

Curricular Track III—Maternal Health as a Global Health Issue

Activity No. 0217-0000-11-107-L04-P (Knowledge-Based Activity)

Wednesday, October 19

10:15 a.m.–11:45 a.m.

Convention Center: Rooms 315 & 316

Moderator: David R. Foster, Pharm.D.

Associate Professor of Pharmacy Practice, Purdue University, Indianapolis, Indiana

Agenda

- | | |
|------------|--|
| 10:15 a.m. | Improving Maternal Health in Developed Countries
<i>Natalie DiPietro, Pharm.D., MPH</i>
Assistant Professor, Ohio Northern University College of Pharmacy, Ada, Ohio |
| 11:05 a.m. | Improving Maternal Health in Developing Countries
<i>Rakhi Karwa, Pharm.D., BCPS</i>
Clinical Assistant Professor of Pharmacy Practice, Purdue University, College of Pharmacy, Wishard Health Services, Indianapolis, Indiana |

Faculty Conflict of Interest Disclosures

Natalie DiPietro: no conflicts to disclose.

Rakhi Karwa: no conflicts to disclose.

Learning Objectives


1. Discuss short and long term complications associated with poor maternal health in developed countries.
2. Identify current and future strategies in clinical pharmacy aiming to improve maternal health outcomes in developed countries.
3. Identify pharmacotherapeutic strategies for decreasing the domestic infant mortality rate.
4. Discuss short and long term complications associated with poor maternal health in developing countries.
5. Compare and contrast challenges facing the pharmacist involved in maternal healthcare in developing versus developed countries.
6. Identify current and future strategies in clinical pharmacy aiming to improve maternal health outcomes in resource constrained settings.

Self-Assessment Questions

Self-assessment questions are available online at www.accp.com/am




Improving Maternal Health in Developed Countries
Natalie A. DiPietro, PharmD, MPH
Assistant Professor of Pharmacy Practice
Ohio Northern University
October 19, 2011




Conflicts of Interest

The author declares no conflict of interest.




Learning Objectives

1. Discuss short and long term complications associated with poor maternal health in developed countries
2. Identify current and future strategies in clinical pharmacy aiming to improve maternal health outcomes in developed countries
3. Identify pharmacotherapeutic strategies for decreasing the domestic infant mortality rate



"Prevention is better than cure."
~ Desiderius Erasmus (1466 –1536)



Lecture outline

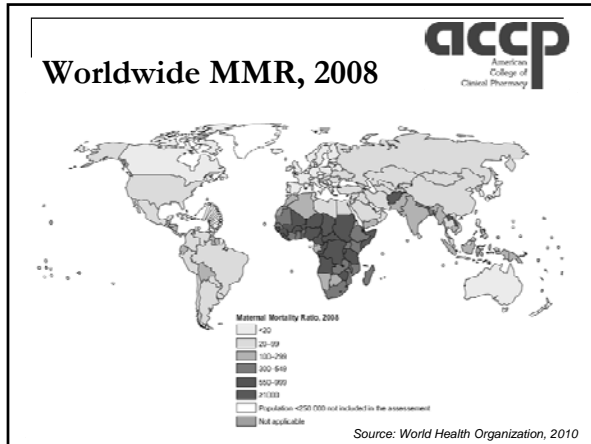
- Current state of maternal and child health in the U.S.
- Preconception care: theory and content
- Opportunities for pharmacists



Improving maternal health

- Focus of national and international health organizations since the late 1980's
 - MDG 5: Improving maternal health
 - Reduce maternal mortality ratio (MMR) by 75% between 1990-2015
 - Average annual decline of 5.5% in the MMR
 - Global progress, 1990-2008
 - MMR has fallen by about 33%
 - Average annual decline in the MMR of 2.3%

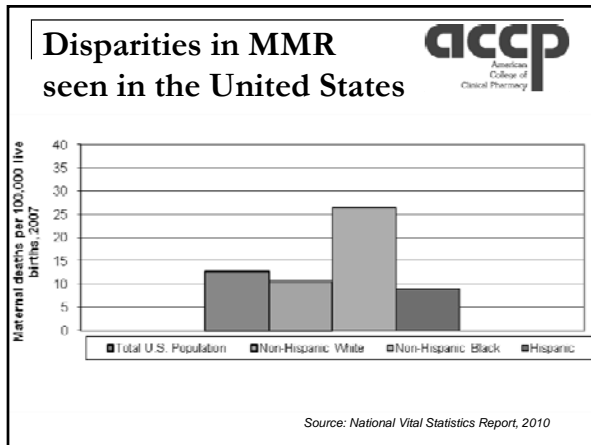
Source: World Health Organization, 2010



Maternal mortality in the United States

- Estimates of maternal mortality vary
 - National Vital Statistics System, 2007 data:
 - 12.7 deaths/100,000 live births
- Leading causes of pregnancy-related deaths:
 - hemorrhage
 - stroke
 - thrombus
 - amniotic fluid embolism
 - infection
 - peripartum cardiomyopathy
 - hypertensive disorders

