TB Talk – New England

”TB All in the Family – Challenges and Successes“

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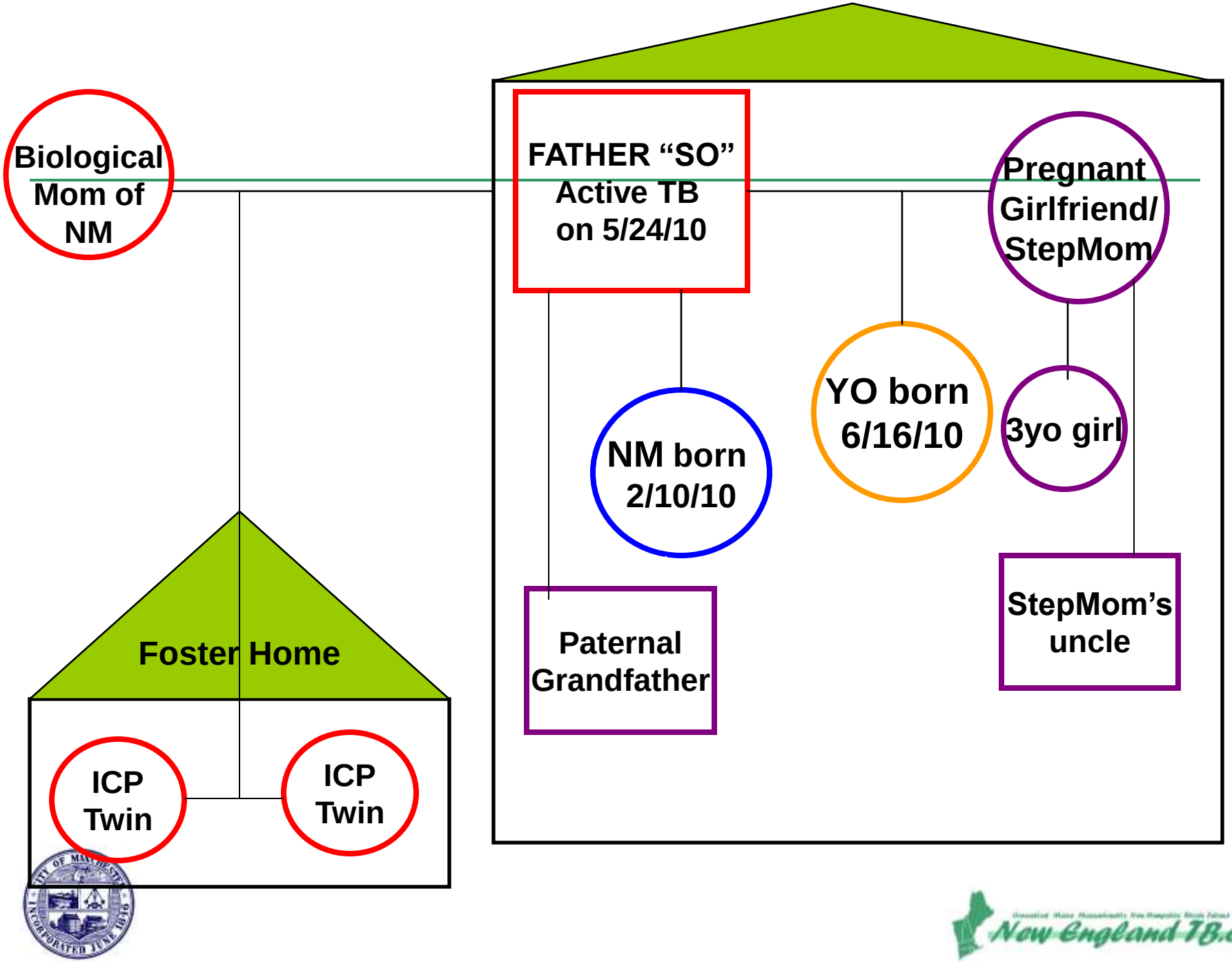
New England TB Consortium
Connecticut • Maine • Massachusetts • New Hampshire • Rhode Island • Vermont

OBJECTIVES

- Discuss TB case management of an infant in setting of a parent with active TB.
- Discuss important factors that contribute to the complexity of TB case management.
- Discuss strategies to cope with the challenges.

CASE HISTORY

- 4/23: 10 week old infant female presented to ED with cough x 2 days, emesis, and fever, failure to thrive?
- H/O prior ED visits with parent concerns of color change, difficulty feeding, and diarrhea.
- F/U for right lower lobe pneumonia


Biological Mom of NM
FATHER "SO" Active TB on 5/24/10
Pregnant Girlfriend/ StepMom
YO born 6/16/10
3yo girl
NM born 2/10/10
Paternal Grandfather
StepMom's uncle
Foster Home
ICP Twin
ICP Twin

Social History

- Patient was removed from biological mother by DCYF, currently living with her 23 y.o. father and his 21 y.o. pregnant (@ 34 weeks) girlfriend. Has been in their care since 7 days old.
- Biological mother has developmental delays, smoked during pregnancy, had little prenatal care and

  ? H/O substance abuse.
- Baby has twin brothers, 18 months old, who were born to same biological parents. They have multiple medical issues, including CMV, severe developmental delays and are living in foster care. Father has visitation rights with the twins.

