

Antimicrobial Therapy in Transitions of Care

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Disclosure

I have no relevant financial relationships or commercial interests to disclose in conjunction with this presentation

Transitional Care¹

Transitional care refers to care and services required in the safe and timely transfer of patients from one level of care to another (*acute to subacute*) or from one type of health care setting to another (*hospital to home*)

- Comprehensive discharge planning and follow-up care
- Ideally ends with normal functioning and recovery
- Functional independence or stabilization

Transitional Care Environments¹

- Hospital
- Home
- Nursing home
- Assisted living
- Rehab
- Hospice
- Nursing Agency

Transitional Care Model vs Standard Care¹

In General

- Improved quality and cost outcomes
- Reductions in preventable hospital readmissions
- Improvement in health outcomes after discharge
- Improved patient & caregiver satisfaction

Transitions of Care

Antimicrobial Therapy

- First described in literature in 1974²
- 1998³
 - 250,000 patients being treated with outpatient abx
 - \$2 billion in revenue
- Named OPAT in early 2000's
- \$9 to \$11 Billion/yr in US Health Care expenditures
- Proliferation of Infusion Pharmacy locations
- Growth fueled by
 - Push for cost containment
 - QD Antibiotics
 - Infusion devices
 - Extended stability data
 - Availability of home nursing

OPAT Definition³

- Parenteral antimicrobial therapy
 - At least 2 doses on different days without hospitalization
 - Outpatient – variety of settings without an overnight stay

OPAT

- Literature supports the effectiveness of OPAT for a wide variety of infections^{3-5,9-12}
- Requires thorough assessment of the :
 - general medical condition
 - Infectious process
 - Home situation
- Requires Team work

IDSA Guidelines⁴

Table 1. Infections treated with outpatient parenteral antimicrobial therapy (OPAT) and the antibiotics used in 4 studies or sites.

OPAT Network (1996-2002) ^a	Cleveland Clinic (1996-2002) ^a	Minneapolis area (1976-1997) ^b	Children's Hospital San Diego (2000) ^c
Type of infection, ranked by frequency (% of OPAT courses)			
Skin and soft tissue (23)	Mucososkeletal	Cellulitis (15)	Bacteremia (16)
Osteomyelitis (15)	Infected devices	Osteomyelitis (13)	Pyelonephritis (13)
Septic arthritis/bursitis (5)	Bacteremia	Late-stage Lyme disease (10)	Meningitis (13)
Bacteremia (8)	Intra-abdominal	Pyelonephritis and UTI (6)	Intra-abdominal (8)
Wound (4)	Skin and soft tissue	Septic arthritis (7)	Cellulitis (7)
Pneumonia (4)	...	Other (46)	Osteomyelitis (7)
Pyelonephritis (3)	Wound (7)
Antimicrobial, ranked by frequency of use (% of OPAT courses)			
Ceftriaxone (33)	Vancomycin (31)	...	Ceftriaxone (42)
Vancomycin (29)	Penicillins (28)	...	Meropenem (11)
Cefazolin (8)	Antivirals (12)	...	Cefazolin (11)
Quadrifluorolactam (5)	Cephalosporins (8)	...	Cefepime (8)
Aminoglycosides (5)	Aminoglycosides (5)	...	Cefazidime (6)
Clindamycin (3)	Other β-lactams (4)	...	Vancomycin (6)
Cefazidime (3)

NOTE. UTI, urinary tract infection.
^a Data from OPAT Outcomes Registry (available at <http://www.opat.org>)
^b Data from Susan Rehm, personal communication. Percentage of infections not recorded.
^c Data from [38].
^d Data from John Bradley, personal communication.

