# Strategies for Achieving Reduction In Maternal Mortality (Clinical Interventions)

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# Maternal death

**Maternal death** is
Death of a woman
while pregnant or within 42 days of termination of pregnancy
irrespective of the duration and site of pregnancy
from any causes related to (Direct) or aggravated by the pregnancy or its management (Indirect)
but not from accidental or incidental causes.

***Great achievement for Maharashtra for consistent decline in MMR to current level 0f 38/100000 LBs***

# Classification of Cause of Death (ICD-10)

M01- Pregnancies with abortive outcome (Maternal death: Direct)

M02- Hypertensive disorders in pregnancy, childbirth and puerperium (Maternal death: Direct)

M03- Obstetric hemorrhage (Maternal death: Direct)

M04- Pregnancy related infections (Maternal death: Direct)

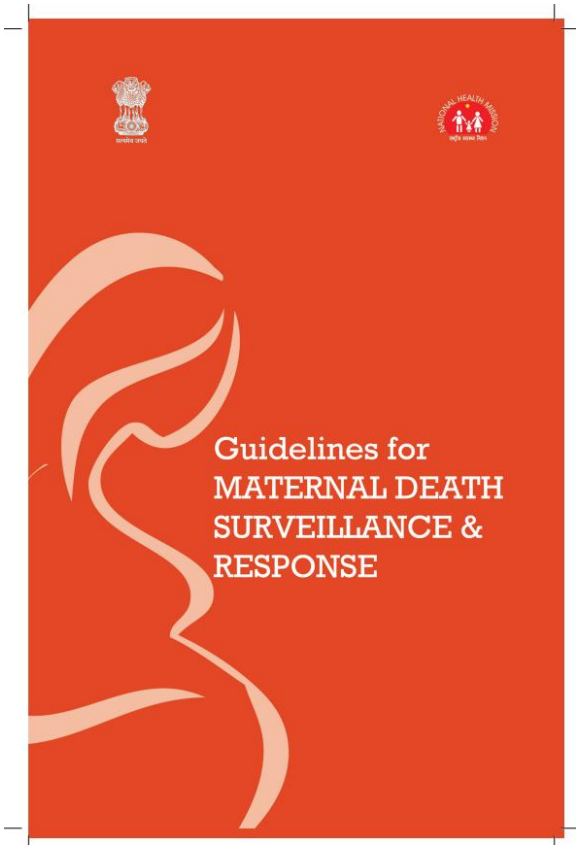
M05- Other obstetric complications (Maternal death: Direct)

M06- Unanticipated complications of Management (Maternal death: Direct)

M07 - Non obstetric complications (Maternal death: Indirect)

M08- Unknown/ undetermined (Maternal death: unspecified)

M09- Co-incidental causes (Death during pregnancy, child birth and puerperium)




M07 : Nonobstetric : Anaemia, Cardiac, Resp, Liver, Renal, Endocrine, Neurological disorders, Infections/infestations

# Subclassification

ANNEXURE II

## The Who Application of ICD-10 to Deaths During Pregnancy, Childbirth and the Puerperium: ICD-MM

For Filling in MDR Tool ICD-MM

**Groups of underlying causes of death during pregnancy, childbirth and the puerperium in mutually exclusive, totally inclusive groups.**

| | |
|---|---|
| **2. Hypertensive disorders in pregnancy, birth and puerperium** | 2.1 Hypertensive disorders of pregnancy induced hypertension,<br>2.2 Pre eclampsia,<br>2.3 Eclampsia,<br>2.4 HELLP Syndrome<br>2.5 Essential Hypertension |

| Type | Group name/number | From the comprehensive list of causes of deaths which can be put in the respective ICD-MM Category |
|---|---|---|
| **A. Maternal death – I. Direct causes** | **1. Pregnancies with abortive outcome** | **Abortions related-**<br>1.1 Abortion → Spontaneous / Induced Abortion (Safe/Unsafe)<br>1.2 Ectopic Pregnancy<br>1.3 Gestational Trophoblastic Disease |