Social History

- Father immigrated from Honduras 6 years ago with his father.
- Baby's father speaks Spanish only.
- Baby's biological mother US born.
- Father's current girlfriend/step-mother is US born, but spent most of her childhood in Puerto Rico. She speaks English and Spanish.

Social History

- Household members besides father and step-mother are:
- Grandfather (paternal).
- Step-mother's 3 year old daughter.
- Step-mother's uncle, who has diabetes.
- Biological mother has supervised visits twice a week.

Physical Exam on Admission to ED 4/23

- **Vitals:**
  - **T 101 - HR 156- BP 116/92 - RR 54**
  - **O2 sat 96% on room air**

Exam: fussy, calms easily in step-mother's arms. Lungs clear, occasional weak cough, no retractions.

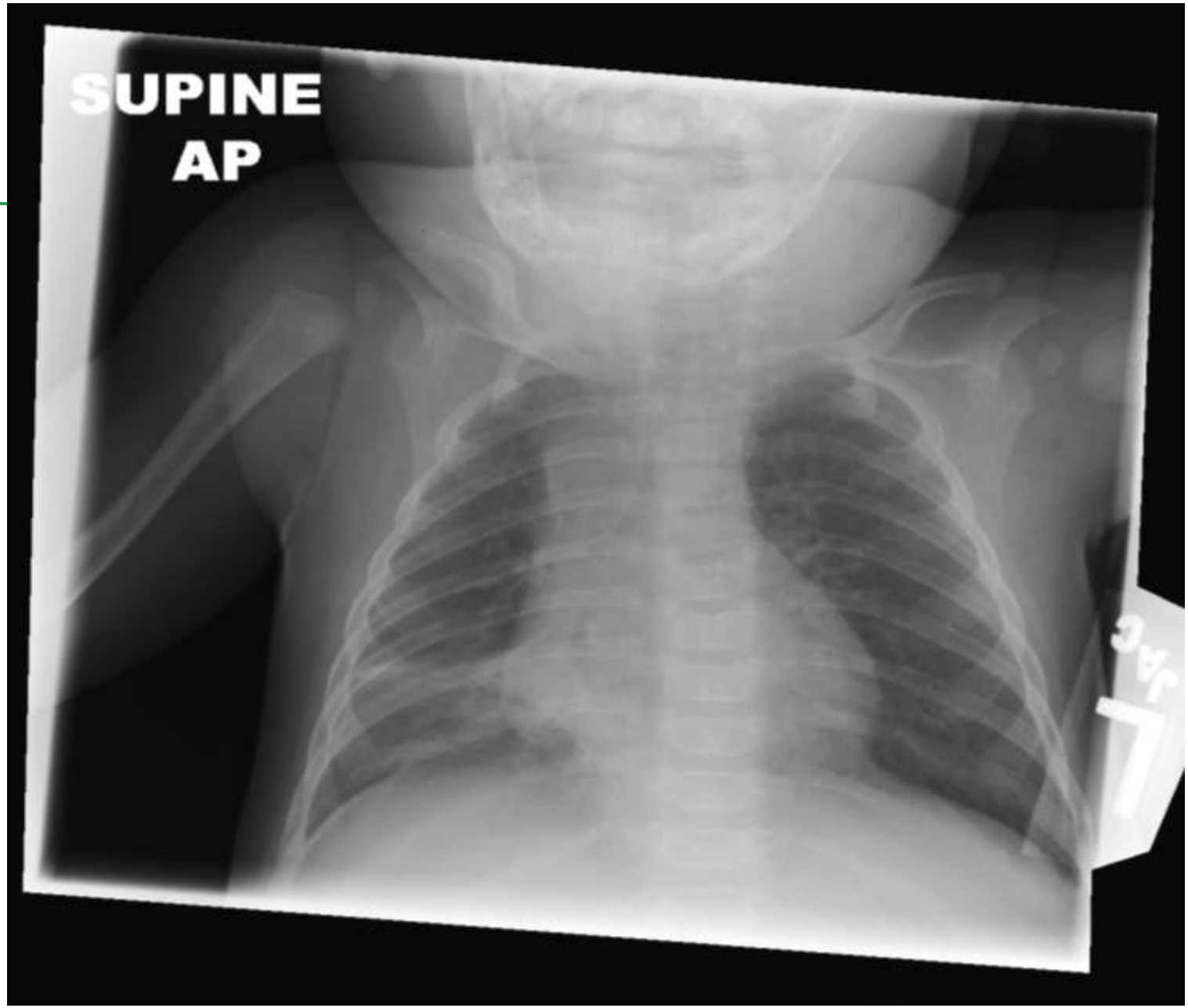
Laboratory Results

- CBC:
- WBC: 25.6 , primarily lymphocytic with positive reactive lymphocytes (4.50-11.50)
- Hematocrit 31 (40.0-54.0)
- Platelets 722 (150-440)
- 4/24: BUN: 5 (5-17) &Creatinine .21 (.5-1.2)

Laboratory Results

- LFT's elevated:
- AST: 107 (8-30)
- ALT: 129   (7-40)
- Alk Phos: 220 (50-136)

CXR



Hospital Course # 1

- Baby admitted to Elliot Hospital on 4/23, discharged on 4/27 with diagnosis of "Upper respiratory infection, right lower lobe pneumonia"
- Discharged on PO Onmicef suspension with instructions to follow up with PCP and repeat LFT's.

