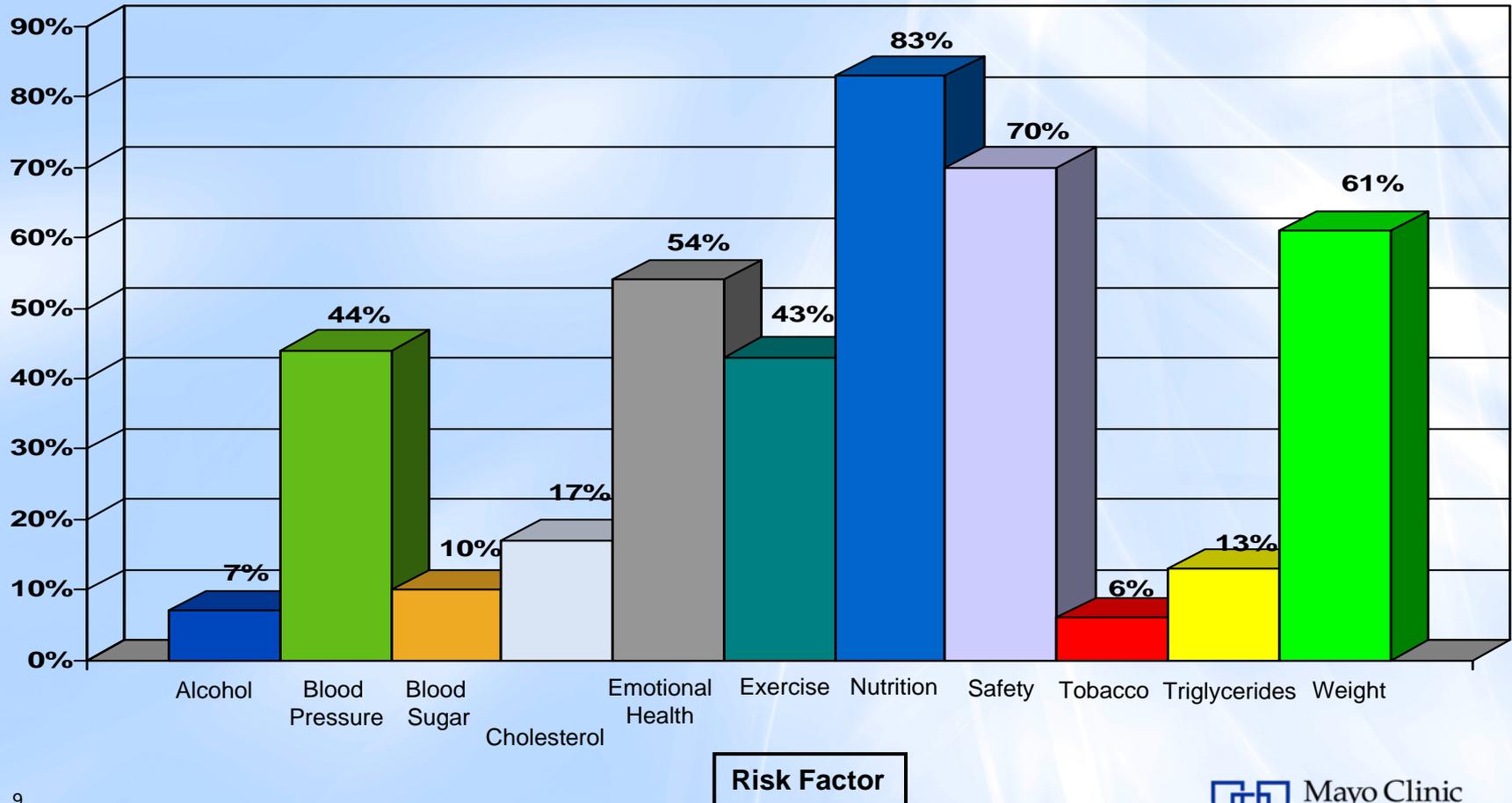
When examining NASA's experience compared to Mayo Clinic Health Solutions' current book of business results, NASA's Health Assessment participants:

- Health perception of Excellent/Very Good is above that of other organizations;
- With three or more risk factors are slightly lower compared to other organizations; and
- Experience chronic conditions at about the same rate as other organizations.



