

Clinical Decision Support (CDS) Content and Health Level 7 (HL7)- Compliant Knowledge Artifacts (KNARTs)

Women's Health: Reproductive Health Clinical Content White Paper

Department of Veterans Affairs (VA)



**Knowledge Based Systems (KBS)
Office of Informatics and Information Governance (OIIG)
Clinical Decision Support (CDS)**

Clinical Decision Support (CDS) Content and Health Level 7 (HL7)-Compliant Knowledge Artifacts (KNARTs): Women's Health: Reproductive Health Clinical Content White Paper

by Department of Veterans Affairs (VA)

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Table 1. Relevant KNART Information: Women's Health: Reproductive Health

Women's Health KNART	Associated CLIN
Reproductive Health - Event Condition Action (ECA) Rule	CLIN0007CA
Reproductive Health - Order Set	CLIN0008BA
Reproductive Health - Documentation Template	CLIN0005AC

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Introduction

The VA is committed to improving the ability of clinicians to provide care for patients while increasing quality, safety, and efficiency. Recognizing the importance of standardizing clinical knowledge in support of this goal, VA is implementing the HL7 Knowledge Artifact Specification for a wide range of VA clinical use cases. Knowledge Artifacts, referred to as *KNARTs*, enable the structuring and encoding of clinical knowledge so the knowledge can be integrated with electronic health records to enable clinical decision support.

The purpose of this Clinical Content White Paper (*CCWP*) is to capture the clinical context and intent of *KNART* use cases in sufficient detail to provide the *KNART* authoring team with the clinical source material to construct the corresponding knowledge artifacts using the HL7 Knowledge Artifact Specification. This paper has been developed using material from a variety of sources: VA artifacts, clinical practice guidelines, evidence in the body of medical literature, and clinical expertise. After reviewing these sources, the material has been synthesized and harmonized under the guidance of VA subject matter experts to reflect clinical intent for this use case.

Unless otherwise noted, items within this white paper (e.g., documentation template fields, orderable items, etc.) are chosen to reflect the clinical intent at the time of creation. To provide an exhaustive list of all possible items and their variations is beyond the scope of this work.

Conventions Used

Conventions used within the knowledge artifact descriptions include:

<obtain>: Indicates a prompt to obtain the information listed

- If possible, the requested information should be obtained from the underlying system(s). Otherwise, prompting the user for information may be required
- Default Values: Unless otherwise noted, <obtain> indicates to obtain the most recent observation. It is recognized that this default time-frame value may be altered by future implementations

[...]: Square brackets enclose explanatory text that indicates some action on the part of the clinical user, or general guidance to the clinical or technical teams. Examples include, but are not limited to:

[Begin ...], [End ...]: Indicates the start and end of specific areas to clearly delineate them for technical purposes.

[Activate ...]: Initiates another knowledge artifact or knowledge artifact section.

[Section Prompt: ...]: If this section is applicable, then the following prompt should be displayed to the user.

[Section Behavior: ...]: Indicates technical constraints or considerations for the selection of items outlined in the section prompt.

[Attach: ...]: Indicates that the specified item (e.g. procedure or result interpretation) should be attached to the documentation template if available.

[Link: ...]: Indicates that rather than attaching an item (e.g. image), a link should be included in the documentation template.

[Clinical Comment: ...]: Indicates technical considerations or notes to be utilized for KNART authoring and at time of implementation planning.

[Technical Note: ...]: Indicates technical considerations or notes to be utilized for KNART authoring and at time of implementation planning.

[If ...]: Indicates the beginning of a conditional section.

[Else, ...]: Indicates the beginning of the alternative branch of a conditional section.

[End if ...]: Indicates the end of a conditional section.

☐ [Check box]: Indicates items that should be selected based upon the section selection behavior.

Chapter 1. Women's Health: Reproductive Health

[Begin Women's Health: Reproductive Health]

1.1. Clinical Context

[Begin Clinical Context.]

Reproductive health is an important concern for most women. Many factors (e.g., emotional, cultural, and gender identity) can have a bearing upon the reproductive health encounter. Often the focus of the reproductive health visit is to determine the most appropriate method of delaying or preventing pregnancy. Each woman has priorities that impact her contraceptive choices. Some women prefer long-acting reversible contraceptives such as intrauterine devices or contraceptive implants. Although these methods are highly effective, some women prefer shorter-acting, yet still highly effective hormonal contraceptives such as the depot medroxyprogesterone acetate birth control shot, combined oral contraceptive pills, the combined contraceptive vaginal ring, or the progestin-only contraceptive pill. Still other women prefer nonhormonal barrier methods such as condoms, the diaphragm, the cervical cap, spermicides, or the sponge. Although barrier methods are less effective than other birth control methods, they are immediately reversible and, especially in the case of condoms, offer protection against sexually transmitted infections. Other methods of birth control, such as periodic abstinence and the lactational amenorrhea method, may be appropriate for some women. Dual method, consisting of condoms plus a more effective birth control method, is recommended for women who wish to have the combined benefit of sexually transmitted infection protection plus effective contraception. Authoritative guidance from clinicians can assist patients in achieving their goals for reproductive health (ACOG Committee Opinion 699 2017).

- The target users are primary care providers (PCPs), including designated women's health providers and gynecologists. The patient cohort is women the system has classified as medically able to conceive and being seen as outpatients.
- Women who are medically able to conceive:
 - Are under the age of 52.
 - Do not have International Classification of Diseases (ICD), Systematized Nomenclature of Medicine (SNOMED), or Current Procedural Terminology (CPT) codes consistent with hysterectomy, bilateral oophorectomy, tubal ligation, or menopause.
 - Have not been previously designated as medically unable to conceive by their provider.

Table 1.1. Clinical Context Domains

Target User	Provider to include Primary Care, designated women's health providers, and gynecologists
Patient	Females of reproductive potential
Priority	Routine
Specialty	Primary Care, Women's Health Providers, Gynecology
Location	Outpatient

[End Clinical Context.]

1.2. Knowledge Artifacts

[Begin Knowledge Artifacts.]

