

**Skin-to-skin  
for all mothers and term babies at birth**

1

**Louise Dumas, RN, MSN, PhD**  
 Honorary professor-researcher,  
 Université du Québec en Outaouais  
 (Western Quebec)

Guest researcher,  
 Karolinska Institutet (Stockholm, Sweden)

Lead assessor, Baby-Friendly Initiatives,  
 WHO/UNICEF, BCC, Quebec Ministry of Health



Picture from Dumas, caesarean section,  
Gatineau, with permission

© copyright Louise Dumas

---

---

---

---

---

---

---

---

**Plan for the next hour**

2

- ❖ Differentiate kangaroo and skin-to-skin
- ❖ Some little history
- ❖ Techniques for skin-to-skin
- ❖ How to get and find evidences
- ❖ Evidence: skin-to-skin at birth
- ❖ Conclusions
- ❖ Practices to adopt

I have no conflict of interest with this presentation

© copyright Louise Dumas

---

---

---

---

---

---

---

---

**Kangaroo or skin-to-skin ?**

3

**VERY important difference:**

- ✓ Kangaroo:  
 Prolonged abdomen to abdomen contact of premature baby  
 with mother or father Charpak et al., 2000, 2005; Hedberg-Nyqvist et al., 2010
- ✓ Skin-to-skin:  
 Nude abdomen to nude abdomen contact between mother  
 and healthy term infant Dumas, Lepage & Grondin, 2007; Cantrill et al., 2014; Widstrom, 2011 and videos

© copyright Louise Dumas

---

---

---

---

---

---

---

---

Some history: kangaroo care

4

1978 : in Bogota, Colombia  
 not enough spaces or incubators  
 → nosocomial infections

24hr kangaroo, positive consequences on premature babies to stabilize homeostatic parameters.

Clear evidence ...



Bogota Fundacion Canguro

---

---

---

---

---

---

---

---

Links between kangaroo care and skin-to-skin care

5

**Plenty of evidence; was so clear for premature babies, it was thought that there should be some benefits for term babies also....**

First, introduction in industrialized countries in order to

- ❖ facilitate mother's first attachment experiences
- ❖ encourage first close contacts between parents
- ❖ facilitate initiation of breastfeeding

But a lot more was found!!!....

© Copyright Louise Dumas

---

---

---

---

---

---

---

---

What is safe skin-to-skin

6

- Nude newborn's abdomen *directly* on mother's nude chest, *without drying*
- Skin-to-skin is *immediate* (directly from the mother)
- Newborn is completely nude (no diaper, ...)
- Baby is extended as much as possible, so as much skin contact as possible (oxytocin)
- Baby is dried, especially back and head
- Newborn is *then* covered with a dry blanket

DUMAS, 2014; WIDSTROM ET AL. (2011)

© Copyright Louise Dumas

---

---

---

---

---

---

---

---

Skin-to-skin at vaginal birth

7

Newborn is placed *vertically* between mother's breasts



Picture by Dumas, VBAC, Gatineau, with permission

Copyright Louise Dumas

---

---

---

---

---

---

---

---

Skin-to-skin at caesarean section

8

Newborn is placed *horizontally* just below or on mother's breasts



Picture at Miramichi Hospital, New-Brunswick, with permission

Copyright Louise Dumas

---

---

---

---

---

---

---

---

To convince scientifically-driven professionals

9

- ❖ We need the strongest evidence, as skin-to-skin care is still considered a "soft, nice thing to do".
- ❖ So we need evidence to demonstrate that skin-to-skin care is **THE SAFEST** transition to extrauterine life.



Picture from Toronto Public Health, with permission

Copyright Louise Dumas

---

---

---

---

---

---

---

---

How to convince: evidence

10

Quantitative data  
from

- ✓ randomised controlled trials (RCT)
- ✓ systematic reviews
- ✓ meta-analyses
- ✓ cohort studies

NO impression, perception, feeling  
NO qualitative data

© Copyright Louise Dumas

---

---

---

---

---

---

---

---

Important note

11

**We cannot directly apply  
research findings  
from kangaroo care  
to term infants  
and vice-versa**

**Be careful when reading or reporting literature**

© Copyright Louise Dumas

---

---

---

---

---

---

---

---

Evidence: **skin-to-skin care**

12

My choice of presentation  
for this review of literature:

- Physiological benefits for mother and baby
- Benefits on breastfeeding
- Psychosocial benefits for mother and baby



Picture by Dumas, Gatineau, with permission

© Copyright Louise Dumas

---

---

---

---

---

---

---

---

1. Physiological benefits for mother and term baby

13

- Baby's temperature
- Mother's temperature
- Expulsion of placenta
- Decreased vasoconstriction at feet
- Lower salivary cortisol
- Better oxygenation
- Better glycemia
- Better neuromotor organization
- Reduction of pain reaction during painful procedures



Picture by Dumas, Gatineau, post-caesarean section, with permission

---

---

---

---

---

---

---

---

---

---

Baby's temperature

14

- Temperature: central, axillary, at foot
- ALWAYS within normal limits
- Temperature better than for
  - swaddled or bundled baby
  - baby with pyjamas in mother's arms
  - baby on warmer
  - swaddled baby in cot
- For babies born vaginally or by caesarean



Picture from Lac Rapide community, Quebec, with permission

Acolet et al., 1989; Anderson et al., 2003; Christensson et al., 1992, 1994, 1995a; Bystrova et al., 2003, 2008; Carfoot et al., 2005; Fardig, 1980; Fransson et al., 2005; Jonas et al., 2007; Kennel & McGrath, 2003; Marin et al., 2010; Nimbalkar et al., 2014; Nolan & Lawrence, 2009

---

---

---

---

---

---

---

---

---

---

Baby's temperature

15

Skin-to-skin re-warms cold babies better than incubator or warmer (hypothermia  $\leq 36.3$  C)

Christensson et al., 1998; Huang et al., 2006; Huang et al., 2006; Mori et al., 2009-meta-analyses of 23 studies

\*\*\*

Skin-to-skin transfer (ambulance, helicopter) is better than transfer in warmed incubator (sick or premature babies)

Sortheimer et al. 2004, cohort study—not evidence but interesting

---

---

---

---

---

---

---

---

---

---

### Mother's temperature

16

- ✓ Mother's and baby's temperatures are in reciprocity so no "over-heating"
- ✓ Mother's axillary temperature stays directly linked to temperature of baby's feet



Christensson et al., 1998; Bystrova et al., 2003, 2008; Bergström et al., 2007, in Uganda

Picture by Dumas, Gatneau, with permission

Copyright Louise Dumas

---

---

---

---

---

---

---

---

### Decreased vasoconstriction in baby's feet

17

Why this interest in baby's feet?

Skin-to-skin reduces the "stress of being born" (Bystrova, 2003)

More than if

- baby is swaddled
- baby is in mom's arms
- baby is in cot in nursery



Picture from George Dumont hospital, New Brunswick, with permission to Dumas

Newborn's "self-regulation to stress"

Bystrova et al., 2003, 2008; Ferber and Makhoul, 2004; Lagercrantz & Slotkin, 1986

Copyright Louise Dumas

---

---

---

---

---

---

---

---

### Expulsion of placenta

18

Skin-to-skin decreases time for placental expulsion

- so less bleeding
- so less maternal anemia

Marin et al., 2010, 274 women

Copyright Louise Dumas

---

---

---

---

---

---

---

---

**Decreased salivary cortisol**

19

When skin-to-skin was immediate at birth,  
and prolonged for 60 to 120minutes,  
salivary cortisol was low (indicating low stress)

and lower in the 120 minutes group  
compared to the 60 minutes group

Takahashi et al., 2011

© Copyright Louise Dumas

---

---

---

---

---

---

---

---

**Better oxygenation**

20

- ✓ Baby placed skin-to-skin has better oxygen saturation than bundled baby in incubator
- ✓ Baby placed skin-to-skin have better arterial gases at 90 minutes of life than bundled baby in incubator



Picture by Dumas, Gatineau, with permission

Acollet et al., 1989; Christensson et al., 1992; Nolan & Lawrence, 2009; Takahashi et al., 2011

© Copyright Louise Dumas

---

---

---

---

---

---

---

---

**Better heart rate**

21

When skin-to-skin is immediate,  
heart rate is stable

Even faster than  
if skin-to-skin is not immediate  
but around 30 minutes later (...argument for caesarean...)