Benefits of OPAT

- Cost Savings
 - Inpatient costs - >\$1000/day
 - OPAT - \$200-\$300/day
- Patient independence
- Patient may be able to return to work
- Improved Safety
 - Reduced nosocomial infections
 - Also a cost savings

Comparison of Costs for Treating Cellulitis: Acute Infections Management Service vs Inpatient

Variable	Cost, US\$
Mean direct cost per visit at AIMS ^a	385
Mean direct cost per day at hospital ^b	1180
Difference in cost per visit or day	795
Estimated cost savings for cellulitis treatment by OPAT at AIMS over first 13 months ^c	375,240
Estimated mean cost savings per patient	7080

NOTE. OPAT, outpatient parenteral antimicrobial therapy.
^a AIMS direct costs included but were not limited to drug acquisition costs, wound care supply costs, and costs to administer infusion.
^b Estimated cost for cellulitis treatment in hospitalized patients at University of California, Davis Medical Center, Sacramento.
^c Savings estimated using 472 visits (53 patients) in 13 months.

Clinical Infectious Diseases 2010;51(5):S210-S223

Per Diem Payments

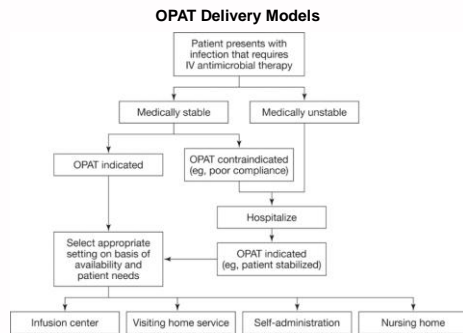
Allows payers to aggregate all the individual cost items within a single line item for each day the patient is on service

- Streamlines claims
- Allows for cost comparisons with hospitals

Delivery of OPAT

3 Suggested Models

- Physician office
- Infusion center
- Home
 - Self-Administered
 - Visiting nurse



Joseph A. Paladino, and Donald Poretz Clin Infect Dis. 2010;51:519B-520B

Infusion Center

- Pro's
 - readily available medical staff & equipment
 - Supervised administration
 - Can be billed under Medicare part A
- Con
 - Patient travel
 - Limited to once daily administration

Visiting Nurse

- Pro's
 - Supervised administration
 - Evaluation of home situation
 - Can be billed under Medicare part A
- Con
 - Cost's of nurse time and travel
 - Limited to once daily administration

Self-Administration

- Pro's
 - Convenience
 - Financial savings
 - Multi-day dosing or continuous
- Con
 - Extensive initial training
 - Vascular access & management
 - On-call support

Home Infusion Service Provider

Organization that continues or completes a patient's parenteral medication in the home or alternate site after the patient is released from the hospital

- Combination of nurse visit, self-administration or infusion suite
- Shared responsibility for patient care and patient outcomes
- Direct contact with the patient

Home Infusion Pharmacies⁸

Prepares & dispenses parenteral sterile medications

- directly to a patient
- pursuant to a valid individual prescription
- in individualized doses

Key Elements Required for an Outpatient Parenteral Antimicrobial Therapy (OPAT) Program.

Element
Health care team
An infectious diseases specialist or physician knowledgeable about infectious diseases and the use of antimicrobials in OPAT
Primary care or referring physicians available to participate in care
Nurse expert in intravenous therapy, access devices, and OPAT
Pharmacist knowledgeable about OPAT
Care manager and billing staff knowledgeable about therapeutic issues and workflow requirements
Access to other health care professionals, including a physical therapist, a dietitian, an occupational therapist, and a social worker
Communications
Physician, nurse, and pharmacist available 24 h per day
System in place for rapid communication between patient and team members
Patient education information for common problems, adverse effects, precautions, and contact lists
Outline of guidelines for follow-up of patients with laboratory testing and intervention as needed
Written policies and procedures
Outline of responsibilities of team members
Patient intake information
Patient selection criteria
D. Patient education materials
Outcomes monitoring
Patient response
Complications of disease, treatment, or program
Patient satisfaction

Joseph A. Paladino, and Donald Poretz Clin Infect Dis. 2010;51:S198-S208

The outpatient parenteral antimicrobial therapy (OPAT) team.