The CDS knowledge artifacts that define this clinical use case are described in detail in the following sections. They are:

- An Event Condition Action (ECA) Rule: Reproductive Health KNART
 - Prompt providers to have conversations with women of reproductive age to assess their:
 - Pregnancy and lactation status.
 - Ability to conceive.
 - Desire to be pregnant now and in the future.
 - Method of pregnancy avoidance when pregnancy is not desired.
 - Rule logic for activating documentation templates or order sets
 - Actions may include activating documentation templates or order sets
- A Documentation Template: Reproductive Health KNART
 - Documents the reproductive health focused clinical encounter.
 - Includes logic for appropriate display of documentation sections.
- An Order Set: Reproductive Health KNART
 - Provides the ordering clinician with a reproductive health focused order set.
 - Includes logic for appropriate display of the order set to manage specific patients in accordance with their desires.

[End Knowledge Artifacts.]

[End Women's Health: Reproductive Health.]

Chapter 2. Event Condition Action (ECA) Rule

2.1. Knowledge Narrative

[Begin Knowledge Narrative.]

[See Clinical Context in Chapter 1.]

[End Knowledge Narrative.]

2.2. ECA Rule: Reproductive Health

[Begin ECA Rule.]

2.2.1. Event

[Begin Event.]

Access of patient record at time of female visit to primary care clinic or an Obstetrician/Gynecologist (OB/GYN) or women's health outpatient visit.

[End Event.]

2.2.2. Conditions

[Begin Conditions.]

- Patient is at least 13 years of age but less than 52 years of age; and
- Patient is not postmenopausal; and
- Patient has not been diagnosed as unable to conceive, and
- Patient has not had any of the following:
 - Hysterectomy; or
 - Bilateral oophorectomy; or
 - Tubal ligation.

[End Conditions.]

2.2.3. Actions

[Begin Actions.]

- Notify the provider the patient is a candidate for a discussion regarding reproductive health; and
- Activate the Reproductive Health KNART Documentation Template; and
- Activate the Reproductive Health KNART Order Set.

[End Actions.]

[End ECA Rule.]

Chapter 3. Documentation Template

[Begin Documentation Template.]

3.1. Knowledge Narrative

[Begin Knowledge Narrative.]

[See Clinical Context in Chapter 1.]

[Section Prompt: Reason for visit?]

<obtain> Details

<obtain> Patient age

[End Knowledge Narrative.]

3.2. Menstrual History

[Begin Menstrual History.]

[Section Prompt: Menstrual History.]

- [Section Prompt: Age of Menarche?]

- <obtain> Age

[Section Prompt: Date of Last Menstrual Period (LMP)?]

- <obtain> Date

[Section Prompt: Menstrual Cycle Pattern?]

- ☐ Regular

<obtain> Cycle duration (days)

<obtain> Flow duration (days)

- ☐ Irregular

<obtain> Details

[Section Prompt: Menstrual Symptoms.]

- [Section Selection Behavior: Select one. Optional.]

- ☐ Yes

<obtain> Details

- ☐ No

- [Additional Menstrual History.]

<obtain> Details

[End Menstrual History.]

3.3. Medical Ability to Conceive

[Begin Medical Ability to Conceive.]

[Section Prompt: Does this patient have a medical reason that makes her permanently unable to conceive?]

[Section Selection Behavior: Select yes or no. If yes is selected, a reason must also be selected.]

- ☐ Yes
 - ☐ Hysterectomy
 - ☐ Menopause
 - ☐ Bilateral Oophorectomy
 - ☐ Tubal Ligation
 - ☐ Other

<obtain> Reason

- ☐ No

[Technical Note: If yes is selected, then documentation template is complete.]

[End Medical Ability to Conceive.]

3.4. Reproductive History

[Begin Reproductive History.]

[Section Prompt: Prior pregnancies?]

[Section Selection Behavior: Select one. Required.]

- ☐ Yes

<obtain> Total number

- ☐ No

[Technical Note: For “Yes” responses, create one instance of the Pregnancy History: Pregnancy # subsection for each prior pregnancy, based on the answer to “Total number” under the “Yes” answer choice above. Replace the character “#” with the numeral representation of the pregnancy number to be recorded in the created subsection (“Pregnancy 1,” “Pregnancy 2,” etc.). These Pregnancy History: Pregnancy # subsections should be autopopulated and updated with any new pregnancies.]

[Section Prompt: Pregnancy Outcome.]

[Section Selection Behavior: Select any. Optional.]

- ☐ Vaginal delivery
 - ☐ Cesarean section
 - ☐ Stillbirth
 - ☐ Spontaneous abortion
 - ☐ Elective abortion

☐ Ectopic pregnancy

- <obtain> Medical treatment

<obtain> Surgical treatment

[Section Prompt: Other pregnancy outcome details?]

- <obtain> Other details

[Section Prompt: Currently breastfeeding?]

- ☐ Yes

☐ No

[Section Prompt: Prior contraceptive use?]

[Section Selection Behavior: Select all that apply. Optional.]

- ☐ Intrauterine device

☐ Contraceptive implant

☐ Contraceptive shot

☐ Contraceptive ring, pill, or patch

☐ Male condom

☐ Female condom

☐ Diaphragm

☐ Cervical cap

☐ Contraceptive sponge

☐ Spermicide

☐ Natural family planning (e.g., lactational amenorrhea, rhythm, calendar, or cervical mucus methods)

☐ Nothing

[Section Prompt: Current contraceptive use?]

[Section Selection Behavior: Select all that apply. Optional.]

- ☐ Intrauterine device

☐ Contraceptive implant

☐ Contraceptive shot

☐ Contraceptive ring, pill, or patch

☐ Male condom

☐ Female condom

☐ Diaphragm

☐ Cervical cap

- ☐ Contraceptive sponge
- ☐ Spermicide
- ☐ Natural family planning (e.g., lactational amenorrhea, rhythm, calendar, or cervical mucus methods)
- ☐ Nothing

[Section Prompt: Prior emergency contraception use?]

[Section Selection Behavior: Select only one. Optional.]

- ☐ Yes
 - <obtain> Details
- ☐ No

[End Reproductive History.]

3.5. Sexual History

[Begin Sexual History.]

[Section Prompt: Sexual History.]

- [Section Prompt: Sexually Active?]

<obtain> Sexually Active

[Section Selection Behavior: Select One. Required.]

- ☐ Yes
- ☐ No

[Section Selection Behavior: If yes to "Sexually Active" then display questions below.]