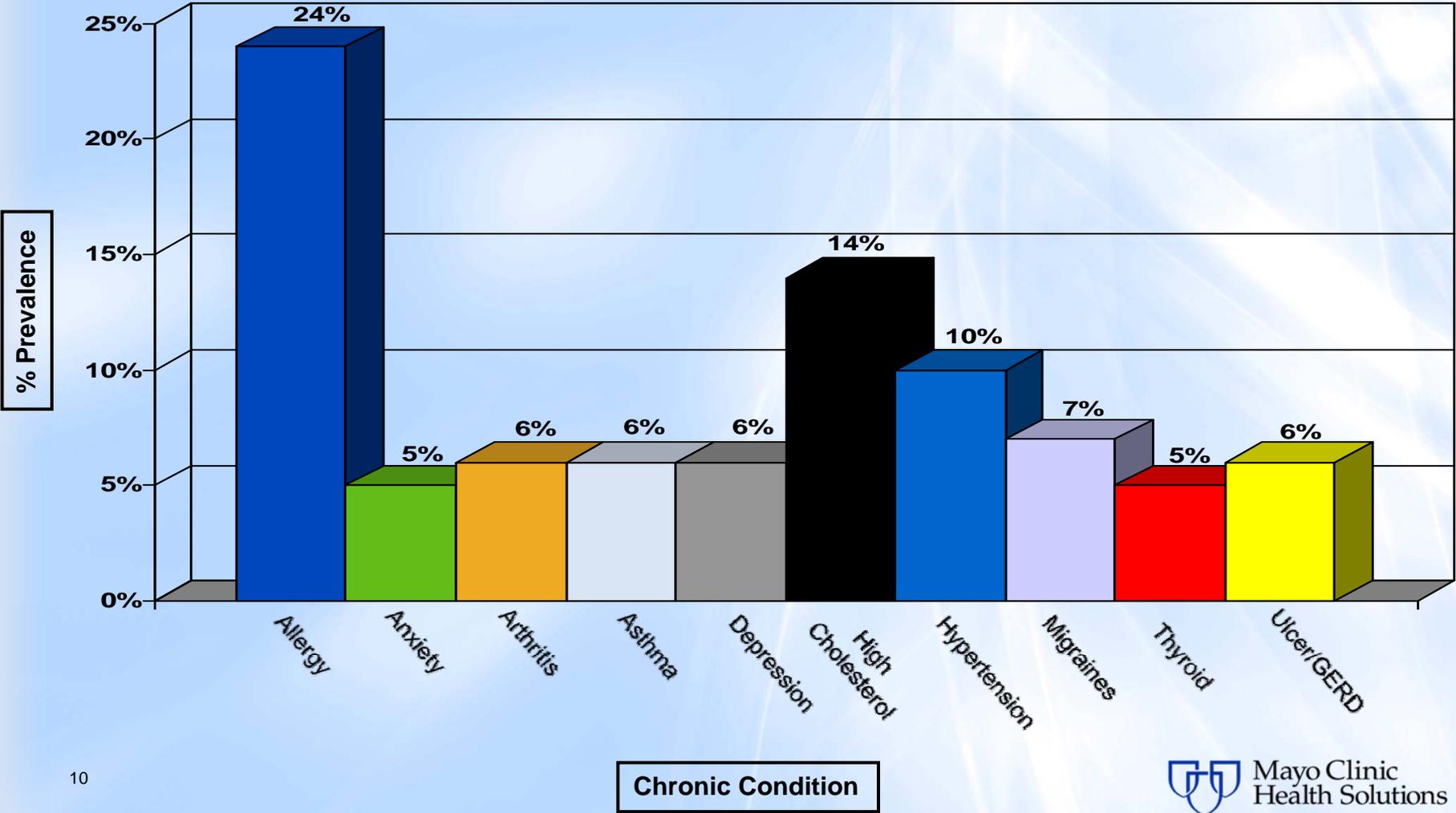
Risk Factor Prevalence

The most prevalent risks (excluding Safety) include: Nutrition (83%), Weight(61%), Emotional Health (54%), and Exercise (43%).



Chronic Condition Prevalence

The most prevalent chronic conditions include: Allergy (24%), High Cholesterol (14%), and Hypertension (10%).



