

### **Lead ChristianaCare Inventor**

Catharine E. Kelly, OTR / L

### **The Invention**

Originally conceived as a pressure ulcer preventative, this specialty wheelchair allows caregiver and/or patient user to apply automated settings of seated movement for the caregiver and/or patient user. Manual manipulation demands time and resources and leaves open the possibility of costly human error. The automated timed movements support recommended seating angles and length of time at each angle. Neither feature is available in tilt-in-space wheelchairs currently marketed.

### **Unmet Need**

There is a demonstrated need for a fully automatic tilt-in-space wheelchair that can adjust the angle and tilt of the occupant dynamically and programmatically, to allow for adequate tissue pressure relief.

Wheelchairs are an essential means of mobility, permitting an occupant to perform activities that would otherwise be difficult or impossible. They are a critical piece of equipment in many hospital and caregiving settings.

Simple manual wheelchairs are limited to a fixed seated position, or a small range of manually adjustable positions. They are unsuitable for long-term occupancy, as remaining seated in a fixed position for extended periods increases the risk of soft-tissue injuries such as pressure ulcers as tissue is not properly offloaded. This can lead to serious complications and even death.

More expensive devices known as tilt-in-space wheelchairs offer the ability to widely adjust the angle and tilt of the occupant relative to the base of the wheelchair, allowing for tissue offloading preventing pressure ulcers. However, tilt-in-space wheelchairs still require an attentive person to make the necessary adjustments at appropriate points over a period of time, either manually or automatically by either the occupant or the caregiver. This not only takes up time and resources, but also leaves open the possibility for human error on the part of the occupant or caregivers leading to inadequate relief of pressure on tissue if the tilting schedule is not adhered to.

The preferred device allows hands-free adjustment of the occupant according to a tissue offloading routine that is controlled programmatically, without the need for a caregiver's personal attention at the time of the adjustments, thus freeing up time and resources for other important tasks and removing the element of human error.

Experts project that between 3 and 3.5 million people in the US will require a wheelchair. In 2018 approximately 57% of the U.S. wheelchair market share (\$6.8 billion) was allocated to sale of powered wheelchair devices, making specialized wheelchairs the largest segment of the US wheelchair market<sup>1</sup>.

---

<sup>1</sup> "Industry Market Research, Reports, and Statistics." IBISWorld, [www.ibisworld.com/industry-trends/specialized-market-research-reports/life-sciences/medical-supplies/wheelchair-manufacturing.html](http://www.ibisworld.com/industry-trends/specialized-market-research-reports/life-sciences/medical-supplies/wheelchair-manufacturing.html).

## Opportunity

This invention provides a wheelchair already having a tiltable support system with

- A powered drive system for adjusting the degree of tilt, and
- A programmable control system for varying the degree of tilt over time according to a defined tilting routine, reducing the burden on healthcare staff and professionals while also ensuring adherence with prescribed tilting schedules.

The Tilt-in-Space wheelchair design addresses the need for offloading of soft tissue, specifically at the sacral and pelvic regions (ischium). Off-loading is critical to avoiding pressure ulcers that can lead to secondary issues of infection, pain and deformity. Such complications can add significant costs to treatment and care. Current Tilt-in-Space wheelchairs are successfully used in complex patient populations in 2 versions: fully automated or manual (both requiring a caregiver to activate the “tilt” feature at adjustment times). The manual version of this chair is highly effective when used in specific time and position settings. However, this is taxing on hospital staff or on independent caregivers who need to be available to manually change the angle in specific time increments (every 15 minutes, or every 30 minutes). With the personnel and time required, it’s also taxing on institutional budgets.

## Unique Attributes

- A fully tiltable support system allowing for adequate tissue offloading;
- A powered drive system to automatically adjust the degree of tilt without manual effort; and
- A remotely accessible and networked control system that can be programmed to adjust the tilt of the chair(s) automatically according to a pre-determined tissue offloading schedule that can be tailored to an individual occupant’s needs.

## Clinical Applications

Commercial application in hospitals, nursing homes, and all other care-giving facilities including private homes.

## Stage of Development

Conceptual Prototype.

## Intellectual Property

US Patent Application filed October 2019.

## Collaboration Opportunity

Actively seeking a licensee for commercial development.

## Institutional Contact

Richard L. Dashefsky, Esq.  
+1 302.623.2573  
rdashefsky@christianacare.org

## L2C Partners Contact

Merle Gilmore  
+1 610.662.0940  
gilmore@l2cpartners.com