PERSONAL EMERGENCY RESPONSE SYSTEMS (PERS): ITS ROLE IN PREVENTING FALLS FROM BECOMING MEDICAL DISASTERS

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PREVALENCE OF FALLS: NATIONAL FINDINGS

- Frequency: Every 2.5 seconds a person over 65 years of age falls.
- Annual Falling probability: 1/3 of people 65 years and older and ½ of people 85 years and older
- Cause of Death: Falls are the leading cause of death due to injury among the elderly.
- Medical Complications of Long Lie Time: Dangers of sarcopenia, rhabdomyolysis, hyperthermia, aspiration pneumonia, dyhydration, death

PROBLEM #1: SENIOR INJURIES DUE TO FALLS IN HAWAII - 2008-2012

Type of Injury	Rank of FALLS	Percent of Cases (Falls)	Number of Cases (Falls)	Total Cases (All)
Fatal Injuries	1	45%	85	187
Non-fatal Hospitalization	1	83%	1892	2460
Non-fatal ER Visits	1	61%	5676	10,214

Source: Dr. Dan Galanis, Overview of Injuries among Seniors in Hawaii, 2008-2012. Hawaii State D

FALL NOTIFICATION STRATEGIES

- Bell or Whistle
- Cell phone
- Baby Monitors
- Pull Cords
- Fall Sensors on chairs, beds, etc.
- PERS

HOW DO PERS WORK?

- Pendant – Manual, Fall Sensor, GPS or Mobile
- Base Console or Communicator – Landline vs. Wireless (Cellular)
- Monitored Call Center (Fee) or non-Monitored (non-Fee)

- <u>Issues and Challenges</u>
  1. Battery life – pendant, communicator
  2. Fall detector pendant availability and reliability
  3. Microphone – Voice distance
  4. Signal distance
  5. Call Center's speed at receiving calls – overload, line down
  6. Ability to understand non-English speakers
  7. Responders issues – distance, age and ability to help
  8. Subscriber level of cooperation to wear pendant at all times
  9. Local vendor for servicing and installations vs. Drop shipment
  10. Length of contract – monthly or annual or multi-year

WHO NEEDS PERS SERVICES?

At-risk populations including those with social and/or medical risk factors such as:

- ✓ Unsafe living situation
- ✓ History of falls
- ✓ Sensory deficits – vision, peripheral neuropathy
- ✓ Mobility deficits – cane, walker, balance issues
- ✓ Outpatient/post-operative complications
- ✓ Psychological difficulties
- ✓ Uncontrolled and or chronic diseases where the onset of symptoms may be sudden, debilitating, and/or life threatening

VARIATIONS IN PERS TECHNOLOGY TODAY

- ✓Basic pendant
- ✓Fall Detector pendants
- ✓Pendants with built-in microphones
- ✓"Landlines" Communicators – POTS, DSL, VOIP, Cable
- ✓Cellular PERS
- ✓Mobile PERS - Combination of GPS, Cellular, WiFi

METHODS AND SUBJECTS

- **Subjects**: 585 subscribers of Kupuna Monitoring Systems which serves the entire state of Hawaii
  - **Questionnaire survey**
  - **Response Rate**= 41.7% (244/585) in 2014. Average: 50 % response rate
- **Methods**