Two weeks later

- NM presented again to ED with worsening cough, vomiting, continued difficulty with PO intake, and decreased urine output.
- Decreased breath sounds at R lower base. Mild hypotonia, otherwise appropriate developmentally.
- Baby admitted to local hospital.

Hospital course # 2

- **Labs:**

  CBC: 15.9, Hb 11.1, Hct 32.2, platelets 728

  BUN/creatinine ratio 40 (8.0-20.0)

  HIV negative

  Negative Chlamydia DNA (to rule out chlamydia pneumonia ? If biological mom had chlamydia)

  Negative test for pertussis.

  Cystic fibrosis sweat test negative.

  RSV negative.

Radiographic Findings

- 5/3 CXR: RML infiltrate
- 5/8-5/14: CXR: stable RML consolidations
- CT Chest 5/14: “dense consolidation in RML and RLL with mild infiltrates in RUL. Evidence for paratracheal, subcarinal, and right hilar adenopathy. Focal narrowing of right bronchus intermedius immediately below the take off of RUL bronchus.”

Transferred to tertiary care hospital 5/17

- TST placed and read at 3mm on 5/17.
- Bronchoscopy with BAL and direct laryngoscopy on 5/20 revealed anterior extrinsic compression of the R mainstem bronchus likely secondary to mediastinal lymphadenopathy.
- 5/24: T-SPOT test positive for TB
- Transferred back to local hospital 5/28

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The Index Case

- 5/24:Tertiary hospital does chest x-ray on father and his current girlfriend per hospital policy.
- Father's chest x-ray: well defined cavitary lesion within RUL, with associated linear soft tissue densities. Opacification in RML and LML noted with possible additional area of cavitation in LML. Findings highly suggestive of active TB.
- Step-mother had normal chest x-ray
- More on the index case later.

NM's Bacteriology

- Smear:
- 5/20: BAL AFB negative
- 5/23: GW AFB negative
- Culture:
- 6/9: BAL specimen from 5/20 + M.tb
- 6/22: GW specimen from 5/23 + M.tb

NM's treatment course

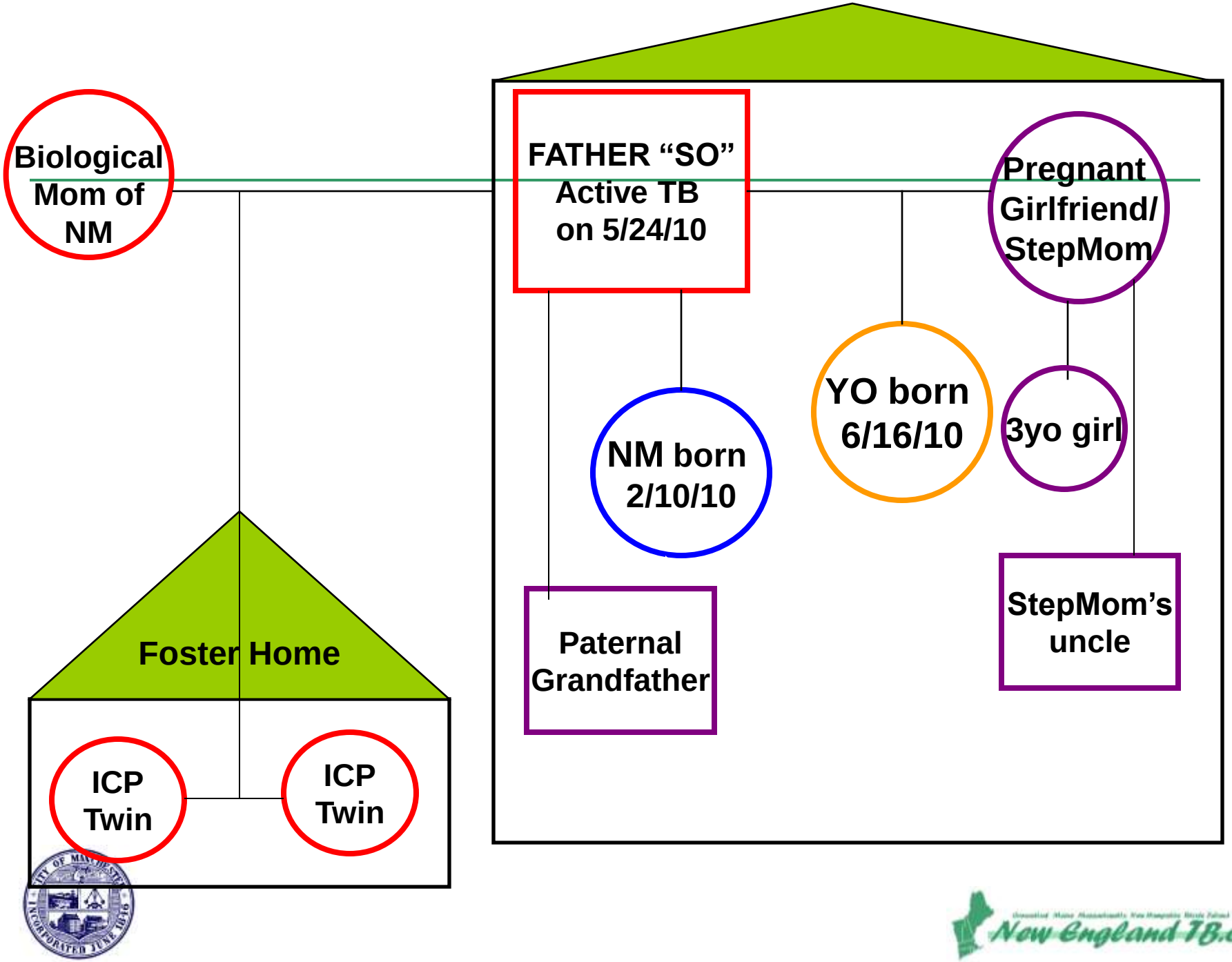
- Started 5/28:
- Rifampin (RIF)
- Isoniazid (INH)
- Ethambutol (EMB)
- Pyrazinamide (PZA)
- Hospital course complicated by aspiration pneumonia and vomiting of medications
- Discharge home on 7/6. DOT by VNA x 3 weeks, followed by public health staff for 9 month total rx

