

Work and Reproductive Health: Awareness and Prevention

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ACKNOWLEDGEMENT

Funding and support for this project has been provided by the State of Washington, Department of Labor & Industries, Safety & Health Investment Projects

CONTENT AND OBJECTIVES

I. Background and epidemiology

- Occupational factors that affect reproductive health positively and negatively

II. Occupational reproductive hazards

- Strategies to reduce exposure

III. Medical legal framework

IV. Case studies

- Back strain, infertility, and miscarriage

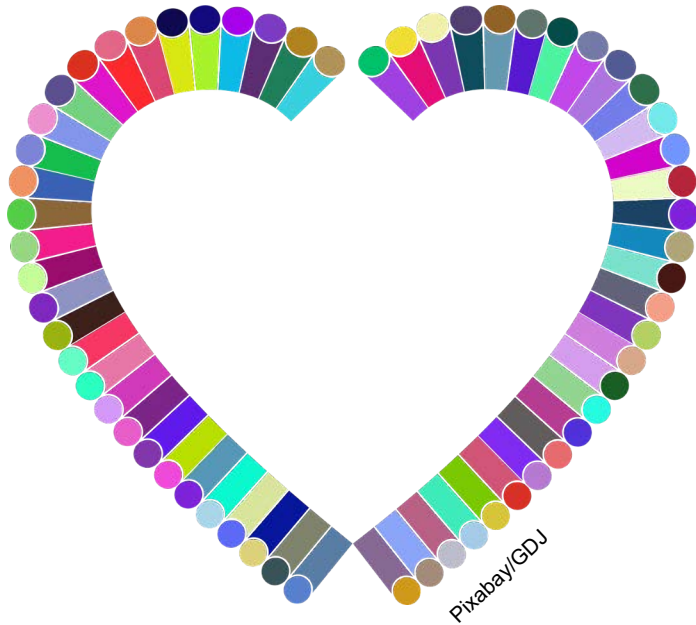


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I. BACKGROUND

Love and work are the cornerstones of our humanness. —Sigmund Freud

A or B: What do you think?

- Which group has the higher rate of preterm birth?
 - A) Women who work for income throughout their pregnancy
 - B) Women who mostly stay home throughout their pregnancy
- Which occupational group has the lower rate of small for gestational age babies?
 - A) Nurses
 - B) Workers in other industries

WORKING WHILE PREGNANT



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EPIDEMIOLOGY

EXPECTED RATES OF ADVERSE OUTCOMES¹:

- 1 in 5 recognized pregnancies: Early pregnancy loss or miscarriage
- 1 in 10 pregnancies: Preterm birth
- 1 in 10 newborns: Low birth weight
- 1 in 10 couples: Infertile
- 3 in 100 newborns: Birth defects
- 1 in 100 pregnancies: Fetal death (stillbirth)

OCCUPATIONS AND OUTCOMES

- **European study²**
 - 13 birth cohorts, n>200,000 mother/child pairs
 - Employment during pregnancy vs not employed:
Less preterm birth (OR 0.86, CI 0.81–0.91)
 - Nurse vs other jobs: Less SGA risk (OR 0.91, CI 0.84–0.99)
 - Food industry vs other jobs: More preterm birth
(OR 1.50, CI 1.12–2.02)
- **National Birth Defects Surveillance study³**
 - 8977 cases over 6 years, 3833 controls
 - Example: offspring with oral cleft
 - Health care work protective (OR 0.80, CI 0.65-0.98)
 - Janitorial work increased risk (OR 1.43, CI 1.01-2.02)

SOME LOW PAYING JOBS

MAY INCREASE RISK OF ADVERSE OUTCOMES

- **French study⁴**: Maternal deprivation plus 3 or more occupational hazards during pregnancy increased risk of preterm birth (RRa= 3.9; CI 1.2-12.4)
- **Swedish study⁵**: Class differences in maternal working conditions explained 14 to 38 percent of low-birth-weight births and 20 to 46 percent of preterm births.

A or B: What do you think?

