AK LEGISLATURE FINANCE COMMITTEES FILES 2007-2008 3272 154

3/10/82

TITLE X - POPULATION RESEARCH AND VOLUNTARY FAMILY PLANNING PROGRAMS

PROJECT GRANTS AND CONTRACTS FOR FAMILY PLANNING SERVICES

SEC. 1001 [300]

(a)The Secretary is authorized to make grants to and enter into contracts with public or nonprofit private entities to assist in the establishment and operation of voluntary family planning projects which shall offer a broad range of acceptable and effective family planning methods and services (including natural family planning methods, infertility services, and services for adolescents). To the extent practicable, entities which receive grants or contracts under this subsection shall encourage family [1] participation in projects assisted under this subsection.

(b)In making grants and contracts under this section the Secretary shall take into account the number of patients to be served, the extent to which family planning services are needed locally, the relative need of the applicant, and its capacity to make rapid and effective use of such assistance. Local and regional entities shall be assured the right to apply for direct grants and contracts under this section, and the Secretary shall by regulation fully provide for and protect such right.

(c)The Secretary, at the request of a recipient of a grant under subsection (a), may reduce the amount of such grant by the fair market value of any supplies or equipment furnished the grant recipient by the Secretary. The amount by which any such grant is so reduced shall be available for payment by the Secretary of the costs incurred in furnishing the supplies or equipment on which the reduction of such grant is based. Such amount shall be deemed as part of the grant and shall be deemed to have been paid to the grant recipient.

(d)For the purpose of making grants and contracts under this section, there are authorized to be appropriated $30,000,000 for the fiscal year ending June 30, 1971; $60,000,000 for the fiscal year ending June 30, 1972; $111,500,000 for the fiscal year ending June 30, 1973, $111,500,000 each for the fiscal years ending June 30, 1974, and June 30, 1975; $115,000,000 for fiscal year 1976;
$115,000,000 for the fiscal year ending September 30, 1977;
$136,400,000 for the fiscal year ending September 30, 1978;
$200,000,000 for the fiscal year ending September 30, 1979;
$230,000,000 for the fiscal year ending September 30, 1980;
$264,500,000 for the fiscal year ending September 30, 1981;
$126,510,000 for the fiscal year ending September 30, 1982;
$139,200,000 for the fiscal year ending September 30, 1983;
$150,030,000 for the fiscal year ending September 30, 1984; and
$158,400,000 for the fiscal year ending September 30, 1985.

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[1] So in law. See section 931(b)(1) of Public Law 97-35 (95 Stat. 570). Probably should be "family"

FORMULA GRANTS TO STATES FOR FAMILY PLANNING SERVICES

SEC. 1002 [300a]

(a)The Secretary is authorized to make grants, from allotments made under subsection (b), to State health authorities to assist in planning, establishing, maintaining, coordinating, and evaluating family planning services. No grant may be made to a State health authority under this section unless such authority has submitted, and had approved by the Secretary, a State plan for a coordinated and comprehensive program of family planning services.

(b)The sums appropriated to carry out the provisions of this section shall be allotted to the States by the Secretary on the basis of the population and the financial need of the respective States.

(c)For the purposes of this section, the term "State" includes the Commonwealth of Puerto Rico, the Northern Mariana Islands, Guam, American Samoa, the Virgin Islands, the District of Columbia, and the Trust Territory of the Pacific Islands.

(d)For the purpose of making grants under this section, there are authorized to be appropriated $10,000,000 for the fiscal year ending June 30, 1971; $15,000,000 for the fiscal year ending June 30, 1972; and $20,000,000 for the fiscal year ending June 30, 1973.

TRAINING GRANTS AND CONTRACTS; AUTHORIZATION OF APPROPRIATIONS

SEC. 1003 [300a-1]

(a) The Secretary is authorized to make grants to public or nonprofit private entities and to enter into contracts with public or private entities and individuals to provide the training for personnel to carry out family planning service programs described in section 1001 or 1002 of this title.

(b) For the purpose of making payments pursuant to grants and contracts under this section, there are authorized to be appropriated $2,000,000 for the fiscal year ending June 30, 1971; $3,000,000 for the fiscal year ending June 30, 1972; $4,000,000 for the fiscal year ending June 30, 1973; $3,000,000 each for the fiscal years ending June 30, 1974 and June 30, 1975; $4,000,000 for fiscal year ending 1976; $5,000,000 for the fiscal year ending September 30, 1977; $3,000,000 for the fiscal year ending September 30, 1978; $3,100,000 for the fiscal year ending September 30, 1979; $3,600,000 for the fiscal year ending September 30, 1980; $4,100,000 for the fiscal year ending September 30, 1981; $2,920,000 for the fiscal year ending September 30, 1982; $3,200,000 for the fiscal year ending September 30, 1983; $3,500,000 for the fiscal year ending September 30, 1984; and $3,500,000 for the fiscal year ending September 30, 1985.