Sources: National Vital Statistics Report, 2010; CDC, 2008



Pregnancy complications

- Depression
- Obesity
- Gestational diabetes
- Maternal morbidity
 - “Physical and psychological conditions resulting from or aggravated by pregnancy that have an adverse effect on the woman’s health” (CDC, 2010)
 - “Severe maternal morbidity is 50 times more common than maternal death” (Callaghan et al, 2008)

Sources: CDC, 2010; Callaghan et al, 2008

Infant mortality


- MDG 4: Reduce child mortality
 - By 2015, reduce mortality of under five-year-olds by 66.7%
 - Progress to date: Annual deaths down 35% from 1990
- U.S. infant mortality rate (IMR) = 6.75 /1,000 live births
 - Disparity seen among black infants compared to white infants
 - IMR 2.3 times greater for black infants

Sources: National Vital Statistics Report, 2010; World Health Organization, 2011

Infant mortality


- 10 leading causes of infant death account for 69% of all infant deaths in the U.S.
 1. congenital malformations
 2. low birthweight
 3. sudden infant death syndrome
 4. maternal complications
 5. unintentional injuries
 6. cord/placental complications
 7. bacterial sepsis
 8. respiratory distress
 9. diseases of circulatory system
 10. neonatal hemorrhage

Source: National Vital Statistics Report, 2010

Maternal health & behaviors 


- “Extensive research has established many associations between maternal characteristics and infant health outcomes” (Bennett & Kotelchuck, 2005)
 - Demographic risks (e.g., maternal age, race, socioeconomic status)
 - Medical risks predating pregnancy
 - Medical risks in current pregnancy
 - Behavioral and environmental risks
 - Healthcare risks
 - Evolving concepts of risk (e.g., physical and psychosocial stress)

Sources: Bennett & Kotelchuck, 2005

Life-course perspective 

- “One can’t cure a lifetime of ills during 9 months of pregnancy”
- Three domains of research support a life-course perspective of women’s health to improve maternal and infant outcomes
 - Cross-generational reproductive outcome studies
 - Barker hypothesis
 - Weathering hypothesis


Sources: Bennett & Kotelchuck, 2005; Lu & Halfon, 2003


Pregnancy intendedness 

- Approximately half of all pregnancies in the U.S. are unintended
 - Reported as wanting to become pregnant “later” (mistimed) or “never” (unwanted)
- Almost half of unintended pregnancies occur among couples who used some form of contraception the month prior to conception
- Unintended pregnancies can result in poorer medical and financial outcomes for infants, mothers, and families

Sources: CDC, 2010b; Finer & Henshaw, 2006; Humbert et al, 2007


Preconception care



Definition 

- Set of interventions that aim to identify and modify bio-medical, behavioral, and social risks to a woman’s health or pregnancy outcome through prevention and management
 - Prevention and management of health issues that may pose risk to mothers or infants
 - Emphasis on health issues that require action before conception or very early in pregnancy for maximal impact
 - Includes active management of fertility (e.g., family planning)
- Should be viewed as part of routine health care rather than a single clinical visit

Sources: CDC, 2006; Kent et al, 2006

Purpose 

- Improve health for all women of childbearing age before conception
 - First or subsequent pregnancy (*interconception care*)
- Components of preconception care include:
 - risk screening
 - health promotion
 - effective interventions

Sources: CDC, 2006; Kent et al, 2006

Goals of preconception care


<p style="text-align: center;">Goal 1</p> <p>Improve the knowledge, attitudes and behaviors of men and women related to preconception health.</p>	<p style="text-align: center;">Goal 2</p> <p>Assure that all women of childbearing age in the U.S. receive preconception care services that will enable them to enter pregnancy in optimal health.</p>
<p style="text-align: center;">Goal 3</p> <p>Reduce risks indicated by a previous adverse pregnancy outcome through interventions during the interconception period.</p>	<p style="text-align: center;">Goal 4</p> <p>Reduce the disparities in adverse pregnancy outcomes.</p>