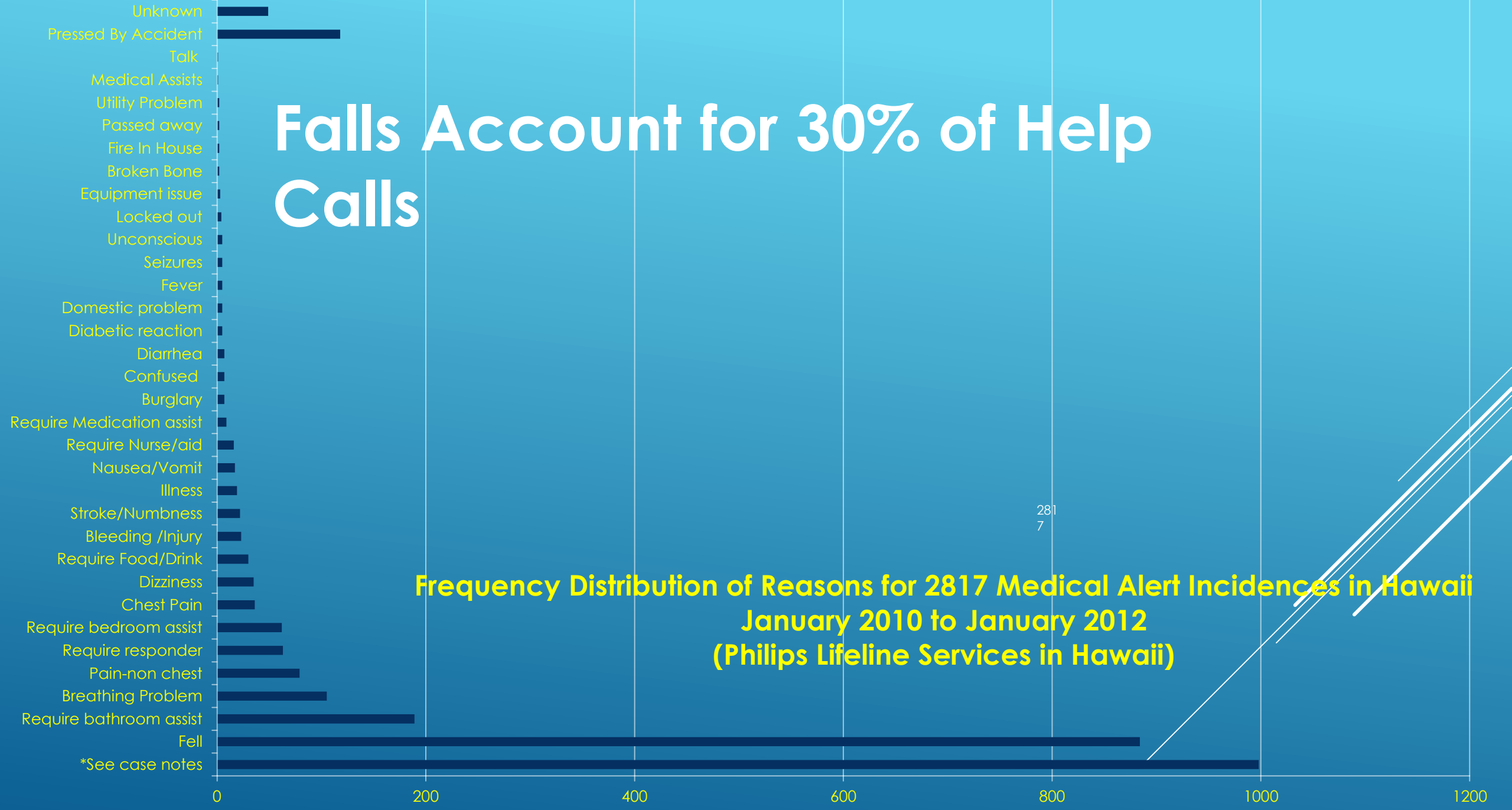
Data collection: Questionnaire survey by mail. Self-addressed stamped envelops to encourage response. Additional data regarding fall incidence and other records from the National database incorporated.

- **Date:** Findings based on one of 3 surveys conducted from 2010-2014
- **Information Collected**: Functional Status (e.g. ADL, IADL), The number of medicine taken, Perceived fall experience, Frequency of Falls, Fall preventions taken, and Risk factors of Falls in terms of medications, eye sight, exercise habit, and home environment.