<obtain> Gender Identity

<obtain> Sexual Orientation

- [Section Selection Behavior: If no to "Sexually Active," then skip questions below.]

[Section Prompt: Sexual practices?]

- [Section Selection Behavior: Select any. Optional.]

- ☐ Vaginal sex
- ☐ Anal sex
- ☐ Oral sex
- ☐ Other

- [Section Prompt: Types of Sexual Partner(s)?]

- [Section Selection Behavior: Select any. Optional.]

- ☐ Men
- ☐ Women

☐ Both

☐ None

<obtain> Number of Sexual Partners

- [Section Prompt: Prior sexually transmitted infections?]

[Section Selection Behavior: Select one. Required.]

- ☐ Yes

- <obtain> Details

☐ No

- <obtain> Types of Contraceptives/Sexually Transmitted Infection Prevention Used

- [Section Prompt: High-risk sexual behaviors?]

- [Clinical Comment: High-risk sexual behaviors are defined as having multiple or casual sex partners without the use of protective behaviors (e.g., condom use) as well as sex in exchange for money or drugs.]

[Section Selection Behavior: Select one. Optional.]

- ☐ Yes

- <obtain> Details

☐ No

[End Sexual History.]

3.6. Medical/Surgical History

[Begin Medical/Surgical History.]

[Section Prompt: Current or prior medical problems?]

[Section Selection Behavior: Select only one. Optional.]

- ☐ Yes

- <obtain> Description

☐ No

[Section Prompt: Mental Health History?]

[Section Selection Behavior: Select any. Optional.]

- ☐ Anxiety

☐ Depression

☐ Eating Disorder

☐ Schizophrenia

☐ Bi-Polar Disorder

☐ Other

- <obtain> Description

[Section Prompt: Prior surgeries?]

[Section Selection Behavior: Select only one. Optional.]

[Technical Note: Enable entry of multiple surgeries for a patient.]

- ☐ Yes
 - <obtain> Date
 - <obtain> Surgical Description
- ☐ No

[End Medical/Surgical History.]

3.7. Social History

[Begin Social History.]

[Section Prompt: Social History.]

[Section Prompt: Substance Use History.]

[Section Selection Behavior: Select one or more. Optional.]

- ☐ Current or former tobacco user
 - <obtain> Link to Tobacco Screening and Cessation Counseling KNART

[Technical Note: Link to Tobacco Assessment and Cessation Counseling Documentation Template KNART.]

☐ Alcohol Use

- <obtain> Details

[Technical Note: Link to Substance Use KNART (not currently available).]

☐ Rehabilitation or detoxification

- <obtain> Details

☐ Cocaine Use

- <obtain> Details

[Technical Note: Link to Substance Use KNART (not currently available).]

☐ Other substance use history

- <obtain> Details

[Technical Note: Link to Substance Use KNART (not currently available).]

☐ Homeless

- <obtain> Details

☐ Unstable Home Environment

- <obtain> Details

☐ Geographically Remote (40+ Mile Drive to Medical Care)

- <obtain> Details

[Section Prompt: Neglect and Abuse History.]

[Section Selection Behavior: Select one or more. Optional.]

- ☐ Yes

- ☐ Sexual

- <obtain> Details

☐ Physical

- <obtain> Details

☐ Emotional

- <obtain> Details

☐ No

[Section Prompt: Additional Social History.]

- <obtain> Details

[End Social History.]

3.8. Pertinent Family Medical History

[Begin Pertinent Family Medical History.]

[Section Prompt: Pertinent Family Health History.]

[Link to Primary Care: Family Health History Documentation Template KNART.]

[Technical Note: In the future, use the following list of conditions to populate the conditions of interest in the linked family health history documentation template.]

[Section Selection Behavior: Select any. Optional.]

- ☐ Endometriosis

☐ Polycystic Ovarian Syndrome

☐ Uterine Fibroids

☐ Other Gynecological Conditions

☐ Diabetes Mellitus

☐ Hypertension

☐ Cardiovascular Disease

☐ Venous Thromboembolism

☐ Colorectal, Breast, Ovarian, or Uterine Cancer

☐ Alcohol or substance abuse

☐ Mental Illness

[Technical Note: For each condition selected in the "Pertinent Family Health History" section, provider should be presented with the following "Family Members" section.]

[Technical Note: In the future, this list of family members should be removed because the provider will be presented with the "Family Members" section in the Family Health History KNART.]

☐ Sister

☐ Brother

☐ Daughter

☐ Son

☐ Mother

☐ Maternal Grandmother

☐ Maternal Grandfather

☐ Maternal Half-Sister

☐ Maternal Half-Brother

☐ Maternal Aunt

☐ Maternal Uncle

☐ Father

☐ Paternal Grandmother

☐ Paternal Grandfather

☐ Paternal Half-Sister

☐ Paternal Half-Brother

☐ Paternal Aunt

☐ Paternal Uncle

[Section Prompt: Other family members.]

[Technical Note: Each time a family member is selected display for completion.]

[Technical Note: In the future, this section should be removed because the provider will be presented with the Family Health History KNART.]

- <obtain> Age at Diagnosis

<obtain> Detail

[End Pertinent Family Medical History.]

3.9. Reproductive Goals Assessment

[Begin Reproductive Goals Assessment.]

[Section Prompt: Please ask the patient, "Do you want to become pregnant within the next year?"]

[Section Selection Behavior: Select only one. Required.]

- ☐ Yes

☐ No

[Technical Note: If "Yes" is selected, the Documentation Template is complete. Provide link to Preconception Counseling KNART if available.]

[Technical Note: If "No" is selected display questions below.]

[Section Prompt: Contraceptive priorities?]

[Section Selection Behavior: Select any. Optional.]

- ☐ Permanence
- ☐ Reversibility
- ☐ Short-acting
- ☐ Long-acting
- ☐ High efficacy
- ☐ High safety
- ☐ Ease of use
- ☐ Noncontraceptive benefits
- ☐ Nonhormonal
- ☐ Personal control
- ☐ Prevention of sexually transmitted infections
- ☐ Declines contraceptive counseling
- ☐ Other

- <obtain> Description

[Technical Note: If "Declines contraceptive counseling" is selected, then Documentation Template is complete.]

[End Reproductive Goals Assessment.]

3.10. Same Day Start Criteria for Contraceptives

[Begin Same Day Start Criteria for Contraceptives.]