Sources: CDC, 2006; Kent et al, 2006

Recommendations

1. Individual responsibility across the life span
Counsel all patients to have a reproductive life plan
2. Consumer awareness
Increase education and use of services
3. Preventive visits
Provide risk assessment and counseling to all women of childbearing age
4. Interventions for identified risks
Increase proportion of women receiving interventions post screening
5. Interconception care
Intensive interventions for women who experienced adverse outcomes

Sources: CDC, 2006; Kent et al, 2006



6. Pre-pregnancy check-ups
Provide a clinical visit to those planning a pregnancy before conception
7. Health coverage for low-income women
Improve access to preventive services
8. Public health programs and strategies
Integrate with existing public health programs
9. Research
Increase research knowledge for preconception care
10. Monitoring improvements
Monitor via public health surveillance and other research

Sources: CDC, 2006; Kent et al, 2006

Proven interventions

- 14 evidence-based interventions have been identified, which can be classified into four categories:
 1. Maternal assessment
 2. Screening
 3. Vaccinations
 4. Counseling

Sources: CDC, 2006; Kent et al, 2006

Maternal assessment


- Pre-gestational diabetes
- Hypothyroidism
- Antiepileptic drug use
- Maternal phenylketonuria (PKU)
- Oral anticoagulant use
- Isotretinoin use

Sources: CDC, 2006; Kent et al, 2006

Condition	Possible risks to mother	Possible risks to fetus
Pre-gestational diabetes	obstetric complications and hospitalizations; renal disease	congenital heart defects; neural tube defect; spontaneous abortion; premature birth; jaundice; long-term health consequences; macrosomia
Hypothyroidism	infertility; hypertension; preeclampsia; anemia	spontaneous abortion; stillbirth; low birth weight; neurological problems
Epilepsy	vaginal hemorrhage; anemia; hyperemesis gravidarum; toxemia	microcephaly; death; hemorrhage; low birth weight; prematurity; congenital anomalies (with antiepileptic drug use)
Maternal PKU		mental retardation; microcephaly; congenital heart defects; spontaneous abortion
Oral anti-coagulant use		embryopathy (1st trimester); fetal CNS abnormalities or bleeding (2 nd or 3 rd)
Isotretinoin use		birth defects; microcephaly; mental retardation; death; spontaneous abortion

Johnson et al, 2010; Berghella et al, 2010; Kent et al, 2006; Yerby, 2000; VanTyle & LaPointe, 2010; Dunlop et al, 2008


Diabetes



- Stabilize blood glucose and achieve euglycemia months before conception
- Recommend folic acid supplementation
- Screening
- Counseling
 - Specific to nutrition and management of diabetes during pregnancy
 - Physical activity

Sources: VanTyle & LaPointe, 2010; Berghella et al, 2010; Kent et al, 2006


Hypothyroidism



- The American Association of Clinical Endocrinologists recommends routinely screening women for thyroid dysfunction by obtaining TSH measurements before pregnancy or during the first trimester
- Women with hypothyroidism should make their healthcare providers aware of their intention to conceive
 - In early pregnancy, dose of levothyroxine must generally be increased for proper fetal development
 - More frequent monitoring of serum TSH is warranted

Sources: Kent et al, 2006; AACE, 2006


Antiepileptic drug use



- Conception should be deferred until condition is well-controlled on minimum dose of medication
 - Patient education regarding contraceptive methods
 - Folic acid supplementation
- Monotherapy preferred
 - Best choice is drug that best controls condition
 - Known potential teratogens:
 - carbamazepine ■ phenytoin
 - primidone ■ valproic acid & derivatives: should be avoided
 - If possible, use an alternate therapy in preconception period

Sources: Johnson et al, 2010; Berghella et al, 2010; Kent et al, 2006


Maternal PKU



- Many women diagnosed with PKU have relaxed their dietary restrictions in adulthood and therefore have increased levels of phenylalanine.
- It is essential that women with PKU adhere to the dietary restrictions at least three months prior to conception and throughout pregnancy.
 - Goal: phenylalanine levels <6 mg/dL achieved at least 3 months before conception and levels of 2-6 mg/dL maintained during pregnancy

Sources: Dunlop et al, 2008; Berghella et al, 2010; Kent et al, 2006


Oral anticoagulant use



- Warfarin is a known teratogen
- CDC recommendation to avoid warfarin exposure in early pregnancy
 - Use of less teratogenic anticoagulant prior to conception whenever possible
 - Risk/benefit ratio for use of heparin in certain patients

Sources: Dunlop et al, 2008; Kent et al, 2006

Isotretinoin use



- Contraindicated during pregnancy
- Men and women receiving isotretinoin must register with a risk management program known as iPLEDGE
 - Women of childbearing age should ensure effective pregnancy prevention by utilizing two forms of contraception one month before, during, and for one month after isotretinoin therapy