Drug Susceptibility Testing

- 7/7: BAL: INH RESISTANT
- Source case (NM's father) determined to be INH resistant on 6/18
- INH discontinued on both patients

Genotyping

- Genotyping was performed, isolates did match. PCR 06486.
- This PCR type has not been seen in NH (at least since 2005) and matches only 1 other case nationally.
- The family name of the type is “eroamerican”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Source Case: Father "SO"

- 5/24: SO DX with cavitary disease by CXR at tertiary hospital subsequent to child's DX (5/24)
- He was instructed to go home on isolation until PH investigates and provides further instructions.
- No answer at home on 5/25. PH make home visit. Pregnant girlfriend home with her 3 year old and her uncle. SO not at home and girlfriend says he's working but does not know where he is. She is seen texting on her phone during most of this visit.

Source Case: Father "SO"

- 5/25: Spanish speaking PH specialist make another home visit w/ PH RN in evening after patient returns from work.
- After much convincing he agrees to provide sputum specimens and TST plant.
- Girlfriend refuses TST plant for herself and her 3 year old—agreed to consult w PCPs for herself and child
- Uncle agrees to TST. Grandfather not home.
- SO instructed to stay home until results of specimens are received.

SO source case

- SO initially refuses to stay home from work as he is the breadwinner of the family. PH able to convince him to remain home as long as food and other necessities are provided, which public health does.
- 5/25, 5/26, 5/27: Numerous AFB smears positive (later culture confirmed for M.tb)
- 5/27: SO sees ID doctor. Order of home isolation issued by NH DHHS served by PH.

SO source case

- SO continues to deny sx stating he is strong like a “tigre”.
- No cough noted by PH or ID doctor.
- Picture noted on living room wall w SO and the twins. Picture taken few months back. SO seems heavier at the time and admits to over 20 pound weight loss since picture was taken.

SO source case

- SO later informs PH staff that he had the “flu” a couple months back and was coughing and had a fever.
- He says he only coughs now when doing construction (sheetrock) because he does not wear a mask.
- 5/28: SO starts on 4 drug RX by DOT: Rifampin, INH, PZA, Ethambutol

SO source case

- 5/28: SO has 9mm TST read
- Girlfriend's TST 12mm (agreed to plant on 5/26) She had normal CXR at tertiary hospital on 5/24. ON 6/8 Rx INH+ Vit B6.
- Girlfriend's uncle has 0mm TST and denies any sx.
- Girlfriend's daughter has normal CXR, but 20 mm TST read at PCP on 6/3. She starts INH on 6/4.

SO source case

- After PH informs SO that newborn baby, due any day now, will not be able to come home until grandfather is screened, grandfather has TST planted, read on 6/4 =27mm. He has normal CXR on 6/6 and is referred to a provider for medical eval. He starts Rifampin on 7/1.