RESULTS – SUBSCRIBER CHARACTERISTICS (2014)

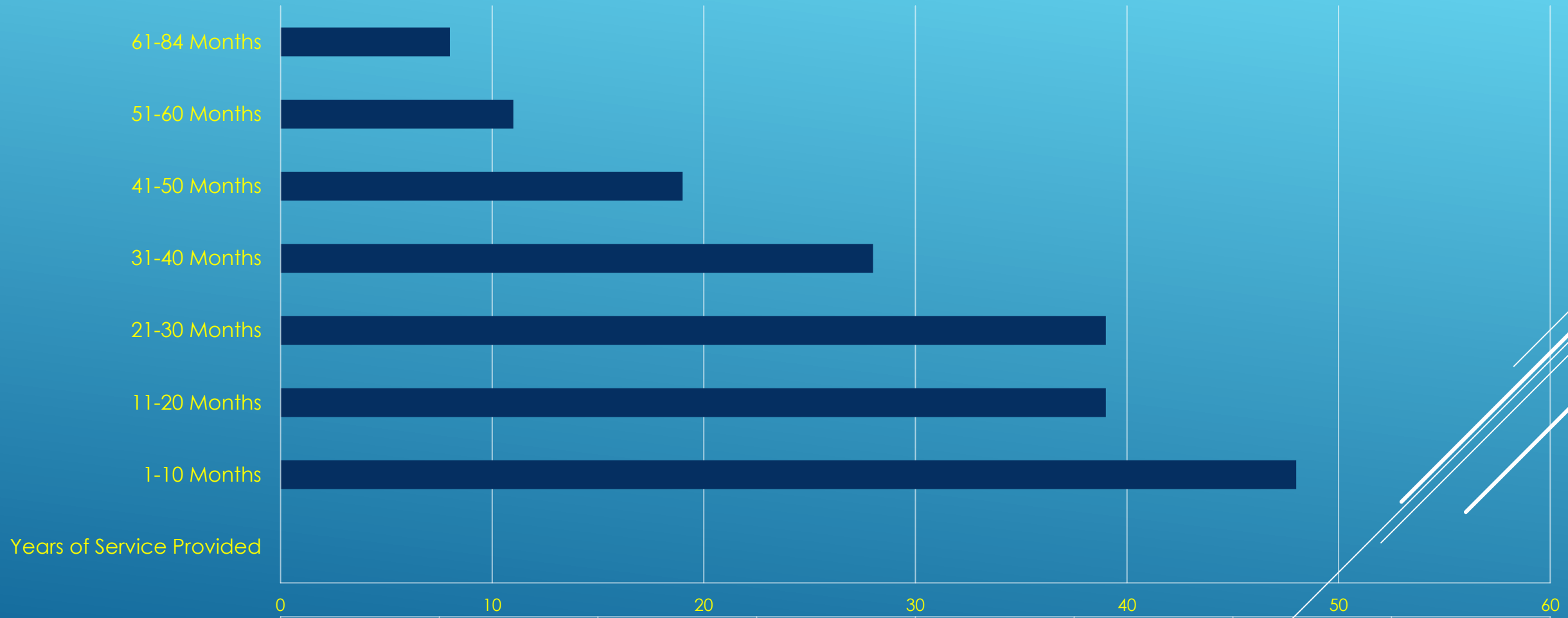
- **Average Age**: 86.1±7.7
- **Gender**: Female 77.8%（161）, Male 22.2%（46）
- **Ethnicity**: Japanese 54.6 % (114),
  Other ethnicity group 45.5 % (95)
- **Fall experience in past 6 months**:
  Yes 47.0 %（110)
  No 53.0 % (124)
- **The number of falls in past 6 months**: 1.1±1.7 times
- **The average number of oral medicine**:
  Prescribed 5.2
  Non Prescribed 2.4