- Which group has the higher rate of preterm birth?
 - A) Women who work for income throughout their pregnancy
 - B) Women who mostly stay home throughout their pregnancy
 - Answer: B
- Which occupational group has the lower rate of small for gestational age babies?
 - A) Nurses
 - B) Workers in other industries
 - Answer: A



II. OCCUPATIONAL REPRODUCTIVE HAZARDS



Hazard ≠ Exposure ≠ Disease

Hazard: Static



Human Contact

Inhalation
Ingestion
Skin absorption
Injection
Placental transfer

Exposure

(Dynamic,
Through
Biological
Uptake)



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Absorption
Distribution
Metabolism
Excretion

Repair &
physiologic
adaptation

**Target
Organ(s)
Contact**

**Biologic
Change**

**Health
Effect**

Adopted from NAS/NRC.Human Biomonitoring for Environmental Chemicals 2006 <http://www.nap.edu/catalog/11700.htm>

Which hazard causes this?

Baby Doe was born deaf, microcephalic, and small for gestational age. Which hazard is the most likely cause?

- A) Cytomegalovirus
- B) Ethylene oxide
- C) Heavy labor job
- D) Radiation

BIOLOGICAL HAZARDS

- TORCH infections: toxoplasmosis, other agents, rubella, cytomegalovirus (CMV)⁶, and herpes simplex
- Hepatitis B, Coxsackie virus, syphilis, varicella-zoster virus, HIV, and human parvovirus B19⁷
- Maternal illness due to Influenza, MRSA, VRE, others (COVID-19)⁸

CHEMICAL HAZARDS ⁹

- Hazardous drugs like methotrexate
- Some sterilants (high level disinfectants)
 - Glutaraldehyde, ethylene oxide, and formaldehyde
- Anesthetic gases
- Glycol ethers, electronic and semiconductor workers
- Carbon disulfide, viscous rayon manufacturing
- 84,000 chemicals in the workplace with unknown reproductive toxicity

LEAD ¹⁰



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You Can't Judge Very Well
how a color will look on your house by the way it looks on the color card. The better way is to have your painter try the color on a few boards of the surface to be covered. Change it till it suits you. You can do this if your paint is mixed on the job, of

COLLIER White Lead
(Dutch Boy Painter Trade-Mark)

and pure linseed oil. White lead paint may be tinted any conceivable color. It is the standard long-wear paint that has proven its worth through generations of use. It is blotch-proof, scale proof, crack-proof.

Come to us for your paint supplies and

Ask for our Painting Points
containing color schemes and many helpful painting suggestions.

T. N. COLEMAN,
Druggist
C. W. BIGERT

An illustration of a painter sitting on a barrel, holding a brush and a color card. The painter is wearing a cap and a striped shirt. The color card is a small rectangular object with a circular logo on it.

Wikimedia Commons



Photo by Ako Mahmoodi, Wikimedia Commons

PHYSICAL HAZARDS

- Strenuous work¹¹
 - Over 22 pounds lifted more than 10 times per day
 - Abdominal trauma and placental abruption
- Shift work, night shift, and long hours¹²
 - Shift work and preterm delivery: OR 1.13 (1.00-1.28)
- Radiation¹³
 - 5.0 mSv (500 mrem) max for women who have declared a pregnancy

EMOTIONAL HAZARD VS. BENEFIT OF WORK ¹⁴



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AVOID UNNECESSARY RESTRICTIONS

There is no evidence to conclude that activity restrictions in average risk women will improve outcomes¹⁵