Sources: Cragan et al, 2006; Kent et al, 2006

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Screening

- Human Immunodeficiency Virus (HIV)/ Acquired Immunodeficiency Syndrome (AIDS)
- Sexually Transmitted Infections (STI)

Sources: CDC, 2006; Kent et al, 2006

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Condition	Possible risks to mother	Possible risks to fetus
HIV/AIDS		perinatal HIV infection
STI	postpartum pelvic inflammatory disease; infertility; endometritis; endometriosis; ectopic pregnancy; chronic pelvic pain	congenital malformations; death; spontaneous abortion; preterm delivery; low birth weight; mental retardation; blindness; conjunctivitis; neonatal pneumonia

Sources: Lee & Thomason, 2010; Berghella et al, 2010; Kent et al, 2006

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Screening

- HIV/AIDS
 - Prior to conception, it is recommended that women be screened and treated for HIV/AIDS
 - US Public Health Service: 8-point preconception counseling for HIV-infected women
- STI
 - Prior to conception, women should be screened and treated for STI

Sources: Lampe 2006; Kent et al, 2006; Lee & Thomason, 2010

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Vaccinations

- Rubella
- Hepatitis B

Sources: CDC, 2006; Kent et al, 2006

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Condition	Possible risks to mother	Possible risks to fetus
Rubella		congenital rubella syndrome (birth defects of eye, ear, heart and/or CNS); spontaneous abortion; stillbirth
Hepatitis B		perinatal transmission to fetus; chronic infection; cirrhosis; hepatocellular carcinoma

Sources: Lee & Thomason, 2010; Berghella et al, 2010; Kent et al, 2006

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Vaccinations

- Rubella
 - Prior to conception, women who are seronegative to rubella should consider vaccination
 - Do not administer during pregnancy
 - Conception should be avoided for 28 days post-vaccination
- Hepatitis B
 - Prior to conception, women who are at risk for contracting hepatitis B should consider vaccination

Sources: Berghella et al, 2010; Kent et al, 2006

Counseling

- Folic acid
- Smoking
- Alcohol & other recreational drug misuse
- Obesity




Sources: CDC, 2006; Kent et al, 2006

Condition	Possible risks to mother	Possible risks to fetus
Folic acid deficiency		neural tube defects
Smoking	ectopic pregnancy; vaginal bleeding; placental abruption; placenta previa	death; preterm birth; low birth weight; serious birth defects (heart defects, limb defects, gastrointestinal disorders, facial disorders); SIDS
Alcohol use	reduction in fertility; placental abruption	spontaneous abortion; premature birth; fetal alcohol spectrum disorder (birth defects; learning, emotional, or behavioral problems; mental retardation)
Recreational drug use	reduction in fertility; serious pregnancy complications; placental abruption	death; preterm birth; intrauterine growth restriction; neonatal withdrawal; low birth weight
Obesity	infertility; labor and delivery complications; hypertension; gestational diabetes; venous thromboembolism	death; birth defects (particularly neural tube defects); macrosomia

Berghella et al, 2010; Kent et al, 2006; March of Dimes, 2011; Lee & Thomason, 2010; Siega-Riz & Loraia, 2006

Folic acid


- All women of childbearing age should consume 400 mcg of folic acid in the preconception period and during pregnancy
 - Supplementation is advised
- Higher risk of NTD-affected pregnancy warrants up to 4,000 mcg folic acid daily



Sources: Berghella et al, 2010; Kent et al, 2006

Smoking


- Prior to conception, encourage women to stop smoking
 - The highest cessation rates are seen in counseling with both behavioral and educational interventions
- “The 5 A’s”:
 - Ask
 - Advise
 - Assess
 - Assist
 - Arrange



Sources: Berghella et al, 2010; Kent et al, 2006; Rosenthal et al, 2006

Alcohol and other recreational drug misuse


- No recreational drugs should not be consumed at any time during the preconception period or pregnancy
- Women should be educated to not consume alcohol during the preconception period or pregnancy
 - Even light drinking may harm the fetus




Sources: Berghella et al, 2010; Kent et al, 2006; March of Dimes, 2011

Obesity

- Body mass index (BMI) should be calculated at least annually for women of childbearing age
- Obese women (BMI ≥ 30) should receive counseling on appropriate weight loss and nutritional intake
 - Calorie and portion control
 - Physical activity that can be safely continued in pregnancy
 - 30-60 minutes/day for 5 or more days per week
- Conception should be delayed until optimal weight is achieved