SO Source Case

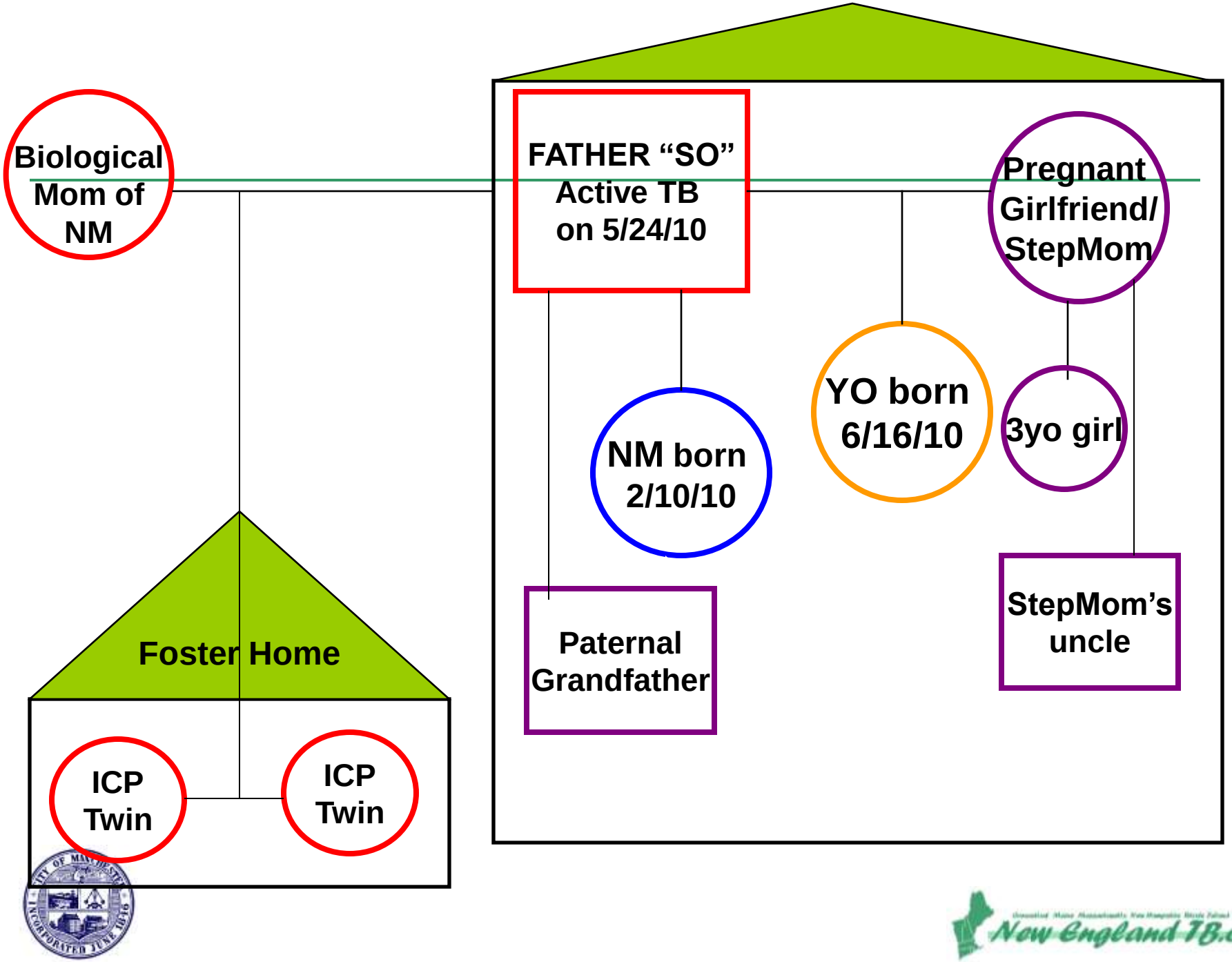
- 6/11:
  - SO had 2 weeks of treatment with clinical improvement
  - Sputum smears had converted
  - Order of isolation lifted
- 6/16: Baby SY, healthy baby girl was born!
- 6/18: INH discontinued due to resistance
- Girlfriend, and her 3 y.o. daughter switch to Rifampin RX due to SO's INH resistance.

Bacteriology: Father

Date	Smear	Culture	DST
5/25/10	AFB pos	*M.tb*	R: INH
5/26/10	AFB pos	*M.tb*	
5/27/10	AFB pos	*M.tb*	
6/8/10	AFB neg	Neg	
6/9/10	AFB neg	Neg	
6/10/10	AFB neg	Neg	

Treatment of SO

- RIF, INH, PZA, EMB from 5/28 to 6/10
- Daily for 14 doses
- 6/18: INH D/C upon learning of resistance
- SO had INH resistance at low and high levels (0.1 and 0.4mcg/mL)
- Twice weekly for duration of RX
- Completed RX on 11/25 (Thanksgiving!)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Treatment of household contacts

- Girlfriend completed 4 months Rifampin
- Her 3 y.o. completed 6 months Rifampin
- Grandfather completed 4 months Rifampin
- Uncle had second 0 mm TST on 8/11 and remains asymptomatic.

The twins: “KO” & “IO”

- Both see SO 3-4 times a month for 1 ½ hours at a time. Both immunocompromised
- IO last visit 5/8 & KO last visit 5/24
- KO: PPD read 5/28 = 0mm
- IO PPD read at PCP on 5/27 = “no bump”
- 2/4 IO has RSV- CXR shows acute bronchiolitis and on 4/6 CXR indicates RAD or viral bronchiolitis ? Atelectasis or RML PNU
- 5/9 KO has fever 106 - CXR indicates viral illness

The twins

- PH consults with PCP asking about window prophylaxis until next TST 8-10 weeks from first TST as recommended.
- PCP refers to pulmonologist who suggests repeat CXR and follow up appt on 6/29 with pulmonologist for medical evaluation
- 6/16: KO CXR: no acute cardiopulmonary process seen
- 6/17: IO CXR normal appearing 2 view of chest

The twins

- Pulmonology appt scheduled for 6/29
- Both “No show” at appt. PH learns that family went to VA, where IO became sick. IO had fever of 100, O2 sats 88. Foster parent calls PCP and IO Rx W/ Prednisone and starts vomitting
- Pulmonology appt rescheduled to 7/6, but twins do not make appt as IO is sick and admitted in local hospital

The twins

- 7/8 Consult between PH medical director, PCP, and pulmonologist.
- Have twins been evaluated for active TB?
- Are they to begin window prophylaxis (Rifampin)?
- 7/9: KO starts Rifampin 150 mg liquid via G-Tube
- 7/13: IO has appt w GI specialist to consider g-tube due to vomitting & 2 # wt loss in 6mo

The twins

- 7/15: IO starts Rifampin 150 mg
- Foster mother expresses insult and invasion of privacy by PH counting pills to confirm # doses of window prophylaxis.
- 7/22: KO TST “negative” read by hospitalist at local hospital
- 7/30: IO TST “< 5mm negative” read at PCP
- Window prophylaxis D/C for both