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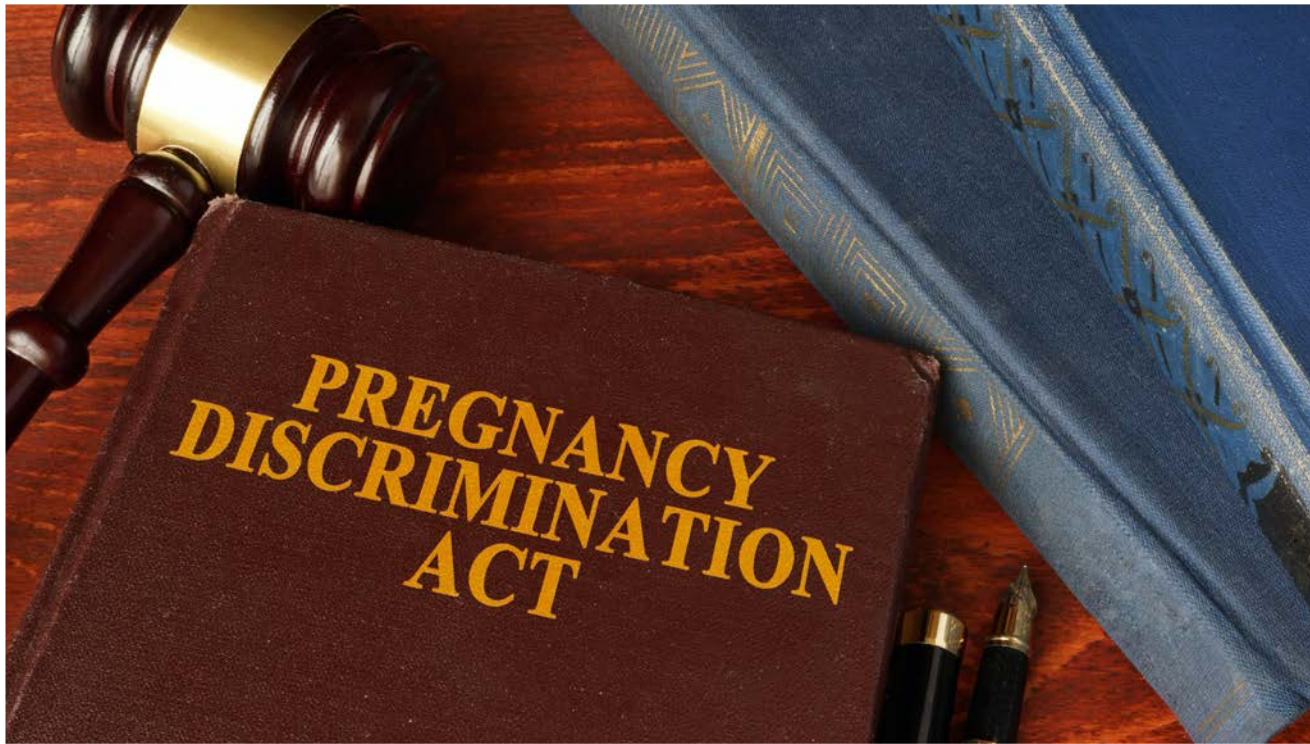


Which hazard causes this?

Baby Doe was born deaf, microcephalic, and small for gestational age. Which hazard is the most likely cause?

- A) Cytomegalovirus
- B) Ethylene oxide
- C) Heavy labor job
- D) Radiation

- Answer: **A**; CMV is a leading cause of congenital health effects, especially deafness



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III. MEDICAL LEGAL FRAMEWORK



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WORKING WHILE PREGNANT

What gives a pregnant woman the right to request and receive a 17-pound lifting limit, frequent restroom breaks, and access to snacks at work during pregnancy?

- A) Pregnancy Discrimination Act
- B) WA Industrial Safety and Health Act
- C) Americans with Disabilities Act
- D) WA Healthy Starts Act

PREGNANCY DISCRIMINATION ACT (PDA)

Protects pregnant women from job discrimination

- Washington Law Against Discrimination (WLAD) is the state law
- Employers with at least 8 employees may not refuse to hire, deny promotion, or take negative action on the basis of pregnancy or childbirth.
- Employers may not implement fetal protection policies
- Employer must offer equivalent job-related modifications (or accommodations) for pregnant workers as other workers

AMERICANS WITH DISABILITIES ACT (ADA)

Federal Standard

- Requires that employers make a reasonable accommodation to limitations of otherwise qualified individuals with disabilities, unless it results in undue hardship to the employer
- Disability: an impairment that substantially limits one or more major life activities.
- May include complications of pregnancy like anemia, sciatica, gestational diabetes, preeclampsia, morning sickness, swelling in the legs, or depression
- Accommodations: Modified schedule, work from home, frequent breaks, other
- ADA accommodation request requires a doctor's note



WA STATE LAWS

More worker friendly

- **WA Healthy Starts Act:** Requires employers with 15 or more employees to grant any pregnant woman certain accommodations on request, including breaks for restroom, sitting, eating, and drinking, and 17-pound lifting limit; no doctor's note needed