Christensson, 1992; Takahashi et al., 2011

© Copyright Louise Dumas

---

---

---

---

---

---

---

---

**Better glycemia**

22

Baby placed skin-to-skin has better glycemia at 90 minutes of life than bundled baby in cot



Moore et al., 2012 (Cochrane: 94 babies, 2 studies); Anderson et al., 2003 (Cochrane with 806 dyads, 17 studies); Christensson et al., 1992 ----translated into ABM Clinical protocol 1: Guidelines for blood glucose monitoring and treatment in term and late-preterm neonates, 2014

Picture from Miramichi Hospital, N-B, with permission

---

---

---

---

---

---

---

---

**Neuromotor organization**

23

During first 4 hours of life

- ✓ More episodes of calm sleep
- ✓ Better scores for optimal flexion
- ✓ Less extension movements

→ So babies are more coordinated and more stable

Ferber and Makhouf, 2004

---

---

---

---

---

---

---

---

**Reduced reaction during painful procedures**

24

Objectively demonstrated analgesia during invasive procedures such as vitamin K injection and heel lance for PKU

→ less crying, less grimacing, ↓ heart rhythm,...

Blass and Watt (1999); Carbajal et al. (2003); Chermont et al. (2009); Gray et al. (2000); Gray et al. (2002); Ludington-Hoe et al. (2005); Weissman et al. (2009); Nishutani et al. (2009)

linda\_lemire@ssss.gouv.qc.ca

---

---

---

---

---

---

---

---

In summary

25

- Harmonizes baby's physiology to safely transfer from life in utero to life outside the uterus
- Maintains baby's energy
- Reduces the stress of birth

(expression «the stress of being born» from Lagercrantz & Slotkin, 1986 then used by Bystrova et al., 2003, 2008)



Healthy Children Project, with permission to Dumas

© copyright Louise Dumas

---

---

---

---

---

---

---

---

2. Benefits on breastfeeding

26

- Innate sequence of the human infant
- Initiation of breastfeeding
- Breast massage by baby, Baby's recognition of mom's milk
- Effective sucking, ↑ milk production
- Baby's weight and weight loss
- Exclusivity of breastfeeding
- Breastfeeding duration ad 6 months
- Breastfeeding difficulties



Picture by Dumas, post-caesarean section, Gatineau, with permission

© copyright Louise Dumas

---

---

---

---

---

---

---

---

Innate sequence of the human infant

27

➢ Widström and colleagues (1993 , 8 minutes video and 2011, article) :

Baby wakes up slowly, creeps towards breast, turns head towards mom's voice and breast, salivates when smelling nipple, licks nipple then attaches spontaneously

*innate sequence of the human infant*

➢ This predictable behavior starts around 10 minutes of life when baby is placed in uninterrupted skin-to-skin with mother

Observational studies: Widström et al. 1995, 2011 and videos 1993, 2010, 2011; Matthesen et al., 2001

© copyright Louise Dumas

---

---

---

---

---

---

---

---




---

---

---

---

---

---

---

---

Other practices  
also facilitate this innate behavior

29

They are so usual that we forget about them....

- Do not interrupt skin-to-skin for at least one hour (WHO, 2009)
- Do not suction unless medically justified (Cantrill et al., 2014)
- Wait for routine treatments at the end of the one hour and do it while baby is in skin-to-skin (Dumas, Savoie, Landry, 2001)

© copyright Louise Dumas

---

---

---

---

---

---

---

---

Influence on initiation of breastfeeding

30

When baby is placed skin-to-skin with mother, **uninterrupted**:

- \* spontaneously attaches to breast
- \* sucking is more effective

Any interruption significantly lengthens process

Picture from George Dumont hospital, New Brunswick, with permission to Dumas

Carfoot, 2003, 2005; Mathiesen et al., 2001; Mikiel-Kostyra et al. 2005-meta-analysis; Moore, 2012; Naskaa et al., 2009; Nolan & Lawrence, 2009; Righard & Alade 1990; Srivastava et al., 2014; Widström et al., 1990, 1995, 2011

© copyright Louise Dumas

---

---

---

---

---

---

---

---

**What has been demonstrated**

31

Factors negative for initiation of breastfeeding:

- Lack of *immediate* skin-to-skin at birth
- Drying baby before skin-to-skin
- First suckling *after* 2 hours of life
- Force baby to the breast

Cantrill et al., 2014; Mikkel-Kostyra et al. 2005-meta-analysis; Nakao et al., 2008; Widström, et al., 1990, 1993, 2011; Svensson et al., 2013