| | |
|---|---|
| **3. Obstetric Haemmorhage (except haemorrage)** | Excluding abortive outcome 1.1 to 1.3<br>1.4 Antepartum hemorrhage<br>-Placenta previa<br>-Placental abruption<br>-Unclassified<br>1.5 Scar dehiscence<br>1.6 Rupture uterus after obstructed labour or otherwise<br>1.7 Surgical injury during labour, Caesarean Section/ Forceps or Vacuum delivery Cervical / Vaginal tears, others<br>1.8 Third Stage haemorrhage with/without Retained placenta, with/without Inversion of uterus.<br>1.9 Postpartum haemorrhage<br>- Atonic<br>- Traumatic<br>- Mixed<br>Labour and delivery complicated by intrapartum haemmorhage, not elsewhere classified |

| | |
|---|---|
| **4. Pregnancy related infection** | 3.1 Excluding abortive outcome<br>3.2 Chorioamnionitis without or with obstructed labour / prolonged labour<br>3.3 Puerperal sepsis<br>3.4 Post surgical procedures (E.g. evacuation, Cesarean section, laparotomy, manual removal of placenta , others)<br>Infections of genito urinary tract<br>Infection of obstetric surgical wound following delivery<br>Infections of breast associated with child birth<br>Pyrexia of unknown origin following delivery<br>3.5 Others like breast abscess<br>3.6 Unknown |

| | |
|---|---|
| **5. Other Obstetric complications** | 4.1 Amniotic Fluid Embolism<br>4.2 Uterine Inversion<br>4.3 Hepatorenal failure due to vomiting during pregnancy<br>4.4 Unexplained |
| **6. Unanticipated complications of management** | **Unanticipated complications of management** |

**30 % of Maternal Deaths during pregnancy**
**40 % Intrapartum & birth day**
**75% in1st week**

Increase in availing ANC including early registration
Increase in Institutional births

Proportionate decline in MMR is expected

***Quality of Care***
***ANC, Peripartum, Postpartum Care***

**Readiness to treat Complications at All the Time**
**Skills Enhancement**

# Quality Maternity Care : ANC

- Assessments: Blood pressure, Wt gain, Hb, Proteinuria…. Every visit(4) Validated equipments
- Compare observations with earlier visits (Hb, excessive/poor wt gain)
- Risk screening: Every visit (HRM), No. of RFs
- *1 complete check up by HWO/MO every PW. 8 checkups for high risk by HWO/MO*

*(300 ANCs in PHC jurisdiction at a given time point, about 100 could be high risk. At SC : About 50 PWs , 15 high risk)*

- Danger signs (Symptom screening)
- Early detection of complications: HDP, APH, PROM, PPH, Shock, Postpartum infection
- Recognition of need for referral
- Initial care, stabilization, Correct, Adequate treatment, Appropriate referral
- Education and Counseling

# Quality Maternity Care : LR

- Correct diagnosis of pain in abdomen ( Labour pains/other)
- Triaging on admission by MO
- Use of tools, protocols, check lists…..
- Preventing infection, birth injuries
- AMTSL
- Examination of placenta, cord
- Referrals, MgSO4, Antibiotics, partograph, treatment given
- *At discharge : Complete evaluation (Hb, Vitals, infection)* *Page 4 of SCC*

# Major Causes

## Direct (70%)

- HDP leading cause
- Hemorrhage (APH/PPH)
- Sepsis
- Obstructed labour/ Uterine rupture
- Abortion, Ruptured ectopic pregnancy

## Indirect (30%)

- Respiratory infections and conditions
- Severe anemia, sickle cell disease
- Hepatitis
- Heart disease

CHAPTER-4

Focusing on Response – Analysis and Action Planning

# MDSR

- Investigating a maternal death
- Assigning an appropriate cause of death
- Underlying causes