Falls Account for 30% of Help Calls

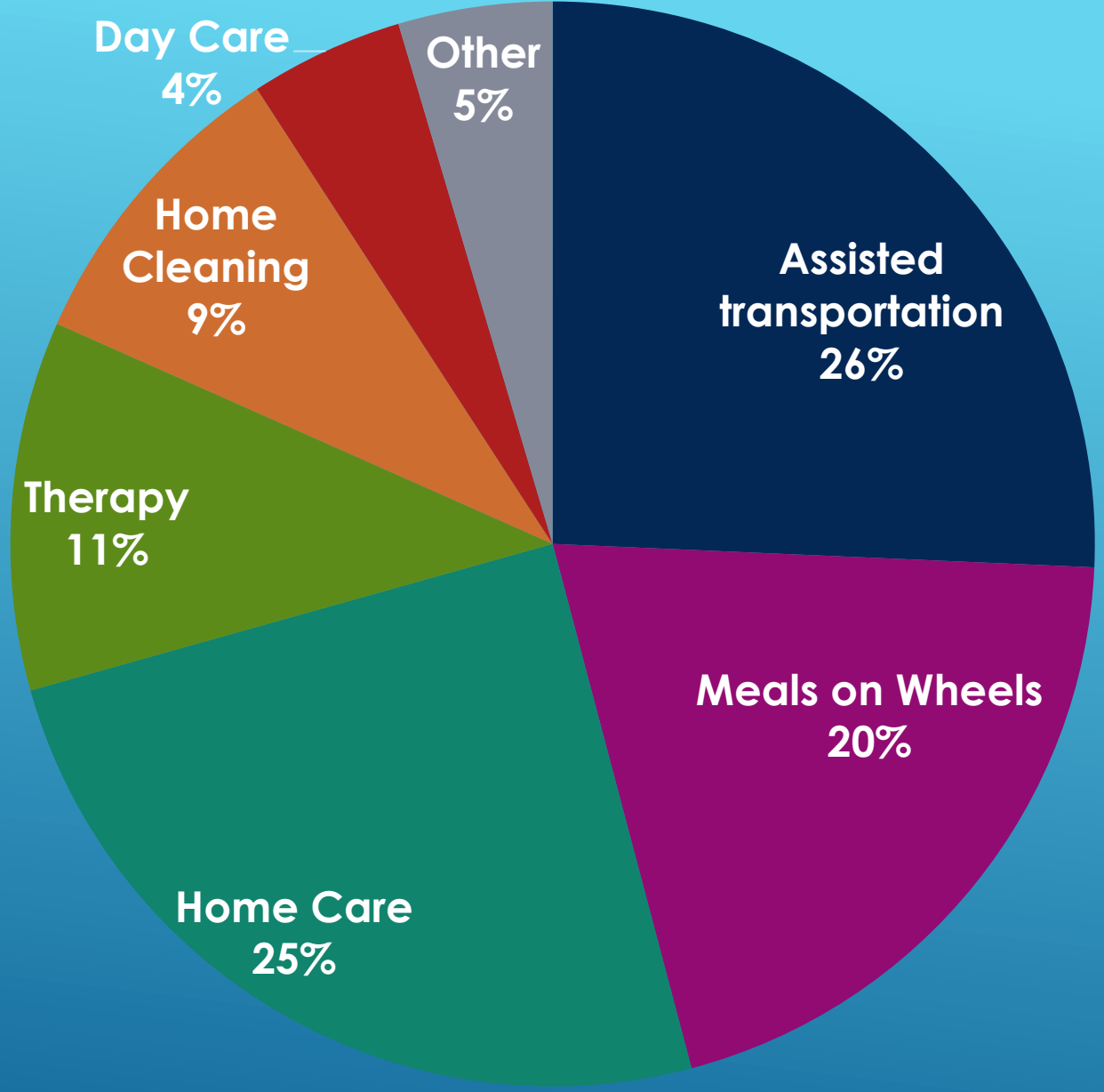


Frequency Distribution of Reasons for 2817 Medical Alert Incidences in Hawaii
January 2010 to January 2012
(Philips Lifeline Services in Hawaii)