[Section Prompt: Criteria for beginning immediate contraception (to include ring, patch, pill or the injectable).]

[Section Selection Behavior: Select any. Required.]

- ☐ First day of the LMP occurred less than or equal to 7 days ago
- ☐ No intercourse since start of the LMP
- ☐ Negative pregnancy test

[End Same Day Start Criteria for Contraceptives.]

3.11. Plan

[Begin Plan.]

[Section Prompt: Review with patient the contraceptive options and the associated levels of effectiveness of those methods:

- Permanent methods (less than 1 pregnancy per year among 100 women with typical use)
 - Tubal ligation (female sterilization)
 - Tubal implant
 - Vasectomy (male sterilization)
- Highly effective methods (1 or fewer pregnancies per year among 100 women with typical use)
 - Intrauterine device
 - Progesterone implant
 - Progesterone shot
- Very effective methods (about 5 pregnancies per year among 100 women with typical use)
 - Contraceptive ring, pill, or patch
- Less effective methods (about 15 to 32 pregnancies per year among 100 women with typical use)
 - Diaphragm with spermicide
 - Cervical cap with spermicide
 - Contraceptive sponge
 - Male condom
 - Female condom
 - Spermicide alone
 - Natural family planning (e.g., lactational amenorrhea, rhythm, calendar, or cervical mucus methods)
- Not effective
 - Nothing.]

[Section Prompt: Review with patient emergency contraceptives in case of unprotected sex.

- Emergency contraceptive (less than 1 pregnancy per year among 100 women if used within 72 hours)]

[Section Prompt: If appropriate, address sexually transmitted infection risk reduction with use of barrier methods.]

- [Section Prompt: Contraceptive plan?]
 - <obtain> Description
- [Section Prompt: Sexually transmitted infection risk reduction plan?]
 - <obtain> Description

[End Plan.]

[End Documentation Template.]

Chapter 4. Order Set

[Begin Order Set.]

4.1. Knowledge Narrative

[Begin Knowledge Narrative.]

[See Clinical Context in Chapter 1.]

[End Knowledge Narrative.]

4.2. Laboratory Tests

[Begin Laboratory Tests.]

[Section Prompt: If the patient is not known to be pregnant, then consider ordering a pregnancy test.]

[Section Selection Behavior: Select one. Optional.]

- ☐ Quantitative human chorionic gonadotropin-serum now
- ☐ Qualitative human chorionic gonadotropin-urine now

[Section Prompt: Sexually Transmitted Infection Screening.]

[Section Selection Behavior: Select any. Optional.]

- ☐ Chlamydia nucleic acid amplification testing vaginal swab now
- ☐ Gonorrhea nucleic acid amplification testing vaginal swab now
- ☐ HIV screen-serum now

[End Laboratory Tests.]

4.3. Point of Care Tests

[Begin Point of Care Tests.]

- ☐ Point of Care Urine pregnancy test now

[End Point of Care Tests.]

4.4. Medications and Devices

[Begin Medications and Devices.]

[Section Prompt: If the patient is not known to be pregnant, then consider ordering a pregnancy test prior to ordering any contraceptive options.]

- [Section Prompt: Please consider the following contraception options.]
- ☐ Etonogestrel 68 mg implant subdermal for implantation now
- ☐ Levonorgestrel 20 micrograms/day device intrauterine for insertion now
- ☐ Levonorgestrel 14 micrograms/day device intrauterine for insertion now

- ☐ Copper T 380A device intrauterine for insertion now

Contraceptive Injection

[Section Prompt: Contraceptive Injection.]

[Section Selection Behavior: Select one. Optional.]

- ☐ Medroxyprogesterone acetate injectable suspension 150 mg/mL. Give 1 mL solution intramuscular every 3 months, first dose now

Combined Oral Contraceptives

[Section Prompt: Select Oral Contraceptives from the following list for patients where "same day criteria" for contraceptives are met.]

[Section Selection Behavior: Select only one. Optional.]

- ☐ Desogestrel 0.15 mg/ethinyl estradiol 0.03 mg. Take 1 tablet oral daily. Take pills in sequence; do not skip pills. Dispense 3 kits. 3 refills.
- ☐ Ethinyl estradiol 0.02 mg/levonorgestrel 0.1 mg. Take 1 tablet oral daily. Take pills in sequence; do not skip pills. Dispense 3 kits. 3 refills.
- ☐ Ethinyl estradiol 0.03 mg/levonorgestrel 0.15 mg. Take 1 tablet oral daily. Take pills in sequence; do not skip pills. Dispense 3 kits. 3 refills.
- ☐ Ethinyl estradiol 0.03 mg/levonorgestrel 0.05 mg, ethinyl estradiol 0.04 mg/levonorgestrel 0.075 mg, ethinyl estradiol 0.03 mg/levonorgestrel 0.125 mg (triphasic). Take 1 tablet oral daily. Take pills in sequence; do not skip pills. Dispense 3 kits. 3 refills.
- ☐ Ethinyl estradiol 0.035 mg/norethindrone 1 mg. Take 1 tablet oral daily. Take pills in sequence; do not skip pills. Dispense 3 kits. 3 refills.
- ☐ Ethinyl estradiol 0.035 mg/norethindrone 0.5 mg, ethinyl estradiol 0.035 mg/norethindrone 0.75 mg, ethinyl estradiol 0.035 mg/norethindrone 1 mg (triphasic). Take 1 tablet oral daily. Take pills in sequence; do not skip pills. Dispense 3 kits. 3 refills.
- ☐ Ethinyl estradiol 0.035 mg/norgestimate 0.25 mg. Take 1 tablet oral daily. Take pills in sequence; do not skip pills. Dispense 3 kits. 3 refills.
- ☐ Ethinyl estradiol 0.035 mg/norgestimate 0.18 mg, ethinyl estradiol 0.035 mg/norgestimate 0.215 mg, ethinyl estradiol 0.035 mg/norgestimate 0.25 mg (triphasic). Take 1 tablet oral daily. Take pills in sequence; do not skip pills. Dispense 3 kits. 3 refills.
- ☐ Mestranol 0.05 mg/norethindrone 1 mg. Take 1 tablet oral daily. Take pills in sequence; do not skip pills. Dispense 3 kits. 3 refills.
- ☐ Ethinyl estradiol 0.03 mg/levonorgestrel 0.15 mg, ethinyl estradiol 0.01 mg. Take 1 tablet oral daily. Take pills in sequence; do not skip pills. Dispense 3 kits. 3 refills.

