Outline of a Medications Management System (Preventing PDRM)

Part 1: A Pharmaceutical Care System

Objectives

- To describe a medications use system
- A pharmaceutical care system within a medications management system
- To introduce basic concepts and terminology of systems and system control (cybernetics)

Pharmaceutical Care Within a Medication Management System

Outline

- Introduction
  - Three Views of a Pharmaceutical Care System
    - Principles of Pharmaceutical Care
    - Functions (People)
    - Flow Diagrams
    - A Medications Management System

Introduction: Review

- Medicines approved by governments as safe and effective cause patient injury or death.
- Investigators see some injury as preventable or avoidable.
- Therefore, the causes must lie in the manner of medications use, i.e., the medications use process
**Definition of a System**

A set of potentially **interacting** people or objects capable of self **control** toward a common **purpose**.

- The point of studying systems is to account for the interactions, control and purpose -- for example to recognize necessary interactions and to make them more effective.

**Two Meanings of “SYSTEM”**

- Can be an ideal, a “paradigm” or viewpoint-- a way of understanding a real thing
- Can be a real (imperfect) thing, e.g., traffic system

Example: a “circle” \( r^2 = x^2 + y^2 \)

**Medications Use System**

To improve outcomes, it is necessary to . . .

- adopt a systems view of medical care in general and drug therapy in particular.
- construct actual medications use systems on the patient level.

**Purpose of a medications Use System**

Optimally cost-effective drug therapy to improve patients’ quality of life: diagnose, cure or control disease; alleviate or control symptoms

(Based on the discussions of motivations and criteria for medications use.)

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System Flow Diagrams

The third major way to describe a system is with diagrams showing flow of work and information

A Specific System is Defined By . . .

- Purpose
- Inputs, Outputs
- Processes
- Information Flow
- Environment

Inputs, Outputs and Processes

Processes change inputs into outputs
- Therefore the three are strongly related (another triangle.)
  - A pre-determined process may assume a certain input but may need to change to obtain a desired output.
  - Definition of the output and input determines the possibilities for processes.

What is the Output of a Pharmacy Visit?

Filled prescription
Answer to a drug therapy question
Solution to a patient problem
A patient receiving necessary care
A patient making progress toward therapeutic objectives
The output and the input determine the processes that must be carried out.
A Specific System is Defined By . . .

- **Purpose**
- **Inputs, Outputs**
- **Processes**

Example: Treatment of U.T.I.

- Patient With UTI
- Dialog
- Prescribe
- Dispense
- Advise
- Patient Receiving Therapy

This is a patient care process, necessary but not sufficient to define a system. What should we add to make it a system?

A System Paradigm vs a Process Paradigm

- **Process:** Standard grill temp, patty thickness, time on each side. (Procedural, with little use of feedback.)
  - Inflexible. Reliable if case conforms to assumptions. May reduce necessary skill.
- **System:** Judge time on each side by feedback (color, aroma, juice, etc)
  - Flexible. Case can deviate from assumptions, but requires skill & understanding.

Cooking Burgers

- **System** more purposeful less procedural
  - produces outputs vs doing steps;
  - the objective vs “the book”
- System considers wholes & inter-relationships rather than parts
- System uses implicit (self) control
- System sees differentiation rather than positional authority

A System is Defined By . . .

- **Purpose**
- **Inputs, Outputs**
- **Processes**
  - **Information Flow**
    - **Feedback**
    - **Control Elements**

Example: Treatment of U.T.I.

- Patient With UTI
- Dialog
- Prescribe
- Dispense
- Advise
- Patient Receiving Therapy

If “no”, continue 3 days
If “yes”, change Tx. 3 days
Symptom?
Example: Treatment of U.T.I.

Patient With UTI → Dialog → Prescribe → Dispense → Advise → Patient Receiving Therapy

If "yes" continue 3 days
If "no" 3 days

Therapeutic Objective
Command Signal Comparator Indicator = Symptom Status

A System is Defined By . . .

✓ Purpose
✓ Inputs, Outputs
✓ Processes
✓ Information Flow
   ➡ Environment

Environment

- Inputs come from the environment
- Outputs return to the environment
- Boundary is arbitrary -- draw where you like for convenient analysis
- Churchman's rule: environment can affect system directly but is not directly controlled by the system (e.g., health care finance program).

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  ■ Principles
  ■ Functions (People)
  ■ Flow Diagrams
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Pharmaceutical Care Within a Medication Management System

SUMMARY: Three Views of a Pharmaceutical Care System

- Principles
- Functions (People)
- Flow Diagrams