Sources: Berghella et al, 2010; Kent et al, 2006


Considerations for men 

- Know family history and genetic risks
- Avoid smoking around partner
- Mitigate occupational exposures
- Screen for STI

Source: CDC, 2006b




Opportunities for pharmacists

Recognizing gaps in preconception care 


- Current literature suggests that many patients are not routinely receiving necessary education or interventions
- Healthy People 2020 topic area “maternal, infant, and child health” includes many objectives related to
 - decreasing maternal and infant mortality and complications
 - increasing the proportion of women receiving preconception care services and practicing key recommended preconception health behaviors

Sources: CDC, 2006; U.S. Department of Health and Human Services, 2011




“Any effort to increase the use of preventive services and improve women’s health status must be interprofessional in nature and include pharmacy as one of the targeted health professions.”

~ U.S. Department of Health and Human Services (HHS), Health Resources and Services Administration (HRSA), Office of Women’s Health (OWH), American Association of Colleges of Pharmacy

Key roles for pharmacists 

- Work with patients to develop and implement a reproductive life plan
 - Identify contraceptive product or method most appropriate and educate on proper and consistent use
 - Proper (optimal) birth spacing - 18 to 59 months
 - Time elapsed between the woman’s last delivery and the conception of the next pregnancy
- Provide education and counseling for patients as appropriate on each of the 14 proven interventions
 - Facilitate follow-up as needed

Sources: Conde-Agudelo et al, 2006; Farris et al, 2010; DiPietro, 2008; Lee & Thomason, 2010

Key roles for pharmacists 

- Administer vaccinations as per state law
- Medication management and patient counseling
- Collaboration with other healthcare providers
- Interpret literature or provide information for patients and other healthcare professionals regarding drug toxicity during pregnancy or data on animal reproduction tests
- Raise awareness
- Advocacy

Sources: Briggs, 2002; DiPietro, 2008; Lee & Thomason, 2010

**Summary: Checklist for
pharmacists**



- Discuss reproductive life plan and family planning methods
 - Recommend daily folic acid intake
 - Discuss risks of smoking and alcohol/drug use
 - Assess patient's immunization status
 - Discuss medication use (prescription, OTC, & supplements)
 - If necessary, counsel on contraception to prevent teratogenic exposure
 - Review medical problems and triage as appropriate for management, screening, etc
-



Questions/Discussion

IMPROVING MATERNAL HEALTH IN DEVELOPING COUNTRIES

Rakhi Karwa, Pharm.D., BCPs
 Assistant Clinical Professor
 Purdue University College of Pharmacy
 Purdue Kenya Program
 Eldoret, Kenya

OBJECTIVES

- Discuss short and long term complications associated with poor maternal health in developing countries.
- Compare and contrast challenges facing the pharmacist involved in maternal healthcare in developing versus developed countries.
- Identify current and future strategies in clinical pharmacy aiming to improve maternal health outcomes in resource constrained settings.

Conflict of interest: The speaker of this program has nothing to declare

MATERNAL MORTALITY

- WHO Definition: *The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.*
- In 2008, 358,000 maternal deaths occurred worldwide

Each day 1000 women die from maternal-related complications

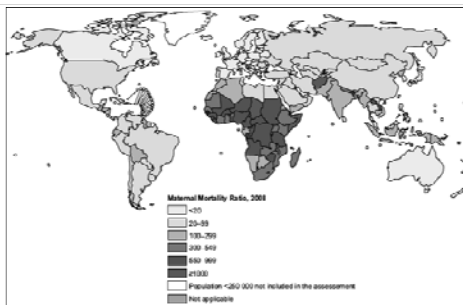
Trends in Maternal mortality: 1990 to 2008. Estimates developed by WHO, UNICEF, UNFPA and The World Bank. Geneva, World Health Organization, 2010

DEVELOPING VS. DEVELOPED REGIONS

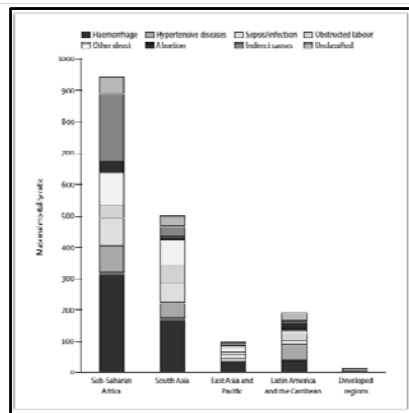
- 99% of deaths occur in developing countries
- 87% occur in Sub-Saharan Africa and South Asia
- Majority (65%) occurred in the following countries
 - Afghanistan
 - Bangladesh
 - The Democratic Republic of Congo
 - Ethiopia
 - India
 - Indonesia
 - Kenya
 - Nigeria
 - Pakistan
 - Sudan
 - Tanzania