Combined Contraceptive Vaginal Ring

[Section Prompt: Select Combined Contraceptive Vaginal Ring from the following list.]

[Section Selection Behavior: Select one. Optional.]

- ☐ Ethinyl estradiol 0.015 mg/day/etonogestrel 0.120 mg/day. 1 vaginal ring. Insert ring into vagina. Leave in place continuously for 3 weeks. Remove for 1 week. Then immediately replace. Dispense 1 box. 3 refills

Progestin-Only Contraceptive Pill

[Section Prompt: Select Progestin-Only Contraceptive Pill from the following list.]

[Section Selection Behavior: Select one. Optional.]

- ☐ Norethindrone 0.35 mg. Take 1 tablet oral daily. Take pills in sequence; do not skip pills. Dispense 3 kits. 3 refills.

Emergency Contraceptive

[Section Prompt: Select Emergency Contraceptive from the following list.]

[Section Selection Behavior: Select one. Optional.]

[Clinical Comment: "1 refill now" allows the patient to take home medications for future emergency use when indicated.]

- ☐ Levonorgestrel 0.75 mg tablet. Take one tablet oral every 12 hours. Take first tablet as soon as possible after and within 72 hours of unprotected intercourse. Take second tablet 12 hours after first tablet. Dispense 1 box containing 2 tablets. 1 refill now
- ☐ Levonorgestrel 1.5 mg tablet oral 1 time. Take as soon as possible after and within 72 hours of unprotected intercourse. Dispense 1 box containing 1 tablet. 1 refill now

[End Medications and Devices.]

4.5. Procedures

[Begin Procedures.]

[Section Prompt: Select procedures from the following list. All procedures are priority of "now" unless otherwise specified.]

- ☐ Essure permanent contraceptive device. Schedule for insertion now.
- ☐ Contraceptive implant implantation
- ☐ Intrauterine device insertion
- ☐ Diaphragm fitting
- ☐ Cervical cap fitting

[End Procedures.]

[End Order Set.]

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Appendix A. Existing Sample VA Artifacts

Figure A.1. Reminder Resolution

Reminder Resolution: Pregnancy/Intentions/Contraception

Does this patient have a medical reason that makes her permanently unable to become pregnant?

☐ Yes

☒ No

Please ask the patient "Are you pregnant?" and select her response below

☐ Yes, pregnant

☒ No, not pregnant

☐ Order pregnancy test

☐ Order emergency contraceptive

Please ask the patient "Do you want to become pregnant within the next year?" and select her response below.

☐ Yes

☐ No

☐ Not sure

Please ask the patient "What are you doing to prevent pregnancy?" and select her response(s) below.

☐ Nothing

Contraceptive Methods:

☐ Female Sterilization:
(<1 pregnancy per year among 100 women)

☐ Laparoscopic/Abdominal Tubal Ligation

☐ Hysteroscopic Tubal Occlusion (e.g. Essure)

☐ Extremely effective methods:
(<1 pregnancy per year among 100 women with typical use)

☐ IUD (e.g. ParaGuard, Mirena)

☐ Contraceptive implant (e.g. Nexplanon)

☐ Pregnancy can't result with current partner or never sexually active with a man (e.g. same sex partner or partner has vasectomy)

☐ Highly effective methods:
(about 3 pregnancies per year among 100 women with typical use)

☐ Contraceptive shot (e.g. Depo-Provera)

☐ Very effective methods:
(about 8 pregnancies per year among 100 women with typical use)

☐ Contraceptive pill, ring, or patch

☒ Effective methods:
(about 14 to 28 pregnancies per year among 100 women with typical use)

☐ Male condom

☐ Female condom

☐ Diaphragm with spermicide

☐ Cervical cap with spermicide

☐ Contraceptive sponge

☐ Spermicide

☐ Natural family planning (e.g. rhythm, calendar, or cervical mucus methods)

☐ Emergency contraception

☐ Withdrawal

☐ No current partner

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Figure A.2. Contraceptive Resources

The image displays a screenshot of a web application interface. At the top, a blue banner reads "Contraceptive Resources". Below this, a window titled "Reminder Resolution: Pregnancy/Intentions/Contraception" is open. It contains the text "Contraceptive Resources:" followed by two links: "U. S. Medical Eligibility Criteria (US MEC) for Contraceptive Use" and "U. S. Selected Practice Recommendations (US SPR) for Contraceptive Use". Below these links is a question: "Does this patient have a medical reason that makes her permanently unable to become pregnant?" with "Yes" and "No" radio button options. A blue arrow points from the "U. S. Medical Eligibility Criteria (US MEC) for Contraceptive Use" link to the "United States Medical Eligibility Criteria (US MEC) for Contraceptive Use, 2016" link on the CDC page below. Another blue arrow points from the "U. S. Selected Practice Recommendations (US SPR) for Contraceptive Use" link to the "U.S. Selected Practice Recommendations (US SPR) for Contraceptive Use, 2016" link on the CDC page. The CDC page is titled "Reproductive Health" and includes a sidebar with links like "About Us", "Data and Statistics", "Emergency Preparedness", "Maternal and Child Health Epidemiology Program", "Pregnancy Risk Assessment Monitoring System", "Integrity", "Assisted Reproductive Technology (ART)", and "Depression Among Women". The main content area displays the "United States Medical Eligibility Criteria (US MEC) for Contraceptive Use, 2016" and the "U.S. Selected Practice Recommendations (US SPR) for Contraceptive Use, 2016". At the bottom, the text "VETERANS HEALTH ADMINISTRATION" and "WOMEN VETERANS HEALTH CARE" is visible.

Contraceptive Resources

Reminder Resolution: Pregnancy/Intentions/Contraception

Contraceptive Resources:

[U. S. Medical Eligibility Criteria \(US MEC\) for Contraceptive Use](#)

[U. S. Selected Practice Recommendations \(US SPR\) for Contraceptive Use](#)

Does this patient have a medical reason that makes her permanently unable to become pregnant?

