



Advancing Metrics in Environmental Performance: Exploration of Life Cycle Assessment (LCA) Applications in Health Care

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INTRODUCTION

Life Cycle Assessment (LCA) is a protocol for quantifying the impacts of a system or product from the acquisition of raw materials (e.g., agriculture, mining, residuals management) through materials processing, manufacturing, use/maintenance, and the retirement of the product or technology [1-3]. The impacts analyzed can include environmental (resource depletion, public health risks), economic (personnel protection, waste management, health care costs) and social (job creation, employee satisfaction, patient preference) making LCA a powerful sustainability tool. This protocol has been successfully used in industry, including pharmaceutical production [4], to decrease the environmental impact of products. LCA has the potential to expand our use of quantitative data in advancing environmental performance in health care.

PURPOSE

The purpose of the current project was to explore possible applications of LCA in health care relevant to decision making for health care providers. Applications for LCA were considered for further exploration if they (1) were product categories common in Physical Medicine and Rehabilitation and (2) allowed for at least two choices between products that had similar or equal clinical efficacy.

Figure 3:

Examples of Proposed Applications of LCA

Medications	Diagnostic Equipment	Medical Equipment	Patient Care Products
<ul style="list-style-type: none"> • NSAIDs • Antidepressants • Anti-spasticity medications • Analgesics 	<ul style="list-style-type: none"> • Reusable vs. disposable electrodes 	<ul style="list-style-type: none"> • Prosthetic limb components • Wheelchairs 	<ul style="list-style-type: none"> • Wound care products

Figure 1: Environmental Performance as a Quality Improvement Process

Selecting and Implementing the Least Burdensome Product / Service

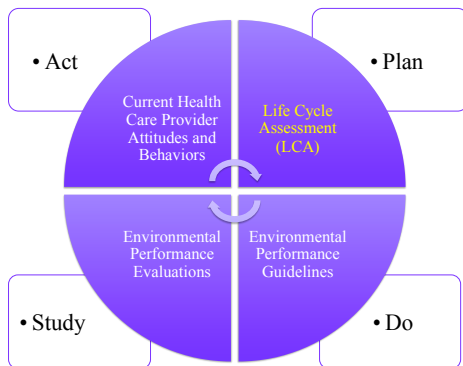


Figure 2: Life Cycle Assessment (LCA): Anticipated Steps in Health Care Applications

Goal and Scope Definition

- Intended clinical application, geographic considerations, system considerations

Inventory Assessment

- Quantifies life cycle energy use (e.g., total, fossil, and petroleum), emissions to air, water, land emissions (e.g., emissions of carbon dioxide), and land and water use for technology use in each life cycle stage

Impact Assessment

- Estimates the contribution to impact given the life cycle inventory

Interpretation

- Investigates the contribution of each life cycle stage, technology use throughout the life cycle (e.g., transportation or energy generation contribution) and includes data quality, sensitivity and uncertainty analyses

CONCLUSIONS

•LCA is a promising tool for advancing environmental performance in health care and can be applied as part of a quality improvement model.

•Potential LCA applications relevant to health care provider decision making include medications, diagnostic equipment, medical equipment and patient care products.

•Advantages of LCA include the ability to generate quantitative data, applications in multiple areas of health care, ability to incorporate clinically meaningful parameters into analysis and applicability at multiple levels of the health care system.

•The next step in this project is actual LCA analysis of disposable and reusable electrodiagnostic electrodes to further explore the validity of LCA in health care applications.

REFERENCES

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