RESEARCH

SEC. 1004 [300a-2]

The Secretary may -

(1) conduct, and

(2) make grants to public or nonprofit private entities and enter into contracts with public or private entities and individuals for projects for, research in the biomedical, contraceptive development, behavioral, and program implementation fields related to family planning and population.

INFORMATIONAL AND EDUCATIONAL MATERIALS

SEC. 1005 [300a-3]

(a) The Secretary is authorized to make grants to public or nonprofit private entities and to enter into contracts with public or private entities and individuals to assist in developing and making available family planning and population growth information (including educational materials) to all persons desiring such information (or materials).

(b) For the purpose of making payments pursuant to grants and contracts under this section, there are authorized to be appropriated $750,000 for the fiscal year ending June 30, 1971; $1,000,000 for the fiscal year ending June 30, 1972; $1,250,000 for the fiscal year ending June 30, 1973; $909,000 each for the fiscal years ending June 30, 1974, and June 30, 1975; $2,000,000 for fiscal year 1976; $2,500,000 for the fiscal year ending September 30, 1977; $600,000 for the fiscal year ending September 30, 1978; $700,000 for the fiscal year ending September 30, 1979; $805,000 for the fiscal year ending September 30, 1980; $926,000 for the fiscal year ending September 30, 1981; $570,000 for the fiscal year ending September 30, 1982; $600,000 for the fiscal year ending September 30, 1983; $670,000 for the fiscal year ending September 30, 1984; and $700,000 for the fiscal year ending September 30, 1985.

REGULATIONS AND PAYMENTS

SEC. 1006 [300a-4]

(a)Grants and contracts made under this subchapter shall be made in accordance with such regulations as the Secretary may promulgate. The amount of any grant under any section of this title shall be determined by the Secretary; except that no grant under any such section for any program or project for a fiscal year beginning after June 30, 1975, may be made for less than 90 per centum of its costs (as determined under regulations of the Secretary) unless the grant is to be made for a program or project for which a grant was made (under the same section) for the fiscal year ending June 30, 1975, for less than 90 per centum of its costs (as so determined), in which case a grant under such section for that program or project for a fiscal year beginning after that date may be made for a percentage which shall not be less than the percentage of its costs for which the fiscal year 1975 grant was made.

(b)Grants under this title shall be payable in such installments and subject to such conditions as the Secretary may determine to be appropriate to assure that such grants will be effectively utilized for the purposes for which made.

(c)A grant may be made or contract entered into under section 1001 or 1002 for a family planning service project or program only upon assurances satisfactory to the Secretary that--

(1) priority will be given in such project or program to the furnishing of such services to persons from low-income families; and

(2) no charge will be made in such project or program for services provided to any person from a low-income family except to the extent that payment will be made by a third party (including a government agency) which is authorized or is under legal obligation to pay such charge.

For purposes of this subsection, the term "low-income family" shall be defined by the Secretary in

accordance with such criteria as he may prescribe so as to insure that economic status shall not be a deterrent to participation in the programs assisted under this title.

(d)(1) A grant may be made or a contract entered into under section 1001 or 1005 only upon assurances satisfactory to the Secretary that informational or educational materials developed or made available under the grant or contract will be suitable for the purposes of this title and for the population or community to which they are to be made available, taking into account the educational and cultural background of the individuals to whom such materials are addressed and the standards of such population or community with respect to such materials.

(2) In the case of any grant or contract under section 1001, such assurances shall provide for the review and approval of the suitability of such materials, prior to their distribution, by an advisory committee established by the grantee or contractor in accordance with the Secretary's regulations. Such a committee shall include individuals broadly representative of the population or community to which the materials are to be made available.

VOLUNTARY PARTICIPATION

SEC. 1007 [300a-5]

The acceptance by any individual of family planning services or family planning or population growth information (including educational materials) provided through financial assistance under this title (whether by grant or contract) shall be voluntary and shall not be a prerequisite to eligibility for or receipt of any other service or assistance from, or to participation in, any other program of the entity or individual that provided such service or information.