☐ Yes

☐ No

CDC Centers for Disease Control and Prevention
CDC 24/7 Saving Lives. Protecting People™

SEARCH

REPRODUCTIVE HEALTH

Reproductive Health

U.S. Selected Practice Recommendations (US SPR) for Contraceptive Use, 2016

The 2016 U.S. Selected Practice Recommendations for Contraception (US SPR) addresses a select group of common, yet are controversial or complex, issues regarding initiation and use of specific contraceptive methods. These recommendations for health care providers are based on a review of the scientific evidence and consultation with national experts who met in Atlanta, Georgia, during August 2015. The information in this report updates the 2010 U.S. SPR (published 2011 CDC MMWR 59(10)). Major updates include:

- 1) Revised recommendations for starting regular contraception after the use of emergency contraceptive pills.
- 2) New recommendations for the use of medications to ease insertion of intrauterine devices.

The recommendations in this report are intended to serve as a source of clinical guidance for health care providers and provide evidence-based guidance to reduce barriers to contraceptive access and use. Health care providers should always consider the individual clinical circumstances of each person seeking family planning services. This report is not intended to be a substitute for professional medical advice for individual patients. Persons should seek advice from their health care providers when considering family planning options.

U.S. Medical Eligibility Criteria (US MEC) for Contraceptive Use, 2016

The United States Medical Eligibility Criteria for Contraceptive Use, 2016 (US MEC) includes recommendations for using specific contraceptive methods by women and men who have certain characteristics or medical conditions. The recommendations in this report are intended to assist health care providers when they counsel women, men, and couples about contraceptive method choice. Notable updates include the addition of recommendations for women with cystic fibrosis, women with multiple sclerosis, and women using certain psychiatric drugs or St. John's wort; revisions to the recommendations for emergency contraception, including the addition of ulipristal acetate and levonorgestrel; and revisions to the recommendations for postpartum women, women who are breastfeeding, and women with known dyslipidemia, migraine headaches, superficial venous disease, gestational trophoblastic disease, sexually transmitted diseases, human immunodeficiency virus, or who are using antiretroviral therapy. These recommendations for health care providers were updated by CDC after review of the scientific evidence and consultation with national experts who met in Atlanta, Georgia, during August 28-29, 2015. The information in this report updates the 2010 U.S. MEC (CDC U.S. Medical Eligibility Criteria for Contraceptive Use, 2010).

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Figure A.3. Medically Unable to Conceive? (image 1 of 2)

The image shows a two-part form titled "Medically unable to conceive?". The first part, titled "Reminder Resolution: Pregnancy/Intentions/Contraception", contains links for "U. S. Medical Eligibility Criteria (US MEC) for Contraceptive Use" and "U. S. Selected Practice Recommendations (US SPR) for Contraceptive Use". It asks, "Does this patient have a medical reason that makes her permanently unable to become pregnant?" with radio buttons for "Yes" and "No". A blue arrow points from the "Yes" radio button to the second part of the form. The second part, titled "Does this patient have a medical reason that makes her permanently unable to become pregnant?", has the "Yes" radio button selected. Below it is a text input field labeled "Medical Reason: *" and three checkboxes: "Hysterectomy", "Menopause", and "Permanent female sterilization".

Medically unable to conceive?

"Yes" opens up the ability to document why

Reminder Resolution: Pregnancy/Intentions/Contraception

Contraceptive Resources:
[U. S. Medical Eligibility Criteria \(US MEC\) for Contraceptive Use](#)
[U. S. Selected Practice Recommendations \(US SPR\) for Contraceptive Use](#)

Does this patient have a medical reason that makes her permanently unable to become pregnant?

☐ Yes
☐ No

Does this patient have a medical reason that makes her permanently unable to become pregnant?

☒ Yes

Medical Reason: *

☐ Hysterectomy ☐ Menopause ☐ Permanent female sterilization

☐ No

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Figure A.4. Medically Unable to Conceive? (image 2 of 2)

Medically unable to conceive?

“No” opens a prompt to ask about pregnancy status/intentions

Contraceptive Resources:
[U. S. Medical Eligibility Criteria \(US MEC\) for Contraceptive Use](#)
[U. S. Selected Practice Recommendations \(US SPR\) for Contraceptive Use](#)

Does this patient have a medical reason that makes her permanently unable to become pregnant?

☐ Yes

☒ No

Please ask the patient "Are you pregnant?" and select her response below.

☐ Yes, pregnant

☐ No, not pregnant

☐ Don't know if pregnant

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Figure A.5. Pregnancy Status (image 1 of 3)

Pregnancy Status – “yes” pregnant

Last Menstrual Period: Dec 6, 2016 ...

Expected Due Date: * Sep 12, 2017 ...

☐ Document Reason for Expected Due Date Change

☐ Pregnancy Diagnoses

Once LMP is entered the EDD is automatically calculated

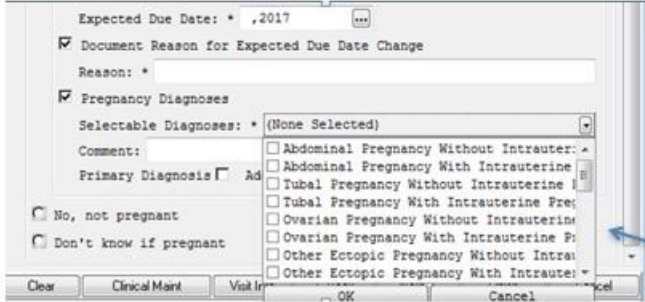
The same form may be used to update the EDD and document the reason for a date change

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Figure A.6. Pregnancy Status (image 2 of 3)

Pregnancy Status – “yes” pregnant



The screenshot shows a software window titled "Pregnancy Status – 'yes' pregnant". It contains several fields and checkboxes. At the top, "Expected Due Date" is set to ", 2017". Below it, a checked checkbox "Document Reason for Expected Due Date Change" has a "Reason" field. Further down, a checked checkbox "Pregnancy Diagnoses" is followed by a "Selectable Diagnoses" dropdown menu currently showing "(None Selected)". To the right of this dropdown is a list of pregnancy-related conditions, each with an unchecked checkbox. These include: "Abdominal Pregnancy Without Intrauterine", "Abdominal Pregnancy With Intrauterine", "Tubal Pregnancy Without Intrauterine", "Tubal Pregnancy With Intrauterine", "Ovarian Pregnancy Without Intrauterine", "Ovarian Pregnancy With Intrauterine", "Other Ectopic Pregnancy Without Intrauterine", and "Other Ectopic Pregnancy With Intrauterine". Below the list are radio buttons for "No, not pregnant" and "Don't know if pregnant". At the bottom are buttons for "Clear", "Clinical Maint", "Visit", "OK", and "Cancel". A blue arrow points from the text "Common pregnancy codes may be chosen from a drop down, and ICD codes added to the problem list" to the "Selectable Diagnoses" dropdown menu.