*Each MD has a story to tell*

*Focus on some errors/delays in diagnosis, treatment*

| Quantitative Indicators e.g. | | Qualitative Indicators e.g. |
|---|---|---|
| **Process Indicators** | **Programme Indicators** | |
| a) No. of maternal deaths reported vs apprehended deaths | a) Place of delivery | a) Identification of complications during ANC |
| b) No. of maternal deaths investigated in district | b) Place of death | b) Care provided in the referred facilities |
| | c) Out of pocket expenditure | c) Money spent in seeking care |
| c) No. of facilities conducting FBMDSR | d) Number of cases received three ANCs | d) Delay in identification of danger signs and decision making |
| d) % of maternal deaths reviewed by CMO committee | e) Number of cases received PNC | e) Delay in reaching at appropriate facility |
| e) % of maternal deaths reviewed by DC | f) Mode of transport used and time taken to reach the facility | f) Delay in initiating treatment at the health facility |

# HDP can progress rapidly: Case 1

- **Primi 33 years**. Mixed **ANC from 12 weeks**
- **BP 130/90** at 34 + 5 weeks
- At 36 weeks Private NH: wt 70 Kg ( 5Kg+), edema 7 days, BP 140/90, proteinuria? On Labetalol 1 BD
- 37 +1 weeks went private NH at 10 PM. BP 130/80 , USG done. discharged at request on next day. Plan for LSCS at 38 weeks
- Next day of discharge , at 3 am she had convulsions, loss of consciousness : **BP 160/120**
- Admitted, Inj MgSO4 given, Nifedipin 10 mg **.** LSCS for fetal tachycardia . Patient deteriorated and died
- **Rapidity of progression to severe hypertension, and fits 4 days**
- **Criteria of severity, Organ function impairment assessment, early delivery when indicated is highlighted**

# HDP : Appropriate level of care to prevent death

- Primary health care level
  - Detection of Ht, proteinuria :
  - ANM/NM : Correct BP recording, Proteinuria test, Wt monitoring, watch for pathological nondependent edema, symptom screening
  - MO : Manage each case of Hypertension, weekly check up, symptom screening, Start Immediate release oral nifedipine/oral Labetalol when BP 150/100 mm Hg, Lab tests if possible, Referral to gynecologist for PE, Give loading dose of MgSO4 if signs of severe PE,
- Secondary health care level
  - DH/WH/Other hospitals: Hospitalization for PE, Look for symptoms /lab evidence of organ dysfunction, Can use IV Labetalol, maternal & fetal health monitoring, Obst management
  - Referral of those with organ dysfunction to multidisciplinary care facility
- Tertiary care : Managing complicated cases of severe PE/eclampsia at HDU/ICU facility (HELLP, Pul edema, oliguria). Obst Management