Aggregate Impact

The risk factors and chronic conditions presented throughout this section of the report focus on the impact each risk factor or chronic condition has on an individual's ability to perform the daily demands of his/her job. These measures are **not** additive as an individual may have more than one risk or chronic condition.

Risk Factor Prevalence & Productivity Loss

- Of all risks measured within the Health Assessment, the most prevalent risks among NASA's employee population were Nutrition and Safety.
- On average, the impact on job performance was greatest for those who were at risk for Blood Sugar and Emotional Health.

Top Risks Ranked by Prevalence

Health Risks	Prevalence
Nutrition	83%
Safety	70%
Weight	61%
Emotional Health	54%
Blood Pressure	44%
Exercise	43%

Top Risks Ranked by Productivity Loss

Health Risks	Productivity Loss
Blood Sugar	1.8%
Emotional Health	1.8%
Tobacco	1.7%
Triglycerides	1.7%
Exercise	1.7%
Alcohol	1.6%

Risk Factors: Related Impact on Job Performance

- The average impact on job demands varies by health risk. **Highlighted** cells indicate the risk factor with the highest impact (and statistically significant) in a specific job performance area.
- Being at risk for Blood Sugar or Emotional Health has the most impact on an individual's overall job performance.

Health Risks	Average Productivity Loss	Time Management	Physical	Mental-Interpersonal	Output
Alcohol	1.6	8.0	4.3*	6.7	4.7*
Blood Pressure	1.3*	5.8*	4.8*	5.3*	3.9*
Blood Sugar	1.8	7.6	6.5	7.8	4.5*
Emotional Health	1.8	8.4	5.5	7.0	5.3
Exercise	1.7	8.1	5.8	6.4	4.7
Nutrition	1.3	6.0	4.7	5.2	3.7*
Safety	1.2*	8.0*	4.3*	5.1*	3.7*
Tobacco	1.7	8.2	6.4*	7.4	4.6*
Triglycerides	1.7	8.1	5.2*	6.9	4.8*
Weight	1.3*	5.7*	4.9*	5.1*	3.6*

Aggregate Presenteeism Costs for Risk Factors

Among measured health risks in 2009, those at risk for Nutrition, Emotional Health, and Safety accounted for the highest dollar impact to NASA.

Health Risk	Total Cost Impact
Alcohol	\$265 Thousand
Blood Pressure	\$1.3 Million
Blood Sugar	\$372 Thousand
Emotional	\$2.2 Million
Exercise	\$1.6 Million
Nutrition	\$2.5 Million
Safety	\$2.0 Million
Tobacco	\$239 Thousand
Triglycerides	\$401 Thousand
Weight	\$1.8 Million

Chronic Condition Prevalence & Productivity Loss

- Of all conditions measured within the Health Assessment, the most prevalent chronic conditions among NASA's employee population were Allergies and High Cholesterol.
- On average, the impact on job performance was greatest for those who indicated that they were diagnosed with Chronic Pain and Depression.

Top Conditions Ranked by Prevalence

Health Conditions	% Prevalence
Allergy	24%
High Cholesterol	14%
Hypertension	10%
Migraine	7%

Top Conditions Ranked by Productivity Loss

Health Conditions	% Productivity Loss
Chronic Pain	5.2%
Depression	3.2%
Anxiety	3.0%
Sleep Disorder	2.9%
Migraine	2.6%

Chronic Condition: Related Impact on Job Performance

The average impact on job demands varies by health condition. **Highlighted** cells indicate that Chronic Pain has the most affect on all job demand areas.

Health Conditions	Average Productivity Loss	Time Management	Physical	Mental-Interpersonal	Output
Allergy	1.5	7.0	5.3*	6.0	4.6
Anxiety	3.0	15.7	6.0*	12.4	8.5
Chronic Pain	5.2	26.6	24.5	22.8	10.3
Depression	3.2	17.1	7.7	12.9	9.1
High Cholesterol	1.7	8.0	6.7	6.5	4.8
Hypertension	1.7	7.3*	6.6	7.3	5.5
Migraine	2.6	12.2	7.5	10.6	7.7
Sleep Disorder	2.9	12.1	10.3	11.1	9.0

*Data is not statistically significant

Aggregate Presenteeism Costs for Selected Chronic Conditions

Among measured health conditions in 2009, those at risk for Allergies and High Cholesterol accounted for the highest dollar impact to NASA.