PROHIBITION OF ABORTION

SEC. 1008 [1] [300a-6]

None of the funds appropriated under this title shall be used in programs where abortion is a method of family planning.

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[1] Section 1009 was repealed by section 601(a)(1)(G) of Public Law 105-362 (112 Stat. 3285).

Sec. 25.20.025. Examination and treatment of minors.

(a) Except as prohibited under AS 18.16.010 (a)(3),

(1) a minor who is living apart from the minor's parents or legal guardian and who is managing the minor's own financial affairs, regardless of the source or extent of income, may give consent for medical and dental services for the minor;

(2) a minor may give consent for medical and dental services if the parent or legal guardian of the minor cannot be contacted or, if contacted, is unwilling either to grant or withhold consent; however, where the parent or legal guardian cannot be contacted or, if contacted, is unwilling either to grant or to withhold consent, the provider of medical or dental services shall counsel the minor keeping in mind not only the valid interests of the minor but also the valid interests of the parent or guardian and the family unit as best the provider presumes them;

(3) a minor who is the parent of a child may give consent to medical and dental services for the minor or the child;

(4) a minor may give consent for diagnosis, prevention or treatment of pregnancy, and for diagnosis and treatment of venereal disease;

(5) the parent or guardian of the minor is relieved of all financial obligation to the provider of the service under this section.

(b) The consent of a minor who represents that the minor may give consent under this section is considered valid if the person rendering the medical or dental service relied in good faith upon the representations of the minor.

(c) Nothing in this section may be construed to remove liability of the person performing the examination or treatment for failure to meet the standards of care common throughout the health professions in the state or for intentional misconduct.

Sec. 25.20.030. Duty of parent and child to maintain each other.

Each parent is bound to maintain the parent's children when poor and unable to work to maintain themselves. Each child is bound to maintain the child's parents in like circumstances.

Sec. 25.20.040. Maintenance and education of minor out of income of the minor's property.

Title 25. MARITAL AND DOMESTIC RELATIONS
Chapter 25.20. PARENT AND CHILD

3/10/08

Sarah Palin
Governor
P.O. Box 110001
Juneau, AK 99811-0001
www.gov.state.ak.us

STATE OF ALASKA
OFFICE OF THE GOVERNOR

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Press Release

GOVERNOR'S PRESS OFFICE

IMMEDIATE RELEASE **No. 07-216**

Governor Palin Dismayed with State Supreme Court Decision

November 2, 2007, Juneau, Alaska - In a 3-2 vote this morning, the Alaska Supreme Court ruled Alaska's Parental Consent Act unconstitutional. The PCA, passed by the Alaska Legislature in 1997, requires girls 16 and younger to obtain parental consent before getting an abortion. The court decided the law burdens a minor girl's fundamental right to reproductive freedom.

"It is outrageous that a minor girl can get an abortion without parental consent," said Governor Palin. "The State Supreme Court has failed Alaska by separating parents from their children during such a critical decision, moving in the exact opposite direction from the law's intent."

Governor Palin has instructed Attorney General Talis Colberg to file a petition for rehearing. Twenty-six states have parental consent laws that are in effect. Sixteen states have parental notification statutes in effect.

"Our court is out of step with mainstream judicial decisions and our citizens," Governor Palin said. "This decision is clearly a case of legislating from the bench."

In 1997, the Alaska Legislature passed the law that required girls 16 years and younger to obtain parental consent before getting an abortion. Justice Walter Carpeneti, one of the two dissenting justices, recognized the will of the state in his dissent:

"In 1997, faced with competing interests of the highest constitutional level – an underage pregnant girl's constitutional right to privacy in deciding whether to terminate her pregnancy, her parents' constitutional right (and duty) to protect her best interests, and the state's compelling interests in protecting the children against their own immaturity – the Alaska Legislature carefully crafted the Alaska Parental Consent Act in an effort to recognize and protect all of these interests. That law is fully consistent with United States Court precedent, yet today's opinion strikes it down. Because this court's rejection of the legislature's thoughtful balance is inconsistent with our own case law and unnecessarily dismissive of the legislature's role in expressing the will of the people, I respectfully dissent."

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Note: The Governor's comments regarding the State Supreme Court's decision will be on the Governor's satellite window at 3:30 p.m.