Expected Due Date: * , 2017

☒ Document Reason for Expected Due Date Change

Reason: *

☒ Pregnancy Diagnoses

Selectable Diagnoses: * (None Selected)

Comment:

Primary Diagnosis ☐ Add

☐ No, not pregnant

☐ Don't know if pregnant

☐ Abdominal Pregnancy Without Intrauterine

☐ Abdominal Pregnancy With Intrauterine

☐ Tubal Pregnancy Without Intrauterine

☐ Tubal Pregnancy With Intrauterine

☐ Ovarian Pregnancy Without Intrauterine

☐ Ovarian Pregnancy With Intrauterine

☐ Other Ectopic Pregnancy Without Intrauterine

☐ Other Ectopic Pregnancy With Intrauterine

Clear Clinical Maint Visit OK Cancel

Common pregnancy codes may be chosen from a drop down, and ICD codes added to the problem list

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Figure A.7. Pregnancy Status (image 3 of 3)

Pregnancy Status— “no”, not pregnant, “don’t know if pregnant”

Please ask the patient “Are you pregnant?” and select her response below.

☐ Yes, pregnant

☒ No, not pregnant

☐ Order pregnancy test

☐ Order emergency contraceptive

↑

Able to order a pregnancy test or
emergency contraception when
appropriate

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Figure A.8. Pregnancy Intentions

The figure displays a screenshot of a VA form titled "Pregnancy Intentions". The form is divided into two sections, each containing a question and a set of radio button options.

Section 1:

Please ask the patient "Do you want to become pregnant within the next year?" and select her response below.

☒ Yes

Please consider preconception counseling for this patient.

Section 2:

Please ask the patient "Do you want to become pregnant within the next year?" and select her response below.

☐ Yes

☐ No

☒ Not sure

At the bottom of the form, the text "VETERANS HEALTH ADMINISTRATION" is visible on the left, and "WOMEN VETERANS HEALTH CARE" is visible on the right.

Figure A.9. Pregnancy Status

Pregnancy Status – “yes” pregnant

Please ask the patient “Are you pregnant?” and select her response below.

☒ Yes, pregnant

An automated review of this patient's chart indicates the following orders are potentially harmful:

Orderable Item	Status	Start
ABDOMEN-KUB	PENDING	01/12/2017
TETRACYCLINE HCL CAP, ORAL	PENDING	01/12/2017

Order Review Actions:

☐ I have reviewed the above list of potentially harmful orders.

☐ I have notified the encounter provider that the patient is pregnant and has potentially harmful orders.

Medication and imaging review

Documentation of the review

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Figure A.10. Contraceptive Methods (image 1 of 3)

Female Sterilization, Extremely Effective Methods

Reminder Resolution: Pregnancy/Intentions/Contraception

Please ask the patient "What are you doing to prevent pregnancy?" and select her response(s) below.

☐ Nothing

Contraceptive Methods:

☐ Female Sterilization:
(<1 pregnancy per year among 100 women)

☐ Laparoscopic/Abdominal Tubal Ligation

☐ Hysteroscopic Tubal Occlusion (e.g. Essure)

☐ Extremely effective methods:
(<1 pregnancy per year among 100 women with typical use)

☐ IUD (e.g. Paraguard, Mirena)

☐ Contraceptive implant (e.g. Nexplanon)

☐ Pregnancy can't result with current partner or never sexually active with a man (e.g. same sex partner or partner has vasectomy)

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Figure A.11. Contraceptive Methods (image 2 of 3)

Highly Effective, Effective Methods

☐ **Highly effective methods:**
(about 3 pregnancies per year among 100 women with typical use)

☐ Contraceptive shot (e.g. Depo-Provera)

☐ **Very effective methods:**
(about 8 pregnancies per year among 100 women with typical use)

☐ Contraceptive pill, ring, or patch

☐ **Effective methods:**
(about 14 to 29 pregnancies per year among 100 women with typical use)

☐ Male condom

☐ Female condom

☐ Diaphragm with spermicide

☐ Cervical cap with spermicide

☐ Contraceptive sponge

☐ Spermicide

☐ Natural family planning (e.g. rhythm, calendar, or cervical mucus methods)

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Figure A.12. Contraceptive Methods (image 3 of 3)

Contraceptive Methods:

☐ Female Sterilization:
(<1 pregnancy per year among 100 women)

☐ Laparoscopic/Abdominal Tubal Ligation

☐ Hysteroscopic Tubal Occlusion (e.g. Essure)

☒ Extremely effective methods:
(<1 pregnancy per year among 100 women with typical use)

☐ IUD (e.g. Paraguard, Mirena)

☐ Contraceptive implant (e.g. Nexplanon)

☐ Pregnancy can't result with current partner or never sexually active with a man (e.g. same sex partner or partner has vasectomy)

☐ Highly effective methods:
(about 3 pregnancies per year among 100 women with typical use)

☐ Contraceptive shot (e.g. Depo-Provera)

☐ Very effective methods:
(about 8 pregnancies per year among 100 women with typical use)

☐ Contraceptive pill, ring, or patch

☒ Effective methods:
(about 14 to 29 pregnancies per year among 100 women with typical use)

☐ Male condom

☒ Female condom

☐ Diaphragm with spermicide

☐ Cervical cap with spermicide

Able to multi-select methods

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Figure A.13. Notes Resulting from Template Use

Resulting Notes

Vst 01/17/17 WOMEN'S HEALTH ANN Jan 17, 2017@15:14

Woman using an IUD

Pregnancy/Intentions/Contraception:
The patient is medically able to conceive.
The patient states that she is not pregnant.
The patient states that she does not want to become pregnant within the next year.
The patient states that she is using an IUD to prevent pregnancy.