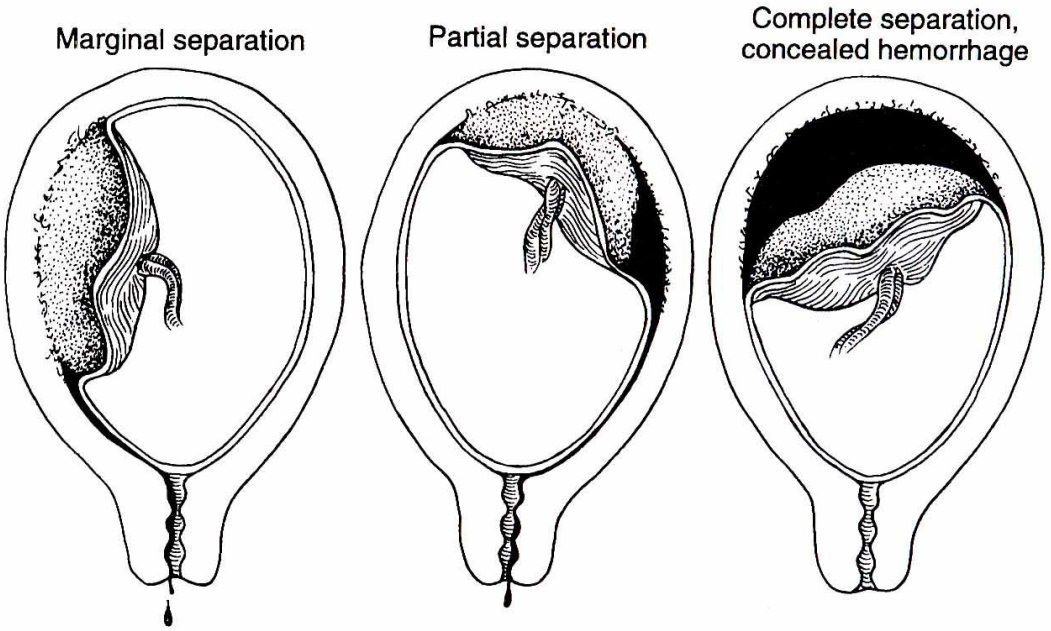
# Reducing HDP

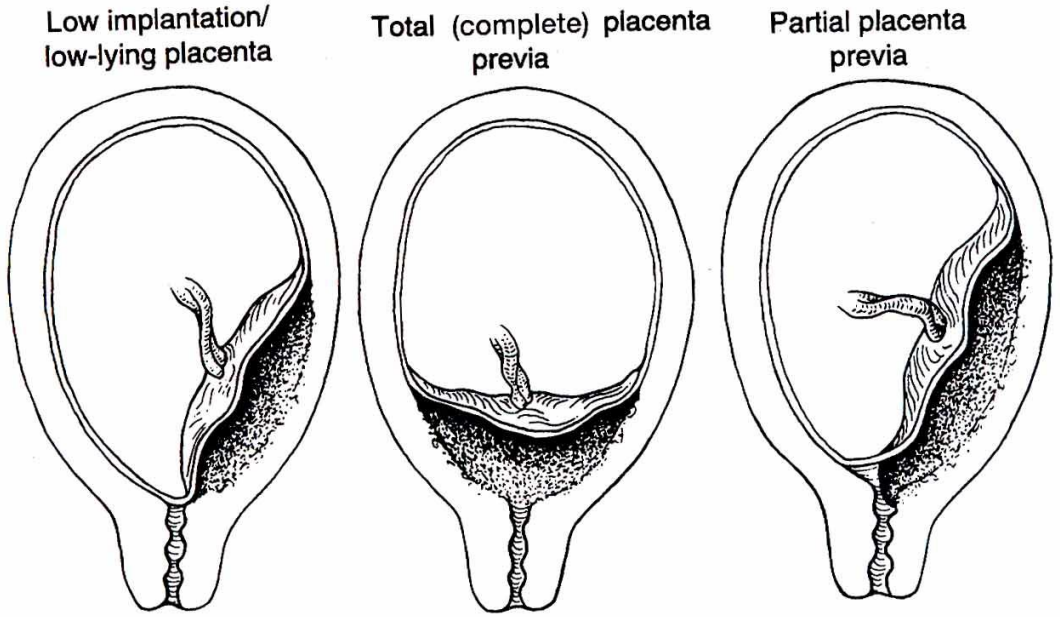
- Calcium supplementation in low calcium intake population
- Low dose aspirin for those at higher risk of PE. We need find the proportion of PWs exhibiting the high/moderate risk indicators.
- Early detection and appropriate care is the only practicable solution for substantial improvement

# Hemorrhage

- PPH, Atonic, traumatic, retained placenta/tissue, coagulation disorder
- APH : Placenta previa, Abruptio placenta
- Uterine rupture
- Abortion, ectopic pregnancy

- Early, Correct diagnosis : Internal /External bleeding
- Accurate assessment of blood volume lost
- Conceled *abruption: Pallor* tachycardia, FHR inaudible ( Fetal death > 2 liters, PPH, DIC)
- Adequate volume replacement (before delivery/LSCS)
- Blood transfusion: Timely, as per volume lost
- Time interval between bleeding, and resuscitation is critical
- Preventive interventions (AMTSL)
- Timely referral