2/10/08

Web posted November 8, 2007

Lawmakers pushing for parental consent abortion referendum

About 15 percent of the Legislature says state's high court erred in ruling

STEVE QUINN
The Associated Press

Two Republicans are leading a push by state lawmakers to place a constitutional amendment on the ballot next year to determine whether underage teenage girls need parental consent to have an abortion.

Rep. John Coghill of North Pole and Sen. Fred Dyson of Eagle River are among 10 members - or about 15 percent - of the Alaska Legislature who say the state Supreme Court erred in ruling that girls 16 and younger can get abortions without permission from their parents.

"What this court decision did was put the parents out of the loop when it comes to the care, protection, nurturing and decision-making of the child," Coghill said Wednesday at a news conference. "The Legislature did everything it could to protect the privacy of a young child getting pregnant."

Clover Simon, head of Planned Parenthood of Alaska, said lawmakers should focus on more pressing priorities - ethics reform, oil taxes and future construction of a natural gas pipeline - and let the Supreme Court's ruling stand.

"The reality is almost every single teen we've seen come to Planned Parenthood for abortion services, are coming with a parent," Simon said. "The laws are not going to fix the problem of parent-child communication."

Friday's 3-2 decision by the Supreme Court ended a 10-year battle over the Parental Consent Act passed by the Legislature in 1997.

VoxBox

Voice Your Thoughts

Do you agree with the Alaska Supreme Court's decision to allow underage teens to get abortions without parental consent?

***

Post your comments at http://juneaublogger.com/voxbox/.

Print this
E-mail this
Send Editor Comment

Sound off on the important issues at VOX

The majority opinion written by Chief Justice Dana Fabe said the law "places a burden on minors' fundamental right to privacy."

But in the dissent, Justice Walter Carpeneti wrote, "society has long-standing and pervasive interests in protecting children from their own immaturity."

The final decision riled many legislators, including Coghill and Dyson, who want to put the question before voters as a proposed constitutional amendment. Lawmakers are now immersed in a special session over oil taxes, so no formal action can be taken until January when the Legislature returns for its regular session.

On Friday, Gov. Sarah Palin called the Supreme Court ruling "outrageous" and directed Attorney General Talis Colberg to file a petition for a rehearing.

Palin later said she supports putting the parental consent question on the ballot, said the governor's spokeswoman Sharon Leighow.

At least two-thirds of the House's 40 members and Senate's 20 members each must approve a resolution to put the issue on the ballot.

"Parents must be able to control the medical care their children get," Dyson said. "Aside from how you view the abortion issue, this denigration of parental rights is absolutely unacceptable."

The issue of parental consent or parental notification for a teen to receive an abortion is playing out nationwide.

According to NARAL Pro-Choice America, an abortion rights group, 43 states restrict young women's access to abortion with a parental notice or consent. But of those states, seven had laws ultimately ruled to be unconstitutional or unenforceable, including Alaska.

The results are wide-ranging.

Voters in California turned back the state's first abortion-related measure, 53 percent to 47 percent, in 2005. The proposal would have required doctors to alert parents before performing the procedure on minors.

In Idaho last spring, Gov. C.L. "Butch" Otter signed into law a bill requiring minor girls to get permission from a parent or guardian for an abortion. However, teens can bypass their parents and received a judge's approval in cases such as incest, abuse or a medical emergency.

In New Hampshire in 2006 Gov. John Lynch approved legislation to make the state the first to repeal a 2003 law requiring parents be notified before a minor receives an abortion. Like Alaska's Parental Consent Act, New Hampshire's repealed law never took affect.

HB

366

HOUSE COMMITTEE REPC T

(11)
Date Referred to Committee: March 20, 2008 **FURTHER REFERRALS:**

Date of Committee Action: 4/3/08

The FINANCE Committee considered: HB 366

HOUSE BILL NO. 366 **DISCLOSURE : APPROPRIATIONS FROM PFD FUND**

"An Act relating to an exemption from public disclosure of certain appropriations from the dividend fund; and providing for an effective date."