Health Condition	Total Cost Impact
Allergy	\$840 Thousand
Anxiety	\$331 Thousand
Chronic Pain	\$139 Thousand
Depression	\$420 Thousand
High Cholesterol	\$542 Thousand
Hypertension	\$374 Thousand
Migraine	\$391 Thousand
Sleep Disorder	\$286 Thousand

Individual Impact

Although similar risks and chronic conditions are evaluated within this section, the metrics throughout this section focus on the **individual contribution** each risk factor or chronic condition has on an individual's ability to perform his/her daily job demands.

Criteria for Specific Health Problems

The health topics displayed within this section were based on the results of several analyses. Health problems displayed within this section were filtered using the following criteria:

- The **prevalence** in the most recent campaign.
- The **most individual impact** within NASA.
- The **cost per employee**.

Using the above criteria, the health problems were evaluated and those that were significant are displayed throughout the remainder of this section.

Health Problem Impact

- The **Comparator** column identifies the impact per employee with the health problem identified in the data for all WLQ customers. It is the proportion of productivity loss attributable to the health problem. For instance, employees with Depression would experience a 1.3% higher productivity loss than those without depression, given all other health problems being controlled.
- Across each of these conditions **NASA's** population experienced a lower impact compared to the Comparator group. Meaning, participants with these conditions within NASA are impacted less than those with the same diagnosis in other organizations.

Health Problem	Comparator Impact	Unique NASA Impact
Depression	1.330	1.29
Emotional Health	1.026	.993
Exercise	0.401	0.388
Nutrition	0.150	0.145
Safety	0.225	0.218

Combinations of Health Problems

- NASA's employees who have risks in the Lifestyle area – Exercise and Nutrition (37% of Health Assessment completers) experienced, on average, a .5% productivity loss.
- For NASA's employees who are at risk for Depression and Emotional Health (5% of Health Assessment completers) they experienced, on average, a 2.3% productivity loss.

Health Problem	Unique NASA Impact
Depression	1.290
Emotional Health	.993
Exercise	0.388
Nutrition	0.145
Safety	0.218

.53%

Health Problem	Unique NASA Impact
Depression	1.290
Emotional Health	.993
Exercise	0.388
Nutrition	0.145
Safety	0.218

2.28%

Refining the Financial Impact

When we looked at the individual contribution of specific health problems, health-related productivity costs associated with being at risk for Emotional Health, Exercise and Safety had significant financial impact for NASA.

Health Problem	Cost per Employee	Organization-wide Costs*
Depression	\$102	\$354 Thousand
Emotional Health	\$616	\$2.2 Million
Exercise	\$183	\$632 Thousand
Nutrition	\$129	\$445 Thousand
Safety	\$167	\$577 Thousand

**Organization-wide Costs* represent total costs for all employees who completed the Health Assessment.

Key Findings and Recommendations

Key Findings

Health Status

- The most prevalent risk factors were Nutrition, Weight, and Safety.
- The most prevalent chronic condition was Allergies.
- NASA employees compare slightly better than those in other organizations on general health perception, % with 3+ risk factors, and about the same for % with no chronic conditions.

Aggregate Impact

- Being at risk for Nutrition is associated with the highest annual costs for NASA employees. These high costs are driven by the highly prevalent nature of Nutrition risk.
- The higher productivity loss for those at risk for Emotional Health makes it nearly as costly as Nutrition at a lower prevalence.

Individual Impact

- Exercise and Nutrition risks are highly prevalent within NASA's population. Individuals with both these risks represent 37% of 2009 completers. They account for slightly more than half a percent of health-related productivity loss and approximately \$312 per employee.
- Although the number of employees with the combination of Depression and Emotional Health risk is about 5% of Health Assessment completers, this group represents an approximate 2% health-related productivity loss or \$718 per employee.