Marginal separation
Partial separation
Complete separation, concealed hemorrhage


Low implantation/ low-lying placenta
Total (complete) placenta previa
Partial placenta previa

# Case 2

- Pregnant woman 33 weeks presented with pain in abdomen, anaemic
- Diagnosed and treated as a case of preterm labour with anaemia (Tocolytic medicine)
- Duty doctor saw 2-3 times : GC poor, inability to hear FHS. Continued treatment
- At night gynecologist saw her and performed C. section. Pt had heavy bleeding during surgery, died post operatively

***Missing the conceled abruption with fetal death as anaemia-preterm***

***Not transfused, not induced, given expectant management , landed in DIC , desperately operated***

***Incorrect diagnosis, wrong treatment***

| | प्लॅसेन्टा प्रिव्हीया | ॲक्सिडेन्टल हीमोरेज (Placental abruption) |
|---|---|---|
| **वेदना** | रक्तस्त्राव वेदनारहित असतो. कोणत्याही कारणाशिवाय सुरु होतो. वरचेवर होऊ शकतो | वेदनापूर्ण रक्तस्त्राव – मार लागला असण्याची किंवा रक्तदाब वाढलेला असण्याची शक्यता असते. |
| **स्त्रीची सर्वसाधारण आरोग्य स्थिती** | पांढुरकेपणा, नाडीच्या ठोक्यांचा दर अस्वस्थपणा ही लक्षणे दृश्य रक्तस्त्रावाच्या प्रमाणाशी मिळती जुळती असतात | पांढुरकेपणा, नाडीचा वेग, अस्वस्थपणा दृश्य रक्तस्त्रावाच्या प्रमाणापेक्षा खूपच जास्त असू शकतात. |
| **गर्भाशय** | मऊ असते. बाळाचे अवयव तपासताना व्यवस्थित लागतात. बाळाची स्थिती अनैसर्गिक असू शकते | गर्भाशय कडक, दुखरे, सतत आकुंचित अवस्थेत असलेले बाळाचे अवयव नीट कळत नाहीत बाळाची पोझिशन नीट कळत नाही |
| **बाळाची अवस्था** | माता शॉकमध्ये नसेल तर बाळाची स्थिती, हृदयस्पंदने नॉर्मल असतात | बाळ गुदमरल्याची लक्षणे किंवा मृत असण्याची लक्षणे आढळतात. |
| **धोके** | अतिरक्तस्त्रावामुळे माता शॉकमध्ये जाण्याची शक्यता, पीपीएच होण्याची शक्यता | अतिरक्तस्त्रावामुळे माता शॉकमध्ये जाण्याची शक्यता. मूत्रपिंड अकार्यक्षम होऊन किंवा रक्त गोठण्याच्या क्रियेत अडथळा येऊन मृत्यूची शक्यता. |

# Case 3

- 18 yr old primi , FT, admitted with Severe preeclampsia, Hb 9.5 g/dl, wt 37 Kg, wt gain 4 Kg
- Delivered , Baby 1.8 Kg
- Went in shock after delivery, Died

Preventive intervention of AMTSL not done Excessive blood loss undiagnosed, and inadequately treated

*Alert signals ignored: Wt 37 Kg, poor wt gain, teenage, moderate anaemia*

Severe preeclampsia: Intravascular contraction, hemoconcentration, prone to go in shock with moderate amount of blood loss

# Case 4: Acute Abdomen

- A young woman presenting with significant pain in abdomen. Admitted in medical wards at night
- USG : Ascites ++, Liver unremarkable. For seniors opinion next morning
- USG repeated. Referred to gynecologist next day. Patient in shock , Severe pallor
- Operated, ruptured ectopic. BT given
- Could not be saved

***Any young woman presenting with acute abdomen : Suspect ectopic even if she does not give H/O missing period. Gynec opinion***

# Maternal Deaths during Early Pregnancy: Avoidable?

## Ectopic Pregnancy

Severe pelvic/Abd pain
Slight vaginal bleeding
severe pallor
Tachycardia, hypotension, abdomen tender, distended
Cervical manipulation extremely tender
Uterine size smaller than POA