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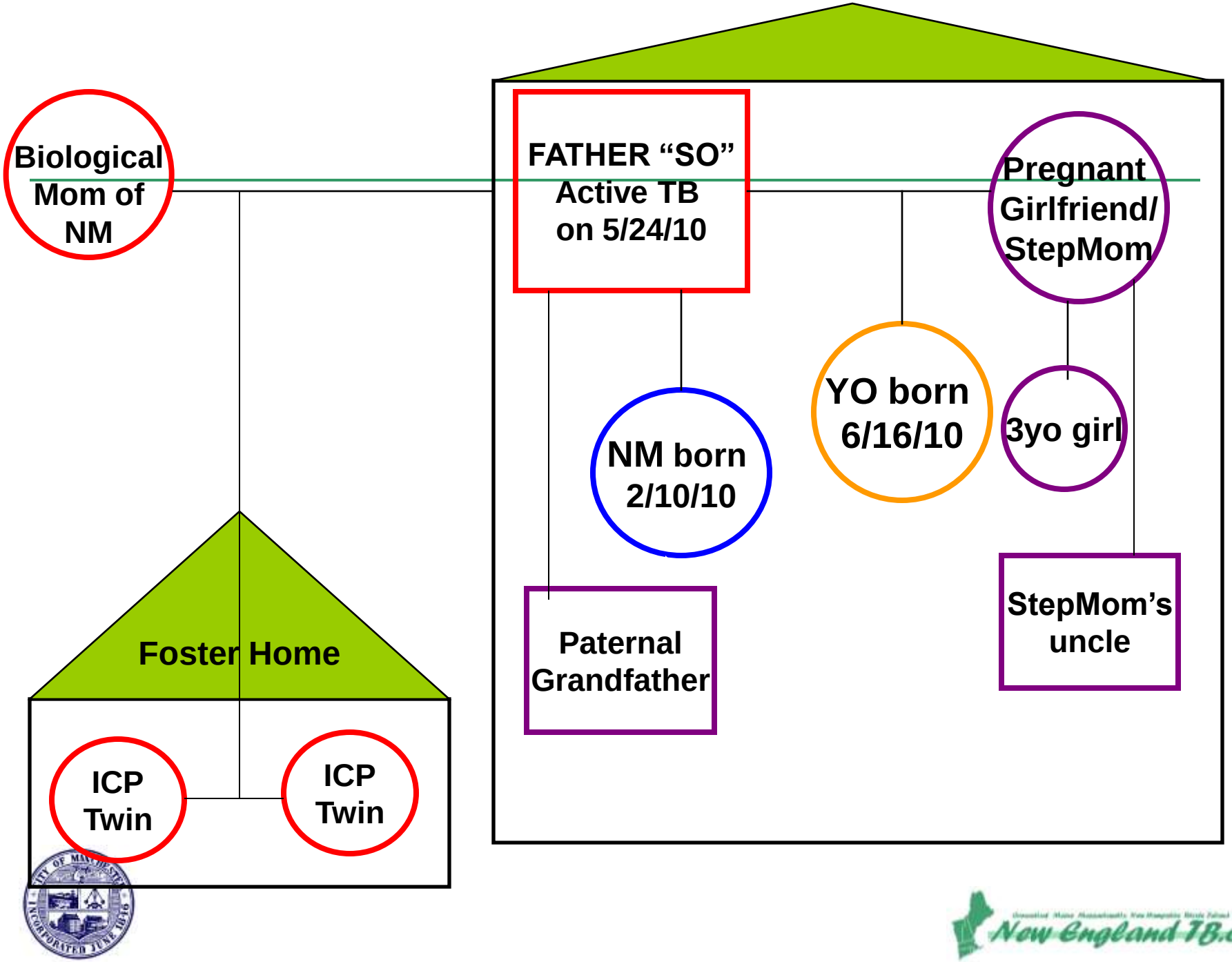
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Total contacts = 202 (35 /SO + 167 /NM)

- SO: 35 contacts include:
- 1 = active infant daughter of SO
- 3 = household contact w + TST, all normal CXR and completed RX.
- 2 = high risk immunnocompromised twin sons living in foster care. Both had neg. TST x 2, normal CXR, and received Rifampin window prophylaxis until 2nd - TST.
- 4 = + TST: 3 co-workers/ 1 interpreter—all foreign born
- Rest of contacts, caseworkers, etc., all negative TST
- 2 contacts screened & refused TST and were found to be low risk