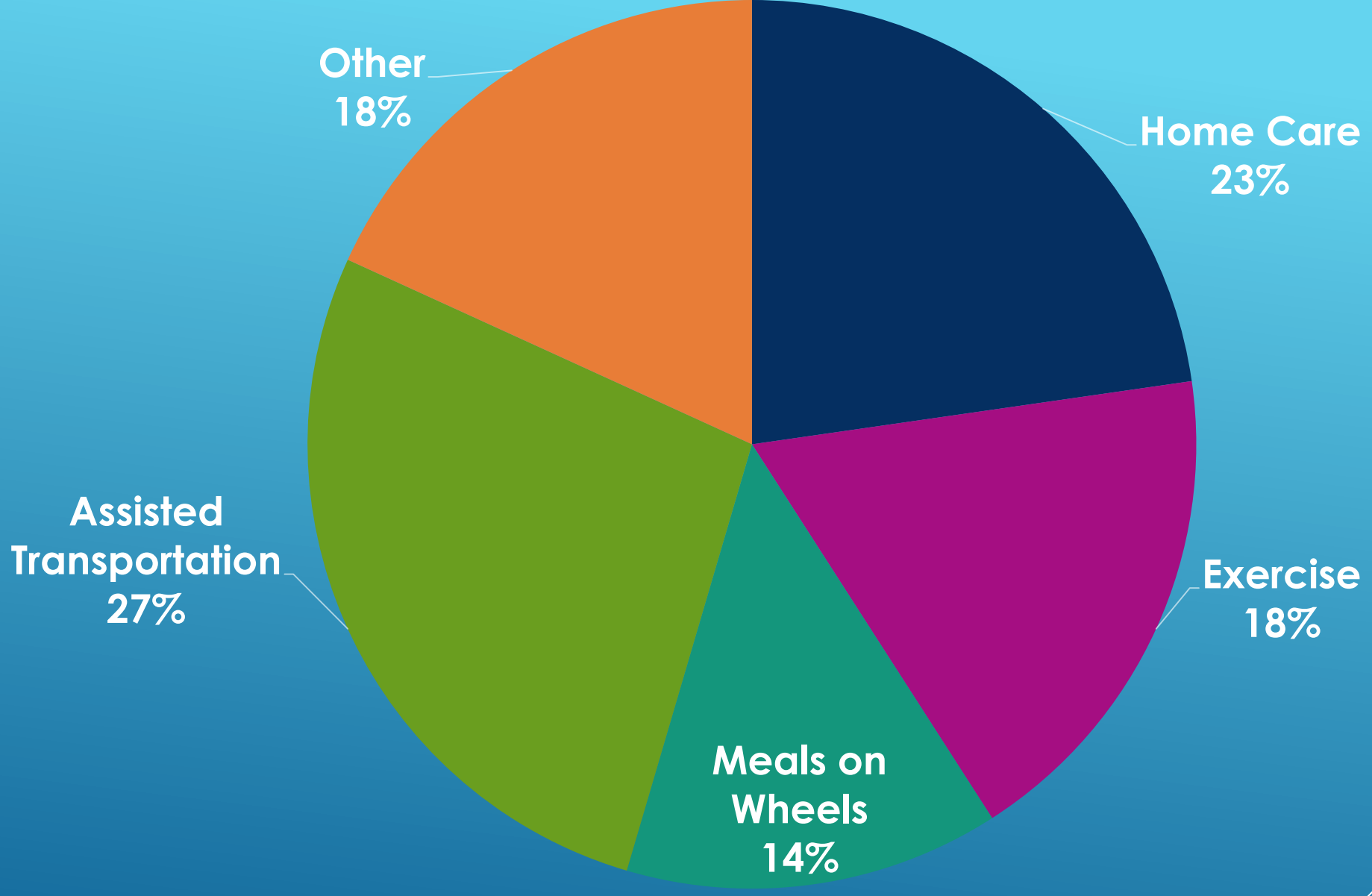
Months of Service – 30 months Average



	Years of Service Provided	1-10 Months	11-20 Months	21-30 Months	31-40 Months	41-50 Months	51-60 Months	61-84 Months
Series1		48	39	39	28	19	11	8