USG : Empty uterus, free fluid, pelvic mass

Managing shock
Urgent referral
Laparotomy or laparoscopy
Blood transfusion

## Incomplete Abortion

- Pelvic pains, profuse bleeding, passage of products of conception
- Cervix dilated, products felt
- Uterine size smaller

- MVA
- Antibiotics

## Septic Abortion ( Unsafe Abortion)

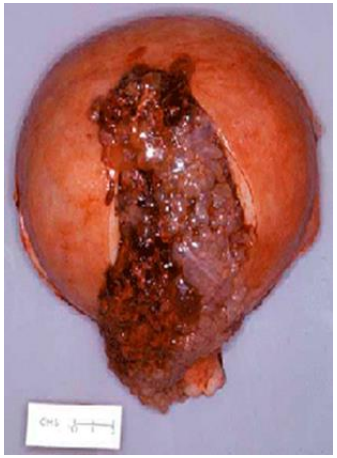
## MTP complications

UPT for all reproductive age group women with missed period and early pregnancy symptoms
Severe Pelvic pain and delayed period: Referral for USG feasible?

# Uterine Rupture

Previous caesarean section (Scar dehiscence/rupture)

Scar tenderness, tachycardia, vaginal bleeding, fetal distress/death, Hypotension



- Prolonged obstructed labour
- Inappropriate use of Uterotonic drugs
- IOL/MTP second trimester?
- Misoprostol use with care
- Uterine ruptures with an intact uterus
- Scarred uterus rupture in MTP cases also

# Volume Status Assessment and Management

- Volume status management depending upon blood loss during/following delivery/surgery
- Severe preeclampsia/eclampsia, severe anemia Women with low BMI need special attention
- Improper fluid management leads to pulmonary edema or renal shut down
- HDP with oliguria needs multidisciplinary care

# Sepsis

- Preventable
- Factors associated: correct anemia, follow cleans, infection control practices
- Indications for antibiotics ,
- Early recognition of signs of infection, treatment by MO. Referral for very sick mothers
- Prolonged leaking (PROM)

# Case 6: Beware of Vaginal discharge//Frequent Urination

- Primi with full term pregnancy admitted with vaginal discharge for 4 days, fever since few hours
- Doctor prescribed her Tab paracetamol and Clotrimazole vaginal pessaries
- Next morning senior saw the patient: Fetal tachycrdia, maternal tachycardia, fever. Noted the history and diagnosed her as Chorioamnionitis
- LSCS done, fowl smelling AF,
- Mother went in septicemia, required ICU care. Baby succumbed to sepsis

# USG diagnosed Oligohydramnios: Case 7

- Referred for genetic clinic ( Had H/O previous late miscarriage)
- Patient was referred from outstation, however she visited the senior gynecologist and opted for termination
- She was leaking for 6 days and that there is no AF left
- Examination confirmed PROM, she was induced, given antibiotics and discharged in well condition

# Prolonged leaking
## Premature Rupture of Membranes (PROM)

- ROM before onset of labor pains
- Term PROM Preterm (<37 wks ).PROM
- Fetal distress, chorioamnionitis ( Foul smelling AF, Maternal/fetal tachycardia, tender uterus), Neonatal sepsis → MD/NND
- Often misdiagnosed as vaginal discharge, frequent urination, oligohydramnios losing vital time for correct management

Urgent referral to gynecologist. Chorioamnionitis requires urgent delivery, higher antibiotics

Time of ROM to delivery and number of vaginal examinations are important factors

- स्त्रीला निर्जंतुक पॅड देऊन काही वेळाने ते पॅड भिजले आहे का ते पहावे.
- स्पेक्युलमने तपासणी करुन हा स्त्राव गर्भाशय मुखातून येत असल्याचे समजते.