Joseph A. Paladino, and Donald Poretz Clin Infect Dis. 2010;51:S198-S208

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Clinical Infectious Diseases

Infectious Disease Transition Teams

Infection Diseases Transitions Services Team (IDTS)

- ID Specialty Pharmacists
- ID Physician
- Nurse
- Assistants

Impact of an Infection Diseases Transition Service on the Care of Outpatients on Parenteral Antimicrobial Therapy

Keller SC, et al. J Pharm Technol. 29(5):205-214;2013

Infectious Disease Transition Teams⁷

Process of Care

Keller SC, et al. J Pharm Technol. 29(5):205-214;2013

Infectious Disease Transition Teams^{6,7}

- ↓ Costs
- May improve process of care measures:
 - Reduced prescribing errors
 - Improved laboratory monitoring
 - Patient follow-up

Infectious Disease Transition Teams^{6,7}

- No difference in
 - re-admission or ED visits
 - Adverse events
 - Medication
 - Catheter related
 - Infection relapse
 - Mortality

Key Elements for OPAT Program⁴

1. Health Care Team
2. Communication
3. Treatment Guidelines
4. Written Policies & Procedures
5. Outcomes Monitoring

Key Elements for OPAT Program⁴

1. Health Care Team
 - ID specialist or Physician knowledgeable in ID & OPAT
 - Primary Care Provider
 - Nurse expert in intravenous therapy, access devices, and OPAT
 - Pharmacist knowledgeable in OPAT
 - Case manager, biller,
 - Other: nutritionist, OT, social worker, etc.

Key Elements for OPAT Program⁴

1. Health Care Team
2. Communication
 - 24-hr on-call physician, pharmacist, nurse
 - Readily accessible communication lines
 - Patient education: written & verbal
 - Emergency contact

Key Elements for OPAT Program⁴

1. Health Care Team
2. Communication
3. Treatment Guidelines
 - ID guidelines
 - Catheter maintenance guidelines

Key Elements for OPAT Program⁴

1. Health Care Team
2. Communication
3. Treatment Guidelines
4. Written Policies & Procedures
 - Outline of team responsibilities
 - Patient intake information
 - Patient selection criteria
 - Patient education

Key Elements for OPAT Program⁴

1. Health Care Team
2. Communication
3. Treatment Guidelines
4. Written Policies & Procedures
5. Outcomes Monitoring
 - Patient response
 - Complications of disease, treatment, or program
 - Patient satisfaction

OPAT Patient Selection

- Types of Infection (see table)
 - Soft tissue and bone infections are most common
- Stability of Infection
 - Risk of sudden or life-threatening changes in health should be low
 - Afebrile
 - Vital signs stable
 - Non-progressive infection

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Osteomyelitis (15)	Infected devices	Osteomyelitis (13)	Pyelonephritis (13)
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Vancomycin (20)	Penicillins (20)	...	Mercaptoam (11)
Cefazolin (8)	Antivirals (12)	...	Cefazolin (11)
Oxacillin/nafcillin (5)	Cephalosporins (9)	...	Cefazime (8)
Aminoglycosides (5)	Aminoglycosides (5)	...	Ceftazidime (8)
Clindamycin (3)	Other β -lactams (4)	...	Vancomycin (6)
Ceftazidime (3)

NOTE. UTI, urinary tract infection.
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³ Data from T.38.
⁴ Data from John Bradley, personal communication.

Infections

OPAT Patient Selection

- Cellulitis
- UTI
- Osteomyelitis
- CNS Infections
- Febrile Neutropenia

Infections

OPAT Patient Selection

- Community-acquired pneumonia
- Select Endocarditis patients
 - Non-enterococcal
 - Caution:
 - prosthetic valves
 - persistently positive blood cultures
 - poorly controlled CHF
 - Large vegetation
 - Recurrent embolic events
 - *S. aureus*

Infections

OPAT Patient Selection

Alternative Routes of Drug Delivery are NOT feasible/appropriate

OPAT Patient Selection

Other Factors

- **Reliable Vascular access**
 - Injection drug or alcohol abuse
- **Patient and Caregiver ability**
 - Responsibility for the infusion
 - Care of the vascular access device
 - Care of the catheter site
 - Able to recognize and report problem
- **Home assessment**
 - Utilities, safety issues, cleanliness, substance abuse, transportation, social strife
 - Risk to health-care practitioners should be considered