Other Services Used by Subscribers

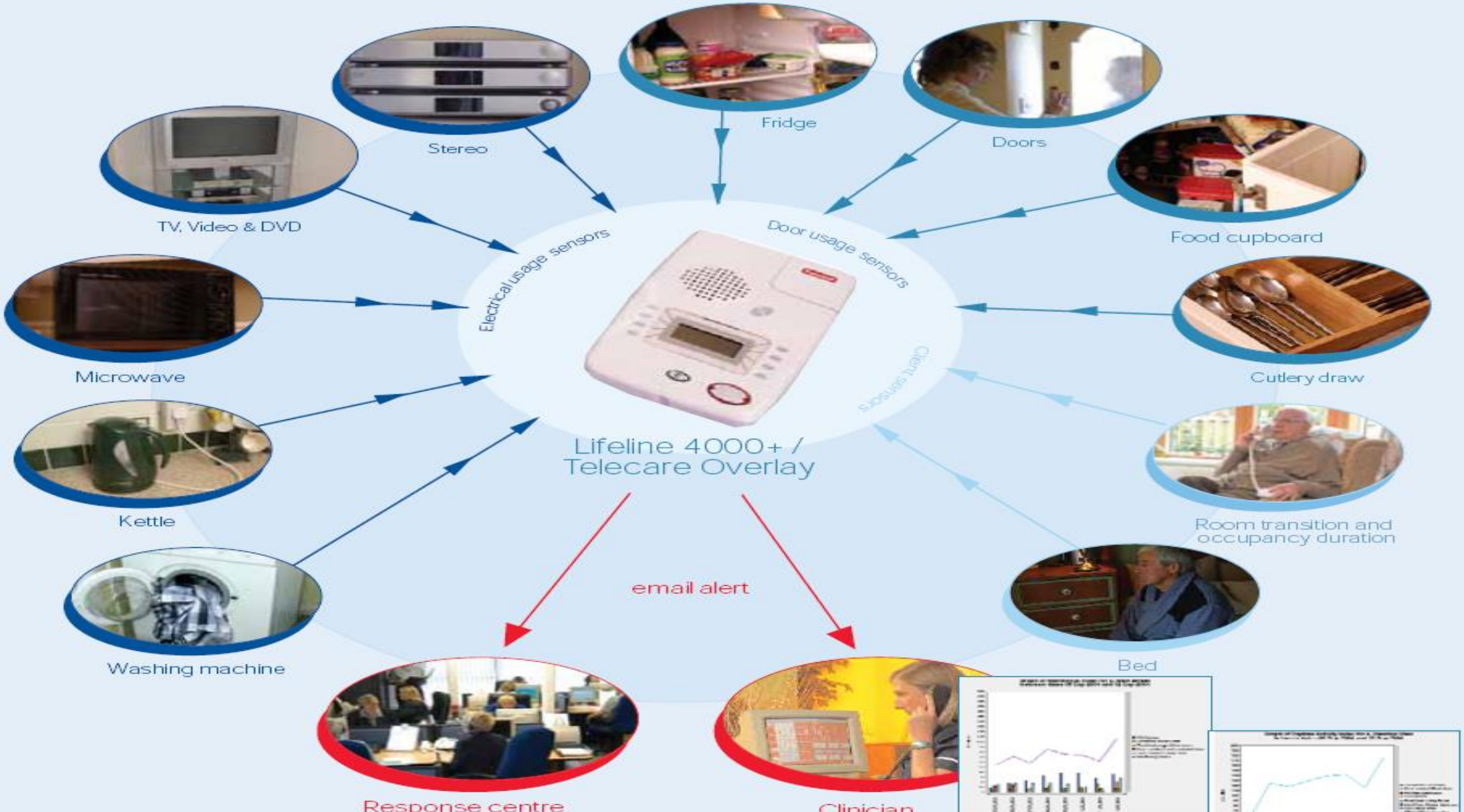


Other Services Needed by Subscribers

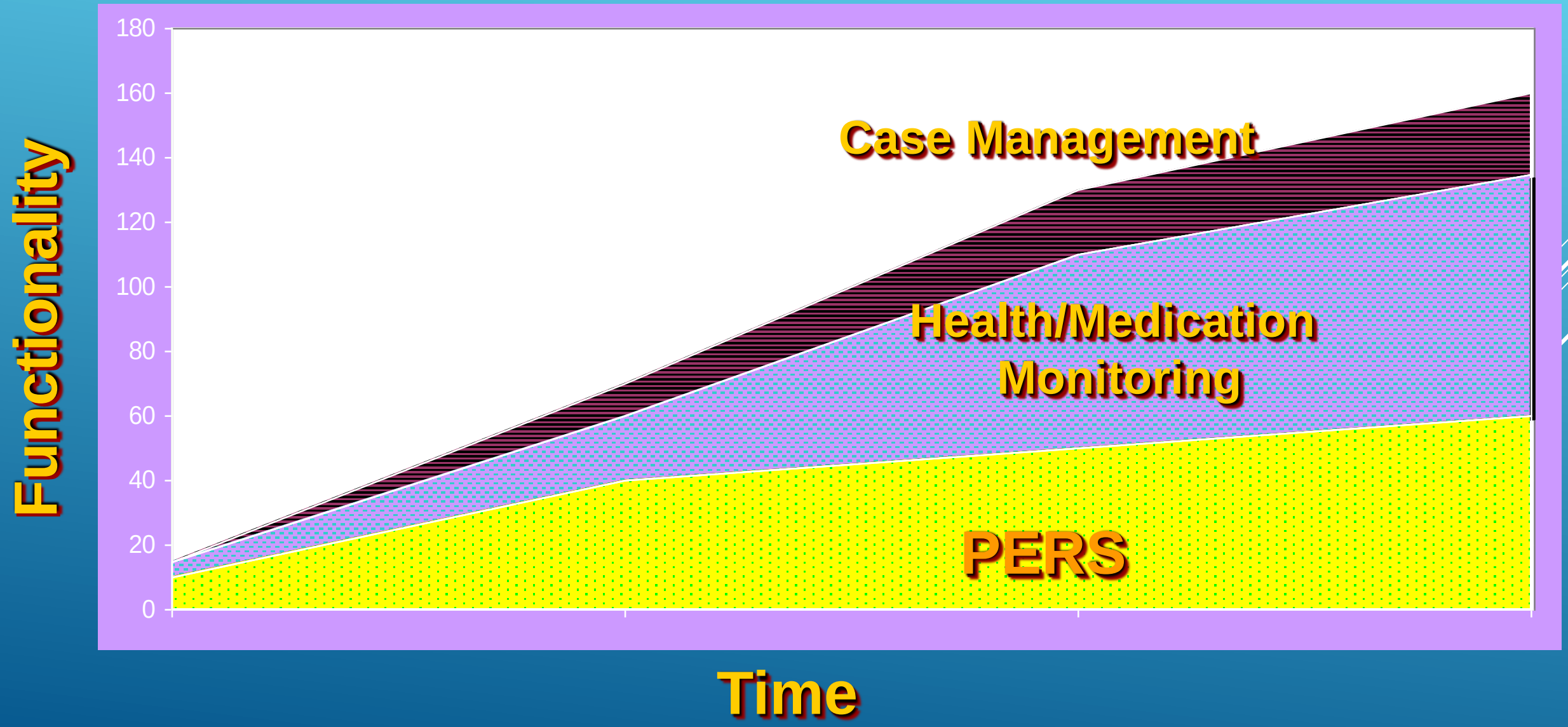
NEW DEVELOPMENTS – 2016-2020

- Mobile PERS – issue – battery life; locating technologies, size, cost
- Use of Smartphones apps with Medical Alert and locating functions
- Home Telehealth Integration with PERS

Sensors can be used to monitor usage of the following:



Increasing Functionality of PERS Over Time: A Prediction



SUMMARY

- Explosive Growth of Elderly
- Nursing Home bed supply shortages
- Home and community-based care
- Less funds available per capita for elder care
- Growing size of the frail & disabled
- Growing Fall Epidemic
- Growing shortage of direct care & professional health care workers particularly in remote rural areas.

- Increased dependence on gerontechnology and integrated telecare monitoring systems