USG

# Pain in Abdomen Often Misdiagnosed!

- Normal labour/ Preterm labor
- Concealed placental abruption
- Severe Preeclampsia
- Chorioamnionitis
- Uterine rupture
- Ruptured ectopic pregnancy

*Careful evaluation necessary*

# गर्भवतीस पोटात दुखु लागण्याची कारणे व कृती योजना

| कारण | प्रसूती वेदना | मुदतपूर्वी प्रसूती | ऑक्सिडेन्टल हिमोरेज | सिव्हीयर प्रिएक्लाम्पशिया | गर्भाशय फूटणे |
|---|---|---|---|---|---|
| गर्भधारणेचा काळ | > ३७ आठवडे | < ३७ आठवडे | २० आठवडयानंतर कधीही | २० आठवडयानंतर | प्रसूतीमध्ये किंवा दिवस भरत आले असताना. |
| वेदनेचे स्वरुप | खऱ्या कळा | खऱ्या कळा | तीव्र वेदना सतत | वरच्या पोटात उजव्या बाजूस | तीव्र वेदना एक सारख्या सर्व पोट दुखरे |
| गर्भाशय | थांबून थांबून आंकुचन पावते आणि मऊ होते. | | कडक<br>दुखरे<br>मऊ होत नाही | | पोटावरुन बाळाचे अवयव सहजी लागतात. मृत गर्भ |
| मातेची आरोग्य स्थिती | चांगली | चांगली | पांढरेपणा, नाडी जलद | उच्च रकतदाब<br>प्रोटीन्युरिया | पांढरेपणा जलद नाडी, रक्तदाब कमी |
| कृती | प्रसूतीसेवा | गर्भधारणा <34 wks इन्जे डेक्सा मिथेझोन सुरु करा संदर्भ सेवा. | रिंगर लॅक्टेट शीरेतून जिल्हा रुग्णालयास संदर्भसेवा द्या | इन्जेक्शन MgSO4<br>निफेडिपीन गोळी<br>संदर्भसेवा | रिंगर लॅक्टेट IV शॉकचे व्यवस्थापन जिल्हा रुग्णालयात संदर्भसेवा. |

# Caesarean Section Rates

Rising caesarean section rates is a concern

MMR following Caesarean delivery 4 times high than Vaginal delivery

13.3/100000 LBs Vs 3.6/100000 LBs

Long term risks: Scar dehiscence, Repeat C section, adherent placenta

*Reducing CSR is a challenge*

Increase in percentage of cesarean births in both private hospital births (33 → 39%) and in public facilities (13 → 18%)

*Overall CS%: Highest in Kolhapur (38.1). Lowest Nandurbar(7.9)*

*Public facilities: Highest in Bhandara (30%), Lowest in Nandurbar (5.6%)*

*Private facilities: > 50% Kolhapur, Palghar, Satara*

**Of delivered women** Deaths following caesarean section rising. Indications vary Case records incomplete, Orders regarding fluid therapy not specific

# NFHS – 5 : Future Directions

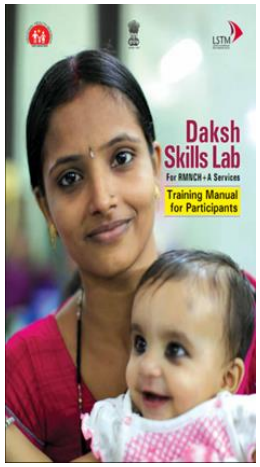
- Pregnant women consuming 100 tab of IFA is still 48%,
- 180 tablets 31%
- Anemia during pregnancy 45.7%
- Pregnant women having 4 ANC visits  70 %
- Adolescent pregnancies 7.6%
- Anemia in Nonpregnant reproductive age women 54.2% (Rise by 6.2% since last survey)
- Anemia in adolescent girls (15-19)  57.2%  (Increased by 7.5% since last survey)

Is further reduction in MMR Possible?