© copyright Louise Dumas

---

---

---

---

---

---

---

---

**Massage of breast by baby**

32

Massage-touching of breast by baby (chin, hands) increases :

- \* oxytocin production
- \* number of suckings
- \* milk production



Picture by Dumas, Gatineau, with permission

Cantrill et al., 2014; Mathiesen et al., 2001; Widström et al., 1993,2011

© copyright Louise Dumas

---

---

---

---

---

---

---

---

**Breast odours, baby's recognition of mom's milk**

33

If immediate skin-to-skin at birth and uninterrupted for at least 50 minutes,

2 to 4 days old babies recognize their mother's milk by movements of the mouth and tongue

Bartocci, 2000; Christensson, Porter & Varendi, 1998; Mizuno et al., 2004; Porter & Varendi,1999; Varendi & al.,1994; Varendi, Porter & Wilberg, 1997; Varendi & Porter, 2001

© copyright Louise Dumas

---

---

---

---

---

---

---

---

**Effectiveness of suckings, milk production**

34

Early sucking (< 2hrs)  
positive effect on milk  
production at day 3 and day 4

- ✓ more suckings at day 3 and day 4
- ✓ less engorgement
- ✓ more milk ingested



Picture by Dumas, Gatheau, with permission

Bystrova et al., 2007a, 2007b, 2008; Cantrill et al., 2014

© copyright Louise Dumas

---

---

---

---

---

---

---

---

**Baby's weight and weight loss**

35

Babies who had skin-to-skin and were not separated from their mothers:  
re-gain their weight loss  
3 to 5 days faster  
than swaddled babies in nursery  
even if babies in nursery received more supplements with formula



Picture by Dumas, St-Petersburg, with permission

Bystrova et al., 2007c, 2008

© copyright Louise Dumas

---

---

---

---

---

---

---

---

**Exclusivity of breastfeeding**

36

Babies who had skin-to-skin and were not separated from their mothers:  
receive less supplement of formula  
than swaddled babies in nursery

Significative link between duration of skin-to-skin  
and exclusivity of breastfeeding at discharge

Bystrova et al., 2007c, 2008

© copyright Louise Dumas

---

---

---

---

---

---

---

---

**Duration of breastfeeding**

37

Babies who had skin-to-skin and were not separated from their mothers:

are breastfed longer



Aghdas et al., 2014; Anderson et al., 2003-Cochrane; Cantrill et al., 2014; Mikiel-Kostyra et al., 2002; Mizuno et al., 2004; Moore et al., 2007-Cochrane; Thomson et al., 1979; Vaidya et al., 2005; Moore et al., 2012 Cochrane; Srivastava et al., 2014; Thukral et al., 2012

Picture by Dumas, Gatheau, with permission

© copyright Louise Dumas

---

---

---

---

---

---

---

---

---

---

**In summary**

38

Immediate and uninterrupted skin-to-skin facilitates:

- first sucking
- exclusivity
- duration of breastfeeding
- solving of major breastfeeding difficulties



Picture from Dumas, Lachenaie, with permission

© copyright Louise Dumas

---

---

---

---

---

---

---

---

---

---

**3. Psychosocial benefits for mother and baby**

39

- > Baby cries less
- > Early mother-infant interaction: bonding
- > Maternal well-being-attachment
- > Less infant abandonment, maltreatment
- > Mother-infant interaction at one year old



Picture from Miramichi Hospital, New Brunswick, with permission

© copyright Louise Dumas

---

---

---

---

---

---

---

---

---

---

**Baby cries less**

40

Babies who had skin-to-skin at birth:

- cry less at birth
- cry less during the first 90 minutes of life
- cry less during first 3 days and first 3 months of life

Anderson et al., 2003-Cochrane of 806 dyads, 17 studies ;Christensson et al.,1992, 1995b; De Château & Wiberg,1977a, 1977b; Ludington-Hoe, 2002; Matthiesen et al., 2001; Moore et al., 2007; Moore et al., 2012-Cochrane

---

---

---

---

---

---

---

---

**Early mother-infant interaction: bonding**

41

**Mother:**

- More visual contacts, more touching; *en face* position
- More verbal communications
- Keep her baby with her longer, tends to follow whoever takes her baby away from her
- More affectionate during suckings; keeps baby closer to her
- Less postnatal depression