Financial Impact

- The highest cost health problems – Nutrition, Exercise, Emotional Health, Depression may account for over \$3.5 Million in productivity loss.
- Recall too, that individuals may have multiple risk factors; so to put this into perspective the sole contribution of an individual risk factor (or the marginal cost per employee) are highest for:
 - Emotional Health (\$616 per employee)
 - Exercise (\$183 per employee)
 - Depression (\$102 per employee)
 - Nutrition (\$129 per employee)

Recommendations

- Continue your focus on increasing your Health Assessment participation across all Centers in order to better understand the health issues of the larger NASA population.
- Use this data to focus on key health issues by providing awareness, education, and interventions designed to focus on these high impact health issues: Emotional Health, Exercise, Nutrition, Weight, and Depression.
 - Communicate topic specific resources available on NASAHealthierYou.com
 - Promote the behavioral programs on NASAHealthierYou.com, specifically My Fitness Solution, My Weight Solution, and My Stress Solution
 - Provide and feature healthy food options in onsite cafeterias
- Promote all NASA programs and services specific to these health issues on NASAHealthierYou.com.
- Share these results with leadership to substantiate the financial impact of these health issues and the importance of creating a healthy culture.

Appendix

- Data Dictionary
- Project Teams

Data Dictionary

- Measures Definition
- Job Performance Descriptions
- Comparative Data Sets
- Model Purpose

Measures Definition

Cost per Employee	This reflects the predicted lost productivity costs and provides an overall average impact per employee of the organization, where employees are counted whether they have the problem or not. This represents the marginal costs for a specific risk factor or condition. (Employees who completed the Health Assessment in the most recent campaign period were used to represent the total employee count.)
Organization-wide Costs	This reflects the total lost productivity costs spread across all employees who completed the Health Assessment.
% Productivity Loss	This measure represents the weighted sum of the scored in the Mental-Interpersonal, Output, Physical, and Time demand determines. It can be interpreted as the estimated average percent productivity loss per respondent per factor assessed.

Measures Definition (cont'd)

Total Cost Impact	<p>This represents the lost productivity costs for individuals at risk for a specific risk factor or condition.</p>
Unique NASA Impact	<p>This reflects the average productivity loss for the specific health problem for NASA. It takes into account differences in the company's environment compared to the Comparator companies.</p>

Job Performance Descriptions

**WLQ Dimension:
Mental-Interpersonal
Demands**

Examines factors associated with the difficulty of performing cognitive job tasks and/or processing information.

**WLQ Dimension:
Output Demands**

Examines a person's ability to meet demands for quantitative, quality, and timeliness of completed work.

**WLQ Dimension:
Physical Demands**

Examines factors associated with a person's ability to perform job tasks that involved bodily strength, movement, endurance, coordination, and flexibility.

**WLQ Dimension:
Time Management
Demands**

Examines factors addressing the difficulty of performing a job's time and scheduling demands.

Comparative Data Sets

Health Status Comparisons (Health Status Section)

The aggregated data used for comparisons are all other customers whose WLQ data has been scored. This represents approximately 228,000 employees.

Comparator (Individual Impact Section)

The aggregated data used for the Comparator includes all customers whose WLQ data has been scored, aggregated, and modeled. (See Individual Impact Model on the next page.) The Comparator numbers represent over 200,000 employees.

Model Purpose

Aggregate Impact Model

(All slides in Aggregate Impact section.)

- The purpose of the *Aggregate Impact Model* is to understand the potential influence that being at risk for a specific condition or having a specific risk factor has on an individual's ability to optimally perform the daily demands of his or her job.
- The model examines specific risks and conditions and compares those at risk versus those not at risk for the risk factor or condition being analyzed. The results of this model are not additive. Rather, they provide a more comprehensive view of how having the risk or condition influences workplace performance.

Individual Impact Model

(All slides in Individual Impact section.)

- The purpose of the *Individual Impact Model* is to identify and estimate the contribution an individual risk factor or condition has on an individual's ability to optimally perform the daily demands of his or her job.
- This is different than the output from the *Aggregate Impact Model* in that each risk factor or condition is assessed on its own, holding all other risk factors or conditions constant. This means that the associated productivity loss and dollar are additive.

Project Teams

The following analyses is provided through the collaborative efforts of:

- The project team led by Dr. Debra Lerner, MS, Ph.D., from Tufts/New England Medical Center.
- The project team led by Arlene Guindon, M.P.H., Director, Healthcare Analytics and Outcomes Reporting, from Mayo Clinic Health Solutions.