# Referral Audit

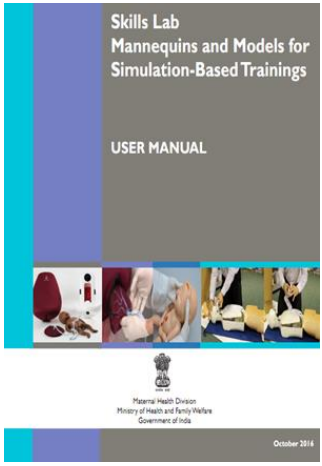
- Timely ( Necessary, not delayed)
- Appropriate: well equipped referral center. Avoiding Multiple referrals resulting in delay
- Initial care, stabilization of condition (Protocol for shock, infection, HDP)
- Accompanied by HCW during referral
- Inform the referral center about the patient
- In house referrals. Immediate attention and action at referral center. Specialist review, necessary investigations, Readiness to deal with complications,
- Periodic review of referrals by team

# Skills Lab : CBT




- Nearly 1300 maternal deaths annually in the state
- Reduction is achievable….
- Commitment to save every mother by every one concerned
- Updating knowledge & Skills to save mothers

Newborn resuscitation using bag and mask



# Maternal Near Miss.

- Investigating cases of life threatening obstetric morbidity
- Near miss are more common than MDs
- Review is likely to yield useful information
- Investigating may be less threatening to providers because the woman survived
- One can learn from the women themselves since they can be interviewed about the care they received.
- Free lessons and opportunities to improve the quality of service
- For everyMD, many more will survive but often suffer from life long disabilities.

# Obstetric Transition

- Change in causes of maternal deaths as countries shift from high MMR to low MMR
- Transition from predominance of direct obstetric causes of MDs to increasing proportion of Indirect causes, noncommunicable causes
- India Stage III. Maharashtra, keral stage IV

  - Stage I (MMR >1000 maternal deaths per 100 000 live births)
  - Stage II (MMR 999–300 maternal deaths per 100 000 live births)
  - Stage III (MMR299–50 maternal deaths per 100 000 live births)
  - Stage IV (MMR <50 maternal deaths per 100 000 live births)
  - Stage V (MMR lower than five maternal deaths per 100 000 live births)

# Non-Obstetric Complications

- Group  M 07
- Deaths often before delivery or beyond 2 weeks after childbirth
- Respiratory: Pneumonias, ARDS, TB
- Hepatitis, Heart disease
- Malaria, Dengue, Leptospirosis, Scrub typhus…….
- Preventive interventions, treatment protocols
- Safe drinking water, Respiratory/personal/food hygiene, preventing mosquito  bites, occupational protective measures should be a component of education of PWs

# Challenges Ahead

- Similar case histories reported from all Hospitals
- Protocols of treatment prepared and circulated repeatedly which are not followed
- Deaths continue to take place
- Quality of EmOC: – CFR for Different Obstetric Complications
- Goal – Not More Than 1% of Women Reaching the Facility Die

# Can Save Lives..

- *Reaching out to every pregnant woman & delivering essential obstetric care*
- *Improving QOC*
- Obst Complications unpredictable, often not preventable but are treatable (Readiness is the key)
- *Updating knowledge & skills of HCWs in Recognition and managing complications*
- *Developing sensitivity & accountability ( Loss to a woman and her children is 100%)*
- *Quality review, Action plan and follow up for implementation*


Thank You ....

# WHY DID MRS. X DIE

- Attending Physician Certified That the Death Was Due to – Haemorrhage due to Placenta Previa
- Consulting Obstetrician Opined
  - Haemorrhage Fatal Because of Anemia, Worms, Malnutrition
  - She Received Only 500 ml of Blood
  - Died on O.T.
  - CS Being Performed by a Physician Undergoing Specialist Training

# WHY DID MRS. X DIE

- Hospital Administrator Noted
  - Patient Arrived 4 Hours After Onset of Severe Bleeding
  - She Also Had Several Episodes of Bleeding During Last Month - No Medical Attention Sought
- Sociologist Observed
  - Age 39 Years
  - Para 7
  - Never Used Contraception
  - This Pregnancy Unwanted
  - Poor, Illiterate, Living in Rural Area