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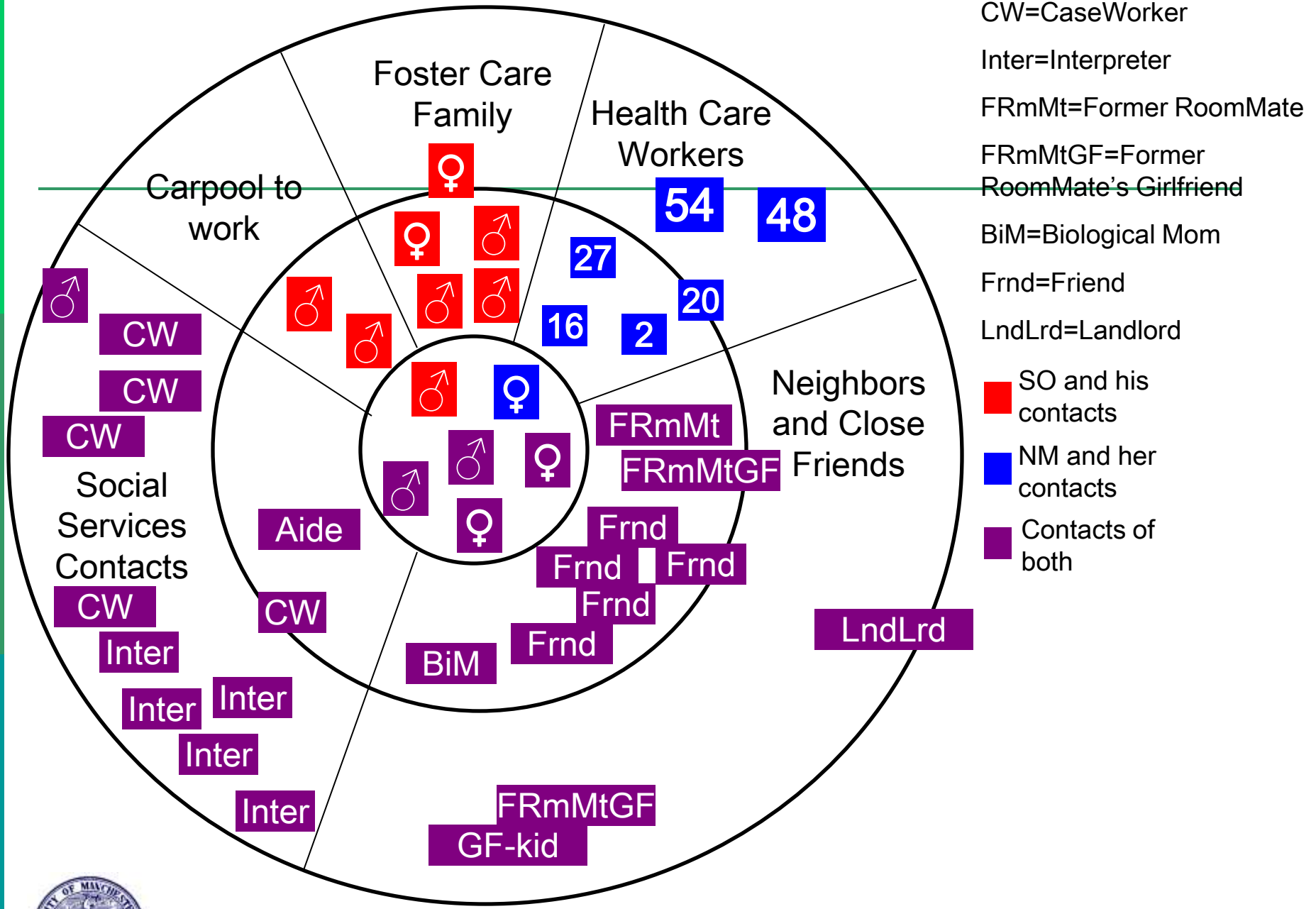
Contacts to baby NM = 167

- 97 local HCW had TST & 70 screened at tertiary hospital include: (all hospitals did their own contact investigation)
- 20 from one local ED hospital
- 75 from hospital where baby hospitalized x 2 before TX to tertiary hospital. All HCW tested negative except 3 who had positive prior TST. Only 27 were later found to be true contacts—the rest were “worried well”
- 2 ambulance staff who TX baby from local to tertiary hospital
- Out of 70 HCW screened at tertiary hospital, 16 were found to be true contacts and either had TST or Sx analysis. No + TST found except those with prior +. All were asymptomatic



CW=CaseWorker

Inter=Interpreter

FRmMt=Former RoomMate

FRmMtGF=Former RoomMate's Girlfriend

BiM=Biological Mom

Frnd=Friend

LndLrd=Landlord

SO and his contacts

NM and her contacts

Contacts of both

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♂ SO

Feb-Apr: Undetected Active TB

♀ NM

Feb: 10 Born

Feb: 17: Moved to SO home (BiM had neglected her)

April

Apr: Stepmother observes NM "just not right"; ER visits
23: Hospitalized
27: D/C home

May

May: 3: in local hosp
17: TST 3mm; to tert hosp
20: CXR; BAL AFB-
23: GW AFB-
24: T-spot +
25: MHD notified
27: 4-drug started
28: back to local hosp

May: 24: CXR
25: TST 9mm; AFB+
26: AFB+
27: AFB+
28: Daily DOT

May 27: Isolation order

June

June: 4: GW culture +
9: BAL(5/20) culture +
10-12: GW AFB-
15: GW AFB rare
21: GW AFB-
22:GW (5/23) culture +
24: GW, BAL AFB-

June 16: Stepsister (YO) born

June: 8: AFB –
9: AFB-
10: AFB-
11: Isolation ends; DOT 2x/wk;
18: INH resist identified

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♂ SO

Feb-Apr: Undetected Active TB

♀ NM

Feb: 10 Born

July

July: Issues w/ Contacts FostFam, Former RmMt, GF of Former RmMt, Child of GF

July: 6: D/C home
6: DOT 2x/d; VNA
7: INH resist ident.
16: DOT 1x/d
29: MHD takes over DOT 1x/d

