

Appendix A Complete UTI Guidelines in Factual English

Background Rules

1. **If** *\$doctor* administers *\$therapy* for *\$patient*, **then** *\$patient* undergoes *\$therapy* from *\$doctor*.
2. **If** *\$patient* undergoes *\$therapy* from *\$doctor*, **then** *\$patient*'s *\$therapy* from *\$doctor* is completed, or not completed.
3. **If** *\$doctor* performs *\$imaging_study* for *\$patient*, **then** *\$patient*'s *\$imaging_study* from *\$doctor* is completed, or not completed.

Recommendation 1

1. **If** *\$doctor*'s *\$patient* is a young child and has an unexplained fever, **then** *\$doctor* considers UTI for *\$patient*.

Recommendation 2

1. **If** *\$doctor*'s *\$patient* is a young child and has an unexplained fever, **then** *\$doctor* assesses *\$patient*'s degree of toxicity.
2. **If** *\$doctor*'s *\$patient* is a young child and has an unexplained fever, **then** *\$doctor* assesses *\$patient*'s degree of dehydration.
3. **If** *\$doctor*'s *\$patient* is a young child and has an unexplained fever, **then** *\$doctor* assesses *\$patient*'s ability to retain oral intake.
4. **If** *\$doctor* assesses *\$patient*'s ability to retain oral intake, **then** *\$doctor*'s *\$patient* is or is not able to retain oral intake.

Recommendation 3

1. **If** *\$doctor*'s *\$patient* is a young child and has an unexplained fever, and *\$doctor*'s *\$patient* is sufficiently ill, **then** *\$doctor* analyzes the culture of *\$patient*'s urine specimen obtained by SPA or transurethral catheterization.

Recommendation 4

1. **If** *\$doctor*'s *\$patient* is a young child and has an unexplained fever, and *\$doctor*'s *\$patient* is not sufficiently ill, **then** *\$doctor* analyzes the culture of *\$patient*'s urine specimen obtained by SPA, transurethral catheterization, or a convenient method.
2. **If** *\$doctor*'s *\$patient* is a young child and has an unexplained fever, *\$doctor*'s *\$patient* is not sufficiently ill, *\$doctor* analyzes the culture of *\$patient*'s urine specimen obtained by a convenient method, and the analysis of *\$patient*'s culture of a urine specimen suggests UTI, **then** *\$doctor* analyzes *\$patient*'s culture of a urine specimen obtained by SPA or transurethral catheterization.
3. **If** *\$doctor* analyzes the culture of *\$patient*'s urine specimen obtained by SPA or transurethral catheterization, **then** *\$doctor*'s analysis of *\$patient*'s culture confirms UTI or excludes UTI.
4. **If** *\$doctor* analyzes the culture of *\$patient*'s urine specimen obtained by a convenient method, **then** *\$doctor*'s analysis of *\$patient*'s culture suggests UTI or does not suggest UTI.
5. **If** *\$doctor*'s analysis of the culture of *\$patient*'s urine specimen confirms UTI, **then** *\$doctor*'s *\$patient* has UTI.

6. **If** *\$doctor's* analysis of the culture of *\$patient's* urine specimen excludes UTI, **then** *\$doctor's \$patient* does not have UTI.

Recommendation 5 is integrated into 3 and 4.

Recommendation 6

1. **If** *\$doctor's \$patient* is a young child and has an unexplained fever, and *\$doctor's \$patient* is toxic, **then** *\$doctor* administers an antimicrobial therapy for *\$patient*.
2. **If** *\$doctor's \$patient* is a young child and has an unexplained fever, and *\$doctor's \$patient* is toxic, **then** *\$doctor* considers hospitalization for *\$patient*.
3. **If** *\$doctor's \$patient* is a young child and has an unexplained fever, and *\$doctor's \$patient* is dehydrated, **then** *\$doctor* administers an antimicrobial therapy for *\$patient*.
4. **If** *\$doctor's \$patient* is a young child and has an unexplained fever, and *\$doctor's \$patient* is dehydrated, **then** *\$doctor* considers hospitalization for *\$patient*.
5. **If** *\$doctor's \$patient* is a young child and has an unexplained fever, and *\$doctor's \$patient* is not able to retain oral intake, **then** *\$doctor* administers an antimicrobial therapy for *\$patient*.
6. **If** *\$doctor's \$patient* is a young child and has an unexplained fever, and *\$doctor's \$patient* is not able to retain oral intake, **then** *\$doctor* considers hospitalization for *\$patient*.

Recommendation 7

1. **If** *\$doctor's \$patient* is a young child, and *\$doctor's* analysis of the culture of *\$patient's* urine specimen confirms UTI, **then** *\$doctor* administers a parenteral or oral antimicrobial therapy for *\$patient*.

Recommendation 8

1. **If** *\$doctor's \$patient* is a young child and has UTI, *\$patient* undergoes an antimicrobial therapy from *\$doctor* for 2 days, and *\$doctor's \$patient* does not show the expected response of the antimicrobial therapy, **then** *\$doctor* reevaluates *\$patient* and analyze the culture of *\$patient's* second urine specimen.
2. **If** *\$doctor's \$patient* is a young child and has UTI, and *\$patient* undergoes an antimicrobial therapy from *\$doctor* for 2 days, **then** *\$doctor's \$patient* shows or does not show the expected response of the antimicrobial therapy.