PAID FMLA AND JOB SECURITY

State and Federal Standards

- WA provides 12 weeks of paid family and medical leave to eligible workers, for all employers, large or small, starting in 2020
- Generally cannot be fired during the 12 weeks of leave
- Federal FMLA: Offers eligible workers 12 weeks unpaid time off within a 12-month period, applies to large employers with >50 workers

Washington State Industrial Safety and Health Act (WISHA)

Employer's Responsibilities

- General duty clause requires covered employers to provide their employees with a workplace free from recognized hazards
 - Washington State Industrial Safety and Health Act (WISHA) is Washington's state-based OSHA
 - Permissible exposure limits consider the worker, not the developing fetus
- Workers have a **Right to Know** the contents and health hazards of chemicals per Safety Data Sheets (SDS)

WORKERS' COMPENSATION

Usually not applicable

- Provides medical care and wage replacement for on-the-job injuries and illnesses that are caused by the unique conditions of work
- Usually not applicable to adverse reproductive outcomes, which are multifactorial and/or idiopathic in most cases

WORKING WHILE PREGNANT: YOUR RIGHTS

What gives a pregnant woman the right to request and receive a 17-pound lifting limit, frequent restroom breaks, and access to snacks at work during pregnancy?

A) Pregnancy Discrimination Act

B) WA Industrial Safety and Health Act

C) Americans with Disabilities Act

D) WA Healthy Starts Act

- Correct answer: **D**, WA Healthy Starts Act, but only if the worker requests the provisions, & \geq 15 workers

IV. CASE STUDIES



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WAREHOUSE WORKER WITH BACK PAIN

25 y/o G1P0 warehouse worker at 20 weeks gestation with back pain. The diagnosis is sacroiliac (SI) joint dysfunction associated with pregnancy. She wants a doctor's note recommending leave of absence for the remainder of the pregnancy.

Would you:

- Give her what she requested, a note recommending leave of absence until six weeks after delivery, or about six months total.
- Get a careful occupational history and provide a note describing how much she can lift and recommending accommodation.
- Advise her to move to Sweden.



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OCCUPATIONAL HISTORY: KEY QUESTIONS

- What do you do in your job?
- Do you feel physically exhausted at the end of your shift from all the lifting you do at work?
- How many pounds do you normally carry, lift, pull, or push, and at what frequency (times per hour)?
- How many times per hour are spent bending, twisting, or reaching?
- What is the maximum frequency (hours per day) for sitting, standing, and walking required by the job?

MEDICAL LEGAL FRAMEWORK

- **WA Healthy Starts Act:** Employer must limit lifting to 17 pounds if the pregnant worker requests it.
- **ADA:** A complication of pregnancy could qualify as a disability (an impairment that substantially limits a major life activity); if so, could request an accommodation.
- **PDA:** Worker can't be reassigned, placed on involuntary leave, or fired because of pregnancy.
- **FMLA:** 12 weeks of paid leave in WA, but save this for after birth.
- **OSHA:** No ergonomic standard, so the employer can ask worker to lift any amount unless she requests accommodation.

ACCOMMODATION REQUEST LETTER

Which of these is the best verbiage?

- 1) Patient should not lift more than 10 lbs or perform activities that require bending.
- 2) Patient can continue to perform most functions of her job while pregnant. She has a pregnancy related condition that requires her to limit lifting to no more than 10 pounds twice per hour.

SAMPLE ADA ACCOMMODATION LETTER

To Whom It May Concern:

On February 15th, 2021, my patient, Ms. Jane Doe, consulted with me in my office. I diagnosed Ms. Doe, who is pregnant, with a complication of pregnancy. Consistent with this complication, Ms. Doe needs an accommodation at work until after her baby is born on or around June 1st, 2021. She may continue clerical work, quality control inspections, light-weight sorting, and other similar tasks. From today through June 1st, she may lift up to 10 pounds up to 3 times/hr; squat up to 4 times/hr; and stand or walk with a 5-minute break at least every 30 minutes. She should avoid climbing ladders. Because of her condition and associated lifting limitation, she is having difficulty pulling heavier boxes off the shelf. For appropriate accommodations, such as types of lift equipment, you may wish to consult the job accommodation network at www.askjan.org.

(See pregnantatwork.org¹⁶, UpToDate “working while pregnant,” or ACOG employment considerations¹⁷ for details)

PRESCRIBE ERGONOMICS EVALUATION?