Ali & Lowry ,1981; Anderson et al., 2003- Cochrane; Bigelow et al., 2012; De Château & Wiberg,1977,1988; Feldman et al., 2010; Francis et al., 2002; Hales et al., 1977; Klaus et al., 1972; Matthiesen et al.,2001; Moore et al., 2012-Cochrane; Velandia et al., 2010; Wiberg ,1990; Widström et al.,1990

---

---

---

---

---

---

---

---

**Early mother-infant interaction: bonding**

42

**Baby:**

- More alert after first cry
- Focuses on mother's face and breast
- More vocalisations



Picture from Miramichi hospital, New-Brunswick, with permission

Ali et Lowry ,1981; Anderson et al., 2003-Cochrane :806 dyads, 17 studies; De Château & Wiberg,1977,1988;Hales et al., 1977; Klaus et al., 1972; Matthiesen et al.,2001; Velandia et al., 2010; Wiberg ,1990; Widström et al.,1990

---

---

---

---

---

---

---

---

**Early mother-infant interaction: bonding**

43

Dumas and colleagues, RCT,  
151 dyads videotaped at day 4  
during breastfeeding session:

Mothers are *significantly* softer  
and more patient

- if had 2 hours uninterrupted skin-to-skin care at birth
- if non separated from birth



Picture by Dumas, Stockholm, with permission

Dumas et al., 2013

---

---

---

---

---

---

---

---

---

---

**Early mother-infant interaction: bonding**

44

During a breastfeeding episode filmed on video, at day 4:

- swaddled babies are *abnormally* calmer, sleep more
- mother demonstrates clear tendency to be rougher with her swaddled baby in :
  - \* her attempts at latch
  - \* her movements to and from baby
  - \* her type of stimulation to wake up baby or to latch
  - \* her general affective response to baby

Dumas et al., 2013

---

---

---

---

---

---

---

---

---

---

**Maternal well-being-attachment**

45

**Skin-to-skin:**

- Less maternal stress: reduce gastrin blood level
- Better maternal well-being: increased oxytocin

**Early breastfeeding:**

- Significant less depressive symptoms
- Increased mother's socialization
- Better maternal well-being: bf doubles plasma endorphins

If mom's well-being is repeated frequently → attachment by repeated activation of opioids and oxytocin

Ali et Lowry,1981; Anderson et al., 2003-Cochrane: 806 dyads, 17 studies; Bystrova et al., 2007b, 2008; Carfoot et al., 2005; De Chateau et Wiberg, 1977a, 1977b; Hales et al., 1977; Kennel et Klaus, 1998; Klaus et al., 1972; Klaus et Kennel, 1976; Moore et al., 2007-Cochrane:4 studies, 314 dyads; Widström et al., 1990, 1995-2010; Winberg, 2005

And many qualitative studies on mother's satisfaction

---

---

---

---

---

---

---

---

---

---

Less infant abandonment, maltreatment

46

- ❖ Significantly reduced parental negligence and maltreatments in socially vulnerable families
- ❖ Less infant early abandonment in postnatal period

? animals

Anderson et al., 2003-Cochrane ;806 dyads, 17 studies ; Lvoif et al.,2000; Strathearn et al., 2009 (bf); Wiberg & Christensson, 1995

© copyright Louise Dumas

---

---

---

---

---

---

---

---

Mother-infant interaction at one year

47

Positive influence on:

- \* mother's sensitivity
- \* ability of child to calm self
- \* mutual reciprocity (PCERA)

when child is one year old

and benefited from immediate uninterrupted 2 hours of skin-to-skin with mother, all confounding variables taken into account



Picture from Anouk Jolin, with permission to Dumas

Bystrova et al., 2008, 2009

© copyright Louise Dumas

---

---

---

---

---

---

---

---

Also very important

48

A 2 hour separation at birth followed by reunion and rooming-in **DID NOT compensate** for the lack of skin-to-skin at birth

Sensitive period\*\*  
Not enough evidences to call it critical period

Bystrova, et al. 2007a, 2007b, 2007c, 2008; Dumas et al, 2013; Kennel et al., 1975; Nissen et al., 1995

© copyright Louise Dumas

---

---

---

---

---

---

---

---

Reuniting mothers and babies after 2 hours  
DO NOT compensate for the 2 hour separation from birth

49



Pictures by Dumas, St-Petersburg, with permission

---

---

---

---

---

---

---

---

SO...