OPAT Patient Selection

Other Factors

- **Reimbursement**
 - Private insurance
 - Medicare – cover drugs but not supply
 - Secondary insurance

OPAT Antimicrobial Selection

<p>Medication</p> <ul style="list-style-type: none"> • Dosing schedule • Drug stability • Drug compatibility • Long term toxicity 	<p>Device Selection</p> <ul style="list-style-type: none"> • Volume of infusion • Rate of infusion • Compatibility • Patient ability • Patient preference • Provider/nurse preference • Cost
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Referral Intake

<p>Demographic Information</p> <ul style="list-style-type: none"> • Patient Contact • DOB • Caregiver Contact • Emergency Contact • Advance Directive • Ht, Wt, gender, age 	<p>Clinical Information</p> <ul style="list-style-type: none"> • Current H&P • Discharge & other notes • Discharge Orders • Pertinent Labs • Allergies • Medication Profile
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Referral Intake

Continued

<p>Catheter Information</p> <ul style="list-style-type: none"> • Type • Number of lumens • Location • Length • Insertion Date • Last access • Current status 	<p>Therapy Information</p> <ul style="list-style-type: none"> • Primary diagnosis • Medication <ul style="list-style-type: none"> – Dose – Duration – First & Last Dose – Next Dose • Prescriber information • Home Health Agency
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Referral Intake

Continued

Payment Information

- Insurance
 - Medicare?
 - Prior Authorization

Preadmission Assessment

Patient

- Agreement:
 - Patient
 - Family
 - Caregiver
- Home environment
- Home geography
- Ability to receive education

Disease

- Suitable for home treatment
- Documented Stability

Preadmission Assessment

Continued

Therapy

- Administration schedule
- Stability
- Compatibility
- Catheter
- Infusion device
- Nursing availability

Insurance

- Coverage details
- Deductibles
- Out-of-Pocket
- Nursing visits

Admission Care Plan

Therapy

- Goals therapy
- Start and end date
- Key benchmarks
- Visit schedule
- Delivery schedule

Clinical Monitoring

- Specific laboratory studies
- Specific Imaging Studies
- Specific Provider follow-up
- Specific telephonic visits
 - Pharmacist
 - Nurse

Admission Care Plan

Continued

Catheter Maintenance

- IV Management Orders
 - Supply Orders
 - Specific flushing schedule
 - Specific dressing change schedule
- Stand-by orders for common problems
 - tPA (CathFlo Activase)

Patient Contingencies

- When to call pharmacist
- When to call nurse
- When to seek medical attention

Patient Education/Documents

Medication Therapy

- Drug, dose, route, interval and duration
- Device education
- Goals of therapy
 - Indicators of progress
- Adverse effects and management
- Storage
- Administration
- Disposal

Catheter Management

- Flushing schedule and technique
- Hygiene
- Aseptic technique
- Dressing change schedule
- Common complications
- When to call nurse or pharmacist
- When to seek medical attention

Patient Education/Documents

Continued

Payment Expectations

- Coverage details
- Deductible
- Out-of-Pocket
- Admission Agreement
 - Acceptance of service
 - Release of Information
 - Agreement to pay
 - Assignment of Benefits Authorization
 - Advance Notice of Benefits

Other

- Contact Phone numbers
 - Pharmacy
 - Nurse or Agency
 - Provider
- Notice of Privacy Practice
- Patient Rights & Responsibilities
- Home Safety and Security information

Common Difficulties

- Facility unfamiliar with transition of care services
- Nursing not familiar with infusion devices or catheter management
- Coordination
 - Discharge to first dose
 - Catheter placement
 - Teaching
 - Holiday's
 - Labs

Common Difficulties

- Delivery restrictions
- Payment issues
 - Medicare
 - Prior authorization
- Catheter issues
- Prescriber oversight

Summary