Recommends it be replaced with [ ] HCS *or* [ ] CS *for* _____ ( )
For Senate Bills with new title: [ ] Technical Title [ ] New Title: HCR_____ [X] Same Title [ ] New Title

[ ] attach amendments
[ ] add new referral to _____Committee
[ ] Letter of Intent_____Committee

List of Abbrev for Dept's:
AD. I
CEO
COR
CRT
EED
DEC
DFG
GOV
HSS
LWF
LAW
LEG
MVA
DNR
DPS
REV
DOT
UA

NEW FISCAL NOTES *Assigned by Chief Clerk's Office				
List by Dept(s):	*FN#	Fiscal	Indet.	Zero
COR				✓

PREVIOUS FISCAL NOTES				
List by Dept(s):	FN#	Fiscal	Indet.	Zero
REV	2.			✓

Signing with recommendations	Printed Last Name	DP	DNP	NR	AM
Michael C Hawker	Hawker			☆	
Mary Nelson	NELSON	✓			
[illegible]	Thoma			✓	
Harry Crawford Jr	CRAWFORD	X			
[illegible]	STOLTZE			X	
[illegible]	Seaton			X	
[illegible]	Gara	✓			
[illegible]	KELLY			X	
Chair:					
Chair: [illegible]	[illegible]			X	

FISCAL NOTE

STATE OF ALASKA
2008 LEGISLATIVE SESSION

Fiscal Note Number: 2
Bill Version: HB 366
(H) Publish Date: 3/20/08

Identifier (file name): HB366-REV-CSSD-3-17-08
Title: Disclosure:Appropriations From PFD Fund
Sponsor: Rep Crawford
Requester: House State Affairs

Dept. Affected: Revenue
RDU: Child Support Services Division
Component: Child Support Services Division
Component Number: 111

Expenditures/Revenues (Thousands of Dollars)

Note: Amounts do not include inflation unless otherwise noted below.

	Appropriation Required	Information					
OPERATING EXPENDITURES	**FY 2009**	**FY 2009**	**FY 2010**	**FY 2011**	**FY 2012**	**FY 2013**	**FY 2014**
Personal Services							
Travel							
Contractual							
Supplies							
Equipment							
Land & Structures							
Grants & Claims							
Miscellaneous							
TOTAL OPERATING	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
CAPITAL EXPENDITURES							
CHANGE IN REVENUES ( )							

FUND SOURCE (Thousands of Dollars)

1002 Federal Receipts							
1003 GF Match							
1004 GF							
1005 GF/Program Receipts							
1037 GF/Mental Health							
Other Interagency Receipts							
TOTAL	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Estimate of any current year (FY2008) cost:

POSITIONS

Full-time							
Part-time							
Temporary							

ANALYSIS: *(Attach a separate page if necessary)*

Last fall we estimated that 10,188 individuals would have received a 2007 dividend, had it not been for conviction or incarceration as a felon or multiple misdemeanant.

1,499 were sentenced felons
8,689 were incarcerated convicted felons and/or incarcerated convicted multiple misdemeanants

Analysis continued on page 2

Prepared by: John Mallonee
Division: Child Support Services Division
Approved by: Jerry Burnett
Department of Revenue

Phone 907 269-6801
Date/Time 3-17-2008 2:00pm
Date 3/17/2008

STATE OF ALASKA
2008 LEGISLATIVE SESSION

BILL NO. HB 366

ANALYSIS CONTINUATION

An amount equal to what would have been paid to to these individuals as dividends is appropriated to the Departments of Corrections and Public Safety each year to offset the cost of incarceration and to provide for programs for victims of crimes. House Bill 366 would add grants to the children of incarcerated parents to the permitted uses of what are commonly called "PFD Felon Funds."

There are approximately 5,000 individuals incarcerated that owe child support for their children. Most of these people have a $50 per month child support order on which they pay very little. Unlike other citizens of Alaska, these incarcerated individuals can not apply for a Permanent Fund Dividend which Child Support Services Division would garnish and provide to the custodial parent and child. Therefore these families receive very little in the way of child support while the non-custodial parent is incarcerated.

This bill would have no impact on the number of individuals eligible to apply for the dividend nor to the amount of the dividend.

FISCAL NOTE

STATE OF ALASKA
2008 LEGISLATIVE SESSION

Fiscal Note Number:
Bill Version: HB366-DOC-IHC-02-21-08
() Publish Date:

Identifier (file name): HB336-DOC-IHC-02-21-08
Title "An act relating to an exemption from public disclosure of certain appropriations from the dividend fund; and providing ..."
Sponsor Representatives Crawford, Gardner
Requester House State Affairs

Dept. Affected: Corrections
RDU Inmate Health Care
Component Inmate Health Care
Component Number 705

Expenditures/Revenues (Thousands of Dollars)

Note: Amounts do not include inflation unless otherwise noted below.