Recommendation 9

1. **If** *\$doctor's \$patient* is a young child and has UTI, **then** *\$doctor* administers an oral antimicrobial therapy that lasts at least 7 days for *\$patient*.
2. **If** *\$doctor's \$patient* is a young child and has UTI, **then** *\$doctor* administers an oral antimicrobial therapy that lasts at most 14 days for *\$patient*.

Recommendation 10

1. **If** *\$doctor's \$patient* is a young child and has UTI, the antimicrobial therapy of *\$doctor's \$patient* is completed, and the imaging study of *\$doctor's \$patient* is not completed, **then** *\$doctor* administers *\$patient* a therapeutically or prophylactically dosed antimicrobial.

Recommendation 11

1. **If** *\$doctor's \$patient* is a young child and has UTI, *\$patient* undergoes an antimicrobial therapy for 2 days from *\$doctor*, and *\$doctor's \$patient* does not show the expected response of the antimicrobial therapy, **then** *\$doctor* performs ultrasonography promptly for *\$patient*.
2. **If** *\$doctor's \$patient* is a young child and has UTI, *\$patient* undergoes an antimicrobial therapy for 2 days from *\$doctor*, and *\$doctor's \$patient* does not show the expected response of the antimicrobial therapy, **then** *\$doctor* performs VCUG or RNC for *\$patient*.
3. **If** *\$doctor's \$patient* is a young child and has UTI, *\$patient* undergoes an antimicrobial therapy for 2 days from *\$doctor*, and *\$doctor's \$patient* shows the expected response of the antimicrobial therapy, **then** *\$doctor* performs VCUG or RNC for *\$patient*.
4. **If** *\$doctor's \$patient* is a young child and has UTI, *\$patient* undergoes an antimicrobial therapy for 2 days from *\$doctor*, and *\$doctor's \$patient* shows the expected response of the antimicrobial therapy, **then** *\$doctor* performs VCUG or RNC for *\$patient*.

Appendix B Sample Narratives and Questions from 20 bAbI Tasks

<p>Task 1 Single Supporting Fact Mary went to the bathroom. John moved to the hallway. Mary travelled to the office. Where is Mary? A: office</p>	<p>Task 2 Two Supporting Facts John is in the playground. John picked up the football. Bob went to the kitchen. Where is the football? A: playground</p>
<p>Task 3 Three Supporting Facts John picked up the apple. John went to the office. John went to the kitchen. John dropped the apple. Where was the apple before the kitchen? A: office</p>	<p>Task 4 Two Argument Relations The office is north of the bedroom. The bedroom is north of the bathroom. The kitchen is west of the garden. What is the bedroom north of? A: bathroom</p>
<p>Task 5 Three Argument Relations Mary gave the cake to Fred. Fred gave the cake to Bill. Jeff was given the milk by Bill. Who did Fred give the cake to? A: Bill</p>	<p>Task 6 Yes/No Questions John moved to the playground. Daniel went to the bathroom. John went back to the hallway. Is Daniel in the bathroom? A: yes</p>
<p>Task 7 Counting Daniel picked up the football. Daniel dropped the football. Daniel got the milk. Daniel took the apple. How many object is Daniel holding? A: two</p>	<p>Task 8 Lists/Sets Daniel picks up the football. Daniel drops the newspaper. Daniel picks up the milk. John took the apple. What is Daniel holding? A: milk, football</p>
<p>Task 9 Simple Negation Sandra travelled to the office. Fred is no longer in the office. Is Fred in the office? A: no</p>	<p>Task 10 Indefinite Knowledge John is either in the classroom or the playground. Sandra is in the garden. Is John in the classroom? A: maybe</p>
<p>Task 11 Basic Coreference Daniel was in the kitchen. Then he went to the studio. Sandra was in the office. Where is Daniel? A: studio</p>	<p>Task 12 Conjunction Mary and Jeff went to the kitchen. Then Jeff went to the park. Where is Jeff? A: park</p>
<p>Task 13 Compound Coreference Daniel and Sandra journeyed to the office. Then they went to the garden. Sandra and John travelled to the kitchen. After that they moved to the hallway. Where is Daniel? A: garden</p>	<p>Task 14 Time Reasoning In the afternoon Julie went to the park. Yesterday Julie was at school. Julie went to the cinema this evening. Where was Julie before the park? A: school</p>
<p>Task 15 Basic Deduction Sheep are afraid of wolves. Cats are afraid of dogs. Mice are afraid of cats. Gertrude is a sheep. What is Gertrude afraid of? A: wolves</p>	<p>Task 16 Basic Induction Lily is a swan. Lily is white. Bernhard is green. Greg is a swan. What color is Greg? A: white</p>
<p>Task 17 Positional Reasoning The triangle is to the right of the blue square. The red square is on top of the blue square. The red sphere is to the right of the blue square. Is the red square to the left of the triangle? A: yes</p>	<p>Task 18 Size Reasoning The football fits in the suitcase. The suitcase fits in the cupboard. The box is smaller than the football. Will the box fit in the suitcase? A: yes</p>
<p>Task 19 Path Finding The kitchen is north of the hallway. The bathroom is west of the bedroom. Then den is east of the hallway. The office is south of the bedroom. How do you go from den to kitchen? A: west, north</p>	<p>Task 20 Agent's Motivations John is hungry. John goes to the kitchen. John grabbed the apple there. Daniel is hungry. Why did John go to the kitchen? A: hungry</p>

Fig. B 1. Data points from the 20 bAbI Tasks