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HAIRSTYLIST WITH INFERTILITY ¹⁸

Photo by Maksim Chernishev on Unsplash



28 y/o G0P0 hairstylist cannot conceive after three years of trying. She wants to know if her job is the cause. Would you:

- Refer the patient and her partner to an infertility specialist to identify the cause.
- Get an occupational history regarding the patient and her partner.
- Refer patient to the UW Pediatric Environmental Health Specialty Unit (PEHSU) and/or OEM clinic (Dr. Cherry) for a detailed occupational exposure assessment.
- Advise her to change careers as soon as possible.



OCCUPATIONAL HISTORY: KEY QUESTIONS

- “What do you do in your job?” Be specific about the tasks you perform at work
- “What are you concerned about in your workplace?” The specific product name or actual chemical name would be most helpful, as well as the safety data sheet if available
- “How much time do you spend using each thing that you are concerned about in your workplace?” Do you have good ventilation?
- “Do you use gloves when performing your job?” What type of gloves?
- “Are you aware of any coworkers having difficulty becoming pregnant?”
- “What type of work does your partner do?”



A CONCERNING HISTORY

This would warrant further investigation

She replies:

I do several Brazilian blowouts per week, and I apply Professional Brazilian Blowout Solution while wearing latex gloves. I do this about an hour per day. Ventilation in the salon is poor, and the odor gets pretty strong. My partner is a police officer. He practices at the shooting range every Friday.

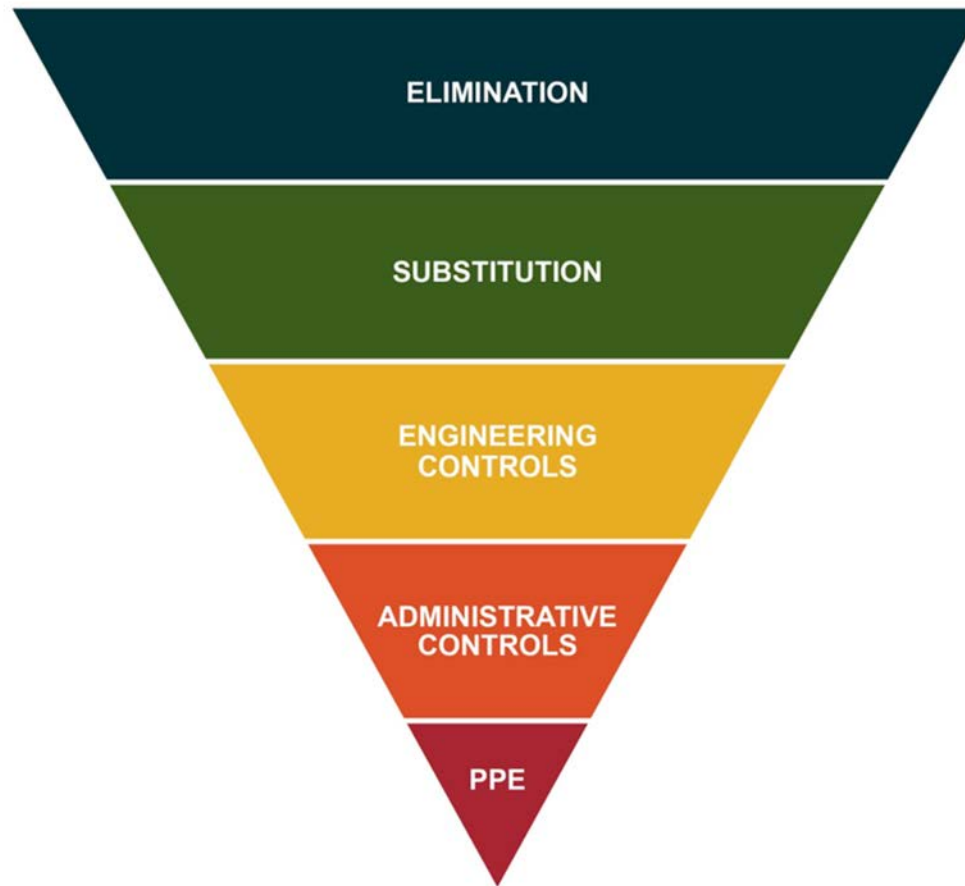
RESOURCES

- Mother to Baby fact sheets¹⁹
- NIOSH health hazard evaluations²⁰
- OSHA and hair salon (web browser)
- Professional Brazilian Blowout Solution and safety data sheet (web browser)
- OSHA and NIOSH webpages on occupational reproductive hazards^{21, 22}
- Chemical hazard databases: ChemHAT²³
- PubMed search