	Appropriation Required	Information					
OPERATING EXPENDITURES	**FY 2009**	**FY 2009**	**FY 2010**	**FY 2011**	**FY 2012**	**FY 2013**	**FY 2014**
Personal Services	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Travel	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Contractual	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Supplies	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Land & Structures	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grants & Claims	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Miscellaneous	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL OPERATING	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
CAPITAL EXPENDITURES							
CHANGE IN REVENUES ( )							

FUND SOURCE (Thousands of Dollars)

1002 Federal Receipts	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1003 GF Match	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1004 GF	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1005 GF/Program Receipts	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1037 GF/Mental Health	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Interagency Receipts	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Estimate of any current year (FY2008) cost: 0.0

POSITIONS

Full-time	0	0	0	0	0	0	0
Part-time	0	0	0	0	0	0	0
Temporary	0	0	0	0	0	0	0

ANALYSIS: *(Attach a separate page if necessary)*

This legislation amends AS 43.23.028(b), exemption's from public disclosure of certain apportions from the dividend funds. Passage of this legislation should have no fiscal impact on the Department of Corrections.

If the legislature chooses to reduce the current level of PFD Criminal Funds appropriated to the Department of Corrections, a General Fund appropriation equal to the reduction would be requested to maintain inmate health care services.

Prepared by: Sharleen Griffin, Director — Phone (907) 465-3339
Division Administrative Services — Date/Time 3/31/08 4:04 PM
Approved by: Dwayne Peeples, Deputy Commissioner — Date 3/31/2008
Department of Corrections

(Revised 10/05/2007 OMB)

Heather Beaty

From: drobbins@gci.net on behalf of Doris Robbins [drobbins@gci net]

Sent: Sunday, March 30, 2008 2:13 PM

To: Rep. Mary Nelson; Rep. Reggie Joule; Rep. Les Gara; Rep. Harry Crawford; Rep. Bill Thomas; Rep. Mike Kelly; Rep. Mike Hawker; Rep. John Harris; Rep. Bill Stoltze; Rep. Kevin Meyer; Rep. Mike Chenault

Subject: HB 366 Approp. from PF for Minor Children of Incarcerated

Attachments: Doris Robbins.vcf

Representative Chenault,
Representative Meyer,
Representative Stoltze,
House Finance Committee,

First, thank you Representative Crawford, for sponsoring this legislation which recognizes the children and family of those in prison. Thank you also for the other co-sponsors! So often, no one thinks of the rest of the family. I'm all for getting "the bad guys" and hopefully providing for their reform with counseling and education, but no one thinks about the kids when they lock up "the bad guys." If I had transportation I would go down to the LIO and voice my wishes, but since I can't, please consider this with the same vigor as you would a live testimony.

Children of the incarcerated become double XX victims. That is the best expression I can use. They have a bad behaving parent, the parent is not there for any support, and there is no monetary fund available for the courts to get at to use for the kids.

In addition to the stigma of a jailed parent the kids have no positive role model in that parent. These kids need a lot of help to be set on a right path. The remaining parent, most often a woman, finds it difficult to provide ordinary needs for the child/children on her income.

With HB 366 allowing the Department of Revenue to provide grants to minor children of incarcerated individuals there is some measure of help. In doing so, this bill ensures that minor children of incarcerated individuals do not lose out on the child support they depend on.

In addition, they need more support in school; and after school they need help from someone like Big Brothers/Sisters for a role model.

Please pass this bill!

Doris Robbins

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Alaska State Legislature

House of Representatives

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(fax) 1-907-269-0105

Representative Harry Crawford
District 21

SPONSOR STATEMENT: HOUSE BILL 366

Approximately 5,000 Alaskan children do not receive child support because their non-custodial parent is incarcerated and ineligible to receive a Permanent Fund Dividend. When non-custodial parents are ordered to pay child support, but are unable to do so, their Permanent Fund Dividend is garnisheed to fulfill the debt. In 1996, AS 43.23.005(d) was amended, making an individual ineligible to receive a Permanent Fund Dividend if, during the qualifying year, they were incarcerated as a result of a felony; or misdemeanor if they have a prior felony; or two or more prior misdemeanors. While this has the desired effect of punishing repeat miscreants by making them ineligible to receive a Permanent Fund Dividend, the amendment has the apparent unintended consequence of denying dependent children of incarcerated parents the child support they depend on.

Under current law, the Permanent Fund Dividends of individuals found ineligible under AS 43.23.005(d) are appropriated to the Department of Corrections and to programs for the victims of crimes. HB 366 will allow the Department of Revenue to provide grants to minor children of incarcerated individuals. In doing so, this bill ensures that minor