Trends in Maternal mortality: 1990 to 2008. Estimates developed by WHO, UNICEF, UNFPA and The World Bank. Geneva, World Health Organization, 2010

DEVELOPING VS. DEVELOPED REGIONS



Trends in Maternal mortality: 1990 to 2008. Estimates developed by WHO, UNICEF, UNFPA and The World Bank. Geneva, World Health Organization, 2010



Lancet 2006; 368: 1189-200.

CAUSES OF MATERNAL MORTALITY

<p><u>Major contributors</u></p> <ul style="list-style-type: none"> ■ Post-partum hemorrhage (PPH) ■ Sepsis ■ Obstructed labor ■ Pre-eclampsia/eclampsia ■ Unsafe abortion 	<p><u>Long term Complications</u></p> <ul style="list-style-type: none"> ■ Spontaneous abortion ■ Intrauterine hypoxia ■ Intrauterine growth restriction ■ PPH ■ Infertility ■ Chronic pelvic inflammatory disease ■ Premature delivery ■ Ectopic pregnancy ■ Pelvic structure damage (eg. Fistula)
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Lancet 2006; 368: 1189–200
 World Health Organization. Managing post-partum hemorrhage. Midwifery education modules. Second edition. 2008
 World Health Organization. Managing incomplete abortion. Midwifery education modules. Second edition. 2008

HIV: INDIRECT CAUSE OF MORTALITY

- In 2008: Estimated 42,000 deaths were due to HIV/AIDS in pregnant women
- Two most important causes of death in women of reproductive age:
 - HIV
 - Maternal complications
- Maternal complications resulting in death in HIV patients:
 - Relative risk is 2x – 13x greater than women without HIV
 - Increased risk of: spontaneous abortion, stillbirth, intrauterine growth restriction, and preterm delivery
- Possible links between disease and pregnancy-related death:
 - Increased immune suppression
 - Poor access to care

Lancet 2010; 376: 1248 – 9
 Clin Obstet Gynecol 2009; 55(2): 270-6
 Trends in Maternal mortality: 1990 to 2008. Estimates developed by WHO, UNICEF, UNFPA and The World Bank. Geneva, World Health Organization, 2010

LONG TERM EFFECTS

- Psychosocial and Social
 - Depression
 - Dissolution of marriage
 - Isolation from home
- Economic:
 - Loss of compensation
 - Loss of productivity in economy
- Affects on the child:
 - Malawi (1996): 3.35x increased risk of death in children
 - Nepal (2003): maternal death associated with 6x – 52x increased relative risk in infant death from 0 to 24 weeks of age
 - Bangladesh (2010): cumulative probability of surviving at 10 years was 24% vs. 89% in children without maternal mortality

Lancet 2006; 368: 1535–41
 Bull World Health Organ 2008; 86(10): 717-25
 Lancet 2010; 375: 2024–31

MILLENNIUM DEVELOPMENT GOALS

- 8 Millennium Development Goals
- Date to achieve: 2015

1. Eradicate extreme poverty and hunger
2. Achieve universal primary education
3. Promote gender equality and empower women
4. Reduce child mortality
5. Improve maternal health
6. Combat HIV/AIDS, malaria and other diseases
7. Ensure environmental sustainability
8. Develop a global partnership for development

http://www.who.int/making_pregnancy_safer/events/2008/mdg5/mdg5_vs3.pdf accessed July 26 2011

IMPROVING MATERNAL HEALTH

<p>Target 1</p> <p>Decrease the maternal mortality ratio by ¾ (between the years 1990 and 2015)</p>	<p>Key Indicators</p> <ul style="list-style-type: none"> Maternal mortality ratio Births with skilled birth attendant
<p>Target 2</p> <p>Achieve universal access to reproductive health by 2015</p>	<ul style="list-style-type: none"> Contraceptive Prevalence Rate Adolescent birth rate Antenatal care coverage Family planning

http://www.who.int/making_pregnancy_safer/events/2008/mdg5/mdg5_vs3.pdf accessed July 26 2011