Pregnant patient with a medication/imaging review

Pregnancy/Intentions/Contraception:
The patient is medically able to conceive.
The patient states that she is pregnant.
An automated review of this patient's chart indicates the following orders are potentially harmful:

Orderable Item	Status	Start
ABDOMEN-KUB	PENDING	01/12/2017
TETRACYCLINE HCL CAP, ORAL	PENDING	01/12/2017

I have reviewed the above list of potentially harmful orders.
Last Menstrual Period: December 6, 2016
Expected Due Date: September 12, 2017

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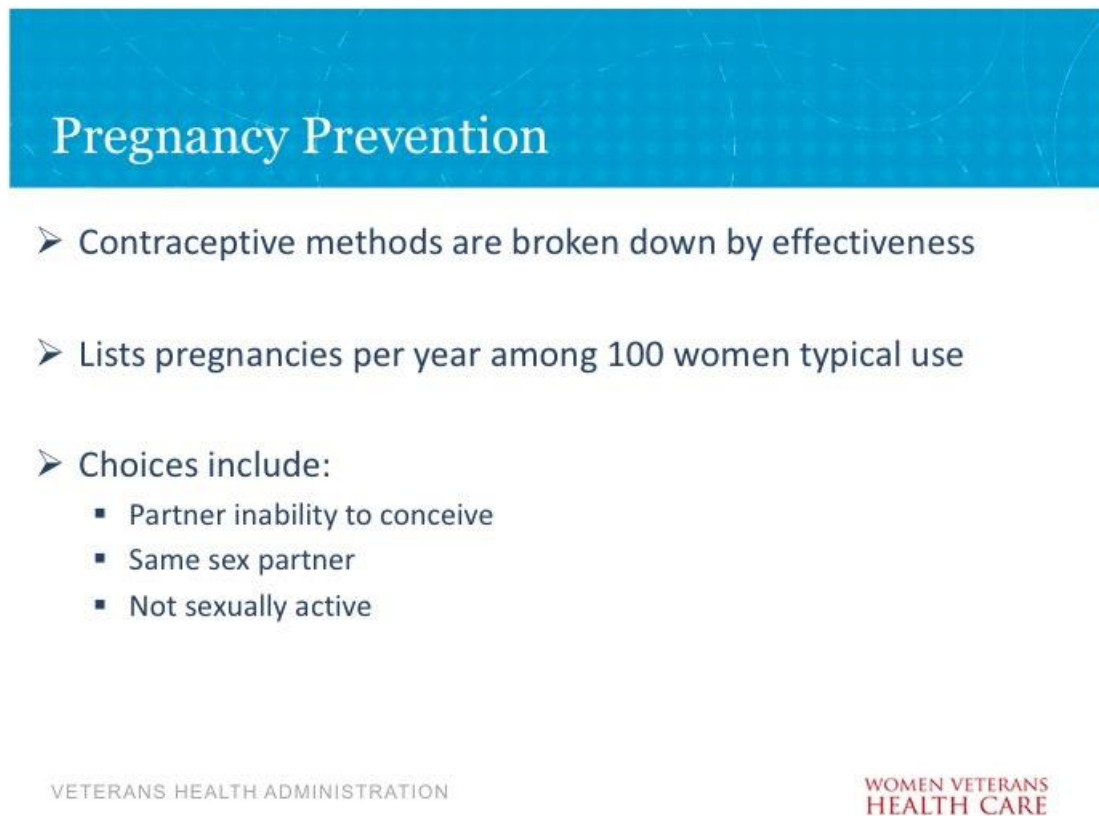
Figure A.14. Clinical Reminder Dialog

The figure shows a blue header box with the text "Clinical Reminder Dialog – When Due?". Below this is a table with two columns: "Likelihood of Becoming Pregnant" and "Reminder Interval".

Likelihood of Becoming Pregnant	Reminder Interval
No Data	All women to age 52 unless backend codes indicating hysterectomy, bilateral salpingoophorectomy, tubal ligation without subsequent reanastomosis
High Likelihood	Every 90 Days
Low Likelihood	Every 365 Days
MUC	None

The dialog is available for use in the reminder drawer for all women

Figure A.15. Pregnancy Prevention

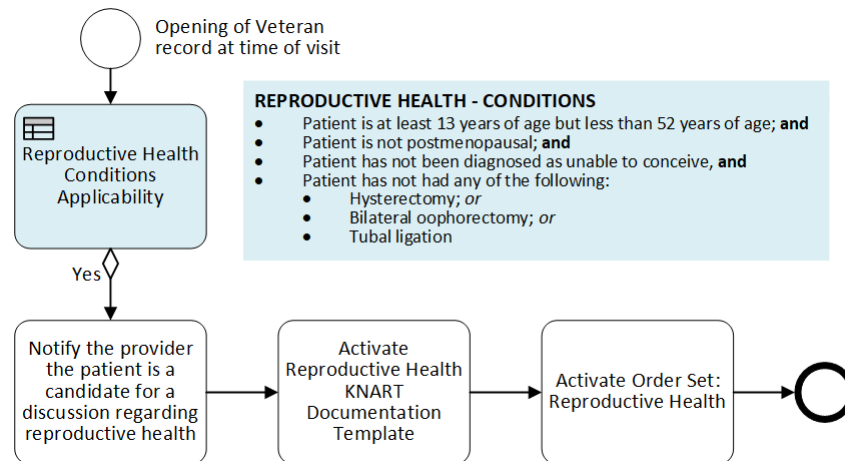


Appendix B. Basic Laboratory Panel Definition

- Blood Urea Nitrogen
- Calcium
- Chloride
- CO₂ (Carbon Dioxide, Bicarbonate)
- Creatinine
- Glucose
- Potassium
- Sodium

Appendix C. Reproductive Health Logic Diagram

Figure C.1. Reproductive Health ECA Rule Diagram



Acronyms

ACOG	American College of Obstetricians and Gynecologists
CCWP	Clinical Content White Paper
CDS	Clinical Decision Support
CPT	Current Procedural Terminology
ECA	Event Condition Action
HL7	Health Level 7
ICD	International Classification of Diseases
KBS	Knowledge Based Systems
KNART	Knowledge Artifact
LMP	Last Menstrual Period
OB/GYN	Obstetrician/Gynecologist
OIIG	Office of Informatics and Information Governance
PCP	Primary Care Provider
SNOMED	Systematized Nomenclature of Medicine
VA	Department of Veterans Affairs