August

Aug: 16: YO hosp (UTI, pneumonia)
18: YO DC home

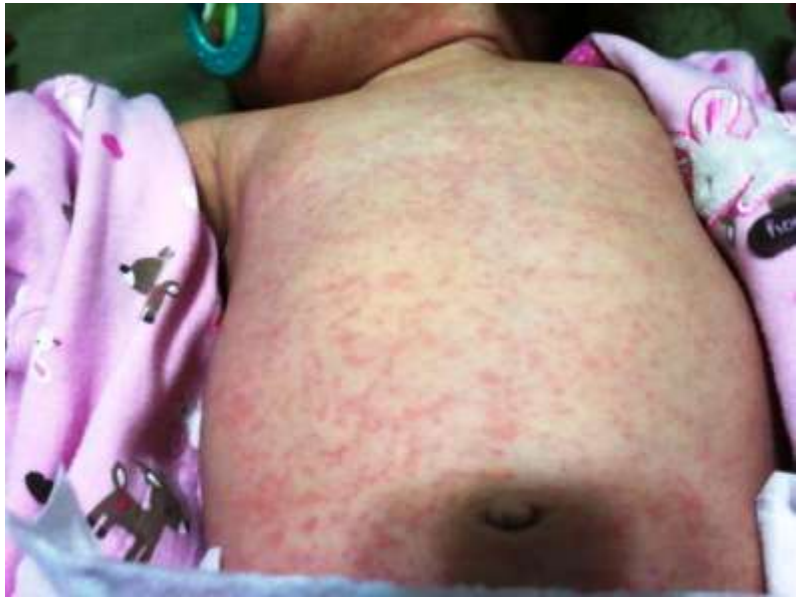
Aug: Issues w/ Contacts continue

Aug: 18: DOT 3x/wk
30: DOT 2x/wk

Sept

Oct

Oct: Problems w/ DOT—gagging, vomiting
10: **Rash**; Meds stopped
11: Allergy to meds ruled out; DOT 2x/wk resumed
29: Decision for DOT for 9 mon



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♂ SO

Feb-Apr: Undetected Active TB

♀ NM

Feb: 10 Born

Nov

Nov: 25 SO- DOT completed!!

Nov: DOT challenges continue

Dec

Dec: DOT challenges continue

Dec: NM meeting developmental milestones

Jan

Jan: DOT challenges continue
10: ER w/ vomiting/diarrhea
20: ER; admitted RLL pneumonia
24: D/C home

Feb

Feb: 10: Healthy, happy, beautiful 1-year-old celebrates her birthday!
28 DOT to be completed!!

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Complexities in case management

- Low socio-economics
- Uninsured/ no health care provider
- Language barrier/speaks only Spanish
- Little formal education ? Understanding of medical complexities
- No transportation for medical appts
- Lack of trust initially to PH authority
- Custody issues/ court appointments

Complexities in contact investigation

- Family not trusting in PH authority /does not disclose contacts
- PH has to go outside of family unit, i.e., caseworkers to get understanding of family's contacts
- PH has to try to maintain confidentiality, but needs to obtain information for public health investigation

Family Dynamics

- Index case is breadwinner—needs to work to provide for his family
- Step-mother has problems with post-partum depression after delivery of YO. We later learn she has a hx of depression. She is the main caretaker of her active 3 year old, the sick baby and her newborn, who are only 4 months apart
- Uncle moves out. Step mother considers him like her father and has difficulty with the situation

Strategies to cope with complexities

- Look for the strengths in the situation:
- Parents (father and his girlfriend) were persistent in seeking care for their sick baby
- They obviously love their children and care for them well. They are clean and seem well adjusted. Parents show in many ways that the children are their priority
- We need to take them where they are at, and try to work with them, i.e. assist in making appointments, transportation, help provide food and other necessities, etc.

Need flexibility and creativity

- We had to work around SO's work schedule for DOT and later step-mother's schedule for NM's DOT after step-mother starts her new job
- Spanish speaking PH specialist develops great rapport with the family and becomes a source of support during much turmoil for this family
- Family overwhelmed-PH keeps track of when med refills are due and delivers from pharmacy to home.

Creativity

- After having difficulty reaching a close contact (former roommate, and co-worker who carpooled with SO), we learned he played soccer in a city park. PH staff goes to the game and asks players to identify him. We speak to him and learn his girlfriend is pregnant, has a 1 ½ old child, who were all close contacts to SO. The "soccer player" is reluctant to get TST and follow up. He is offered an incentive of a grocery card to get TST and another card for getting TST read. He has + TST, normal chest x-ray and starts Rifampin rx. His g.f. and her son both have negative TST.

Team approach

- Infection control nurse at local hospital arranged for discharge planning meetings with multiple professionals involved in the baby's case. This lead to a smoother transition for baby's care at home upon discharge
- DCYF caseworker, who has worked with the family for nearly 2 years, since the twins were born, was very helpful in providing information regarding contacts during critical period for contact investigation

Team approach

- ID doctor gains trust of SO and step-mother. They ask for him to provide for baby's care upon her discharge from hospital. He is accessible to PH staff and understands the work that is involved from PH in complex case.
- Compounding pharmacist for baby's meds also accessible and accommodating.

Team approach

- Spanish speaking PH Specialist made great strides in gaining trust from family. She has gone above and beyond—even working holidays and on vacation at times so that DOT would go uninterrupted.
- PH staff provides support to main caseworker especially during the peak of the investigation.
- PH medical director and state PH &TB program staff lend support during case

SO and NM now:

“Tigre” is feeling well & gained about 30 pounds

Baby is beautiful—just turned one—she is now walking, appears healthy and seems right on task developmentally!