FINDINGS

- This blowout solution is well known to release formaldehyde, an irritant and potential carcinogen, which has a relatively low permissible exposure limit of 0.75 ppm;
- Formaldehyde is a suspected germ cell mutagen (Category 2 EU REACH and ChemHat) and may cause birth defects per ChemHat.

HIERARCHY OF CONTROLS



LEGAL FRAMEWORK

- **PDA:** Mostly N/A. She can't be reassigned, placed on involuntary leave, or fired due to trying to conceive.
- **FMLA:** N/A. She can't take leave for concerns that work chemicals contribute to infertility. She might get leave for f/u appointments to infertility specialist.
- **ADA:** N/A. Wanting to conceive is not a disability.
- **WISHA (OSHA):** Formaldehyde standard

PARTNER EXPOSURE

Shooting ranges: Notorious for lead



Photo by Nancy Beaudet

- Lead is well known reproductive hazard for both men and women
- Take home exposure could occur
- Pregnant women at risk of take-home exposure are supposed to have a lead test per ACOG²⁴
- In this case, I would check lead level on both partners

CONCLUSIONS

What to do in this scenario

- Refer to infertility specialist
- For occupational concerns about formaldehyde and lead, patient or provider may refer to OEM clinic or contact PEHSU²⁵
- Advise patient to avoid using the formaldehyde product OR use controls (ventilation, air monitoring)
- Order a blood lead test

MISCARRIAGE



23 y/o G2P0 nurse's aide just found out she is pregnant and about 8 weeks along. She had a first trimester miscarriage last year and fears something she caught at work was the cause. She wants a doctor's note prohibiting work with patients who have infectious diseases. Would you:

- a) Give her what she requested
- b) Get a careful occupational history, go from there
- c) Advise her to change jobs

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RISK FACTORS

1 in 5 recognized pregnancies end in early pregnancy loss. Cause is usually unknown.

The following may increase risk²⁶:

- Advancing maternal age over 35
- Medical conditions in the mother
 - Infection, diabetes, obesity, thyroid disease
- Medication and substance use
 - Smoking, alcohol
- Environmental factors
 - Lead, air pollution

A CONCERNING HISTORY

- Works in home health providing personal care, such as bathing and feeding, to end stage cancer patients, some of whom are immunocompromised. She spends about an hour in each of four different homes per 8-hour shift. She uses gloves but not necessarily a mask if she knows the client well.

BEST RISK COMMUNICATION

Risk = Hazard + Outrage²⁷

1. Don't over-reassure
2. Proclaim uncertainty
3. Validate emotions, yours and your patient's
4. Give people things to do
5. Share dilemmas

BEST ADVICE

Keep working, adhere to infection control

- Universal precautions (hand hygiene, PPE)
 - *(right answer)*
 - Soap and water is adequate for CMV prevention
- Avoid excessive use of disinfectants
- Keep working

OTHER GOOD ADVICE

- Minimize other environmental exposure
 - Dietary exposure to mercury, including certain types of fish;
 - Pesticides;
 - Potentially toxic household products;
 - Remodeling involving old paint or solvents;
 - See Information for Families, <https://prhe.ucsf.edu/info>²⁸
- Eat a healthy diet, manage stress, get moderate daily exercise and adequate sleep
- Prenatal care including immunizations and prenatal vitamins

TEAM BASED APPROACH

Teamwork is the best approach to support occupational reproductive health.

- Employer
- Human resources department
- Legal services and advocates
- Health care provider
- Occupational health & safety specialist
- Worker/patient

OBJECTIVES RECAP

- I. Background and epidemiology
 - Occupational factors that affect reproductive health positively and negatively
- II. Occupational reproductive hazards
 - Strategies to reduce exposure
- III. Medical legal framework
- IV. Case studies
 - Back strain, infertility, and miscarriage

BACKGROUND & EPIDEMIOLOGY

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BACK STRAIN CASE REFERENCES

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