CHALLENGES

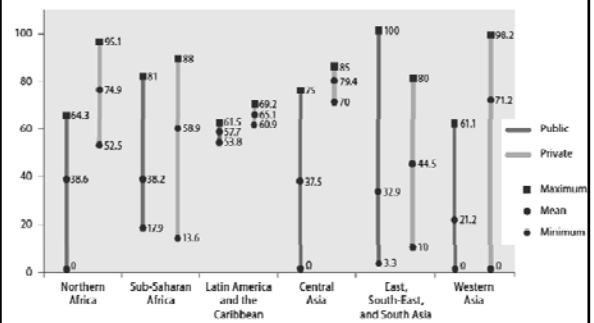
ACCESS TO MEDICINES

Essential medicines

- Goal: meet the most urgent needs of a particular population
- Current list has greater than 350 medicines
- List includes priority medicines for:
 - Post-partum hemorrhage, pre-eclampsia/eclampsia, maternal sepsis, STIs, preterm birth, and maternal HIV and malaria

<http://www.who.int/mediacentre/factsheets/fs325/en/index.html> accessed July 25th 2011. Priority medicines for mothers and children 2011. Geneva, World Health Organization 2011.

Availability of selected medicines in public and private health facilities between 2001 and 2007 (percentage)



<http://www.who.int/medicines/mdg/MDG08ChapterEMedsEn.pdf> accessed July 28th 2011

Margins between producer and consumer prices in the public and private sectors (percentage)

Country	Public sector markup	Private sector markup
China	24-35	11-33
El Salvador		165-6 894
Ethiopia	79-83	76-148
India		29-694
Malaysia	19-46	65-149
Mali	77-84	87-118
Mongolia	32	68-98
Morocco		53-93
Pakistan		28-35
Uganda	30-66	100-358
United Republic of Tanzania	17	56

<http://www.who.int/medicines/mdg/MDG08ChapterEMedsEn.pdf> accessed July 28th 2011

ACCESS TO MEDICINES

Counterfeit and substandard medications

- Approximately 1% – 50% global prevalence
- Most affected medications:
 - Developed countries: medications for chronic use
 - Developing countries: anti-bacterials/malarials
- Example case reports for acetaminophen contaminated with diethylene glycol
 - Haiti (1995): 109 (98% died) cases of acute renal failure in children
 - Nigeria (2008): 57 (95% died) cases of acute renal failure in children

Lancet Infect Dis 2006; 6: 602-13.
JAMA. 1998;279:1176-1180.
MMWR Morb Mortal Wkly Rep. 2009 Dec 11;58(48):1345-7.

LACK OF PHARMACY WORKFORCE

Geographical Representation of the Relative Share of Pharmacy Workforce



FIP Global Pharmacy Workforce Report – 2009

STRATEGIES

STRATEGIES AT AMPATH AND MOI TEACHING AND REFERRAL HOSPITAL

- Emergency kits
- Protocols
- Delivery kits
- Family Planning

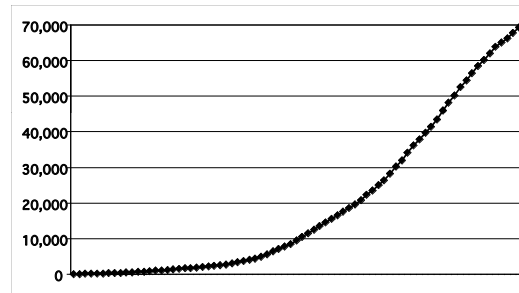


- Initiated in November 2001
- 55 care sites in western Kenya
- Catchment population ~ 2.5 million (HIV prevalence 2 - 30%)
- >120,000 patients enrolled; 75,000 active w/40,000 on cART

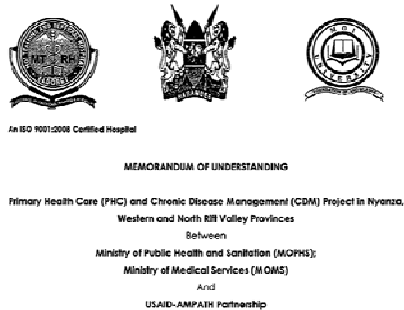
DEVELOPMENT OF THE PROGRAM



AMPATH



PARTNERSHIP WITH GOVERNMENT



MOI TEACHING AND REFERRAL HOSPITAL

- MTRH:
 - Second largest referral hospital in Kenya
 - Serves as referral center for Western Kenya
- Riley Mother and Baby Hospital:
 - Opened: July 2009
 - 17 bed labor ward
 - 50 bed NICU
 - Antenatal and postnatal wards
 - Approximately 8,000 deliveries per year