“we should respect baby and mother  
instinctive  
behavioral  
and endocrine  
interaction sequence”

(Widström, 1988 and 2011)

© copyright Louise Dumas 50

---

---

---

---

---

---

---

---

Skin-to-skin contact with the father???

51

NOT MUCH EVIDENCE

“ *In absence of the mother*, thermoregulation with the father is better than baby bundling and placement in an isolette.”  
Christensson et al. (1996)

- Colonisation with family bacteria??
- Ease to drowsiness, ↓ cry duration  
(Eriandson, 2007)
- Attachment...vocalisations (Velandia, 2012)



Picture by Dumas, Gatineau, with permission

© copyright Louise Dumas

---

---

---

---

---

---

---

---

Are those evidences important???

**YESSSSS!!**

52

We cannot talk about cultural or personal preferences ...  
« it is not only nice to do »

We have demonstrated benefits for term babies ...  
« so it must be done »



Picture from Georges-Dumont Hospital, New-Brunswick, with permission

© copyright Louise Dumas

---

---

---

---

---

---

---

---

Importance of those results

53

**Skin-to-skin has positive influence**

- on physiological variables
- on psychosocial variables
- on breastfeeding

**Non-separation has positive influence**

- on psychosocial variables
- on breastfeeding

© copyright Louise Dumas

---

---

---

---

---

---

---

---

So.....

54

What are the evidence-based practices to adopt and to explain to parents?



Picture from Dumas, Lachenaie, Quebec, with permission

© copyright Louise Dumas

---

---

---

---

---

---

---

---

Practices to adopt and to explain to parents

55

Immediate and uninterrupted skin-to-skin from birth, with mother

NO swaddling, too warm blanketing

No separation for at least 1-2 hours, even for short periods



Picture by Dumas, St-Mary's hospital, Montreal, with permission

Copyright Louise Dumas

---

---

---

---

---

---

---

---

Practices to adopt and to explain to parents

56

Postpone vitamin K for at least one-two hour

Lobby to remove erythromycin as non evidence-based practice (CPS, 2015; Darling & MacDonald, 2010; Dumas et al. 2001)

Do not weigh/measure baby for at least until end of first feed



Picture from Miramichi, Hospital, New-Brunswick, with permission

Copyright Louise Dumas

---

---

---

---

---

---

---

---

Practices to adopt and to explain to parents

57

Encourage first suckling

Hands-off

Calm, respectful environment

Effective support



Picture Miramichi hospital, New-Brunswick, with permission

Copyright Louise Dumas

---

---

---

---

---

---

---

---

Practices to adopt and to explain to parents

58

Uninterrupted mother/baby rooming-in from birth

Interrupted as little as possible and only for major reasons noted in chart

Examinations, tests, etc... in mother's room and with skin-to-skin whenever possible



Picture by Dumas, Stockholm, with permission

---

---

---

---

---

---

---

---

Do we need to update our perinatal practices?

**Yes!!!!!!!!!!**



Picture from Miramichi Hospital, New-Brunswick, with permission to Dumas

© copyright Louise Dumas 59

---

---

---

---

---

---

---

---

Thank you for your attention

60

To reach me

Louise Dumas, RN, MSN, PhD

[louise.dumas@uqo.ca](mailto:louise.dumas@uqo.ca)



Picture by Dumas, postcaesarean section, Gatineau, with permission

---

---

---

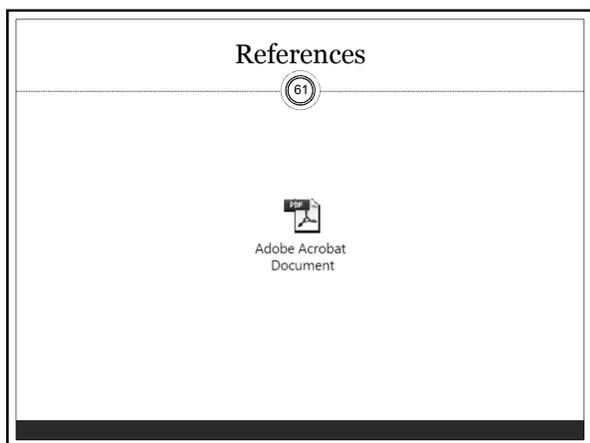
---

---

---

---

---



---

---

---

---

---

---

---

---