Photo courtesy of Sierra Washington

Inpatient Strategies

EMERGENCY KITS

- Purpose: Created to address the routine stock-outs of essential medicines and supplies
- Use: emergency obstetric complications
- Contents address the following:
 - Hemorrhage
 - Pre-eclampsia/eclampsia
 - Cardiopulmonary arrest
 - Gloves, syringes, needles, infusion sets, and foley catheters
- Procedure:
 - Kept in delivery rooms (nursing responsibility)
 - Returned to the pharmacy with record of drugs used

EMERGENCY KITS



EMERGENCY KITS

- Retrospective chart review
- Inclusion: all women admitted between October 2009 – 2010 who used an E-kit
- Data from first year of implementation (2009 – 2010):
 - 192 patients were treated using Obstetrical Emergency Medication Kits (2.3% of all deliveries)
 - Usage:
 - Post-partum hemorrhage: 73% (140)
 - Severe pre-eclampsia or eclampsia: 27% (52)
 - Cardio-pulmonary arrest: 0.52% (1)
 - No deaths observed in women utilizing E-kits

PROTOCOLS

- Strong acceptance by all disciplines of protocolized care
 - Total: 26 protocols
 - Created and/or reviewed by multiple disciplines
- Example topics:
 - Active management of third stage of labor
 - DVT in pregnancy
 - Management of pre-eclampsia/eclampsia
- New protocols:
 - Inpatient management of diabetes

AMPATH CLINICS

FAMILY PLANNING

- 1 in 4 women in sub-Saharan Africa have an unmet need for family planning
- Strategy at AMPATH clinics:
 - Opt out strategy: each woman who comes to the clinic regardless of reason is referred to the family planning clinic unless she opts out
 - Promotion of education
 - Desire is to utilize more long-term family planning methods

Repositioning Family Planning: Guidelines for advocacy action. Geneva, World Health Organization, 2008. http://www.who.int/gbo/maternal_health/reproductive_health/family_planning_text/en/ Accessed on July 27th 2011

FAMILY PLANNING

Current pharmacy involvement:

- Procurement of necessary medications from the government
- Anticoagulation clinic:
 - Ensures that all women on warfarin are using some form of contraception
 - Each woman is counseled on the importance of family planning when using warfarin therapy
 - Contraception utilized: progestin-only injectable
 - Patients are referred for BTL when desired

Future pharmacy involvement:

- Providing counseling to patients on inpatient ward services (esp. post-abortion)

DISPENSARY DELIVERY KITS



DISPENSARY DELIVERY KITS

- For use at the health centers
- Goal: increase patient confidence in the health center's ability to supply essential items for delivery
- In July 2011, 15 – 20 kits used per week
- Cost:
 - Fee is 150 ksh (approximately \$2)
 - Part of fee is used to support the supply of drugs for the Ekits
 - Medications and supplies are purchased through the Revolving Fund Pharmacy
- Challenges:
 - Recording use and inventory stock
 - Need to provide more training on the ekit medications and use
 - Security of items

DECREASING THE RISK OF PPH

- Benefits of using misoprostol vs. oxytocin for PPH: Ease of administration, **Heat-stable**, Low-cost

Prevention of PPH (Outcome: blood loss greater than 500 mL and 1000 mL)			
Author (Year)	Misoprostol (n/N)	Placebo (n/N)	RR (95% CI)
Hoj L (2005) (500 mL) (1000 mL)	150/330	170/331	0.89 (0.76 - 1.04)
	37/330	56/331	0.66 (0.45 - 0.98)
Walraven G (2005) 500 mL 1000 mL	69/629	(Ergometrine) 72/599	0.91 (0.67 - 1.24)
	2/629	4/599	0.48 (0.09 - 2.59)
Derman RJ (2006) 500 mL 1000mL	52/812	97/808	0.53 (0.39 - 0.74)
	2/812	10/808	0.2 (0.04 - 0.91)

BMJ. 2005;331:723.
Lancet. 2006;368:1248-1253.
BJOG 2006;112:1277-83.

ADDRESSING WORKFORCE ISSUES

- Creation of a first-ever clinical pharmacy residency program in Kenya
- Goal: to train clinical pharmacists who can develop and deliver sustainable health care regardless of the setting
- Core areas for development:
 - Clinical
 - Management
 - Research
 - Teaching
 - Didactic education focused public health and research



CONCLUSIONS

- **Status of the developing world:**
 - 99% of maternal deaths occur in the developing world and are easily preventable
 - Maternal death has a negative impact on children and society
- **Challenges:**
 - Most patients have relatively poor access to affordable essential medicines
 - Lack of trained pharmacy staff
 - Lack of published data on pharmacy practice in maternal health
- **Strategies for success:**
 - Simple solutions can have a large impact
 - Think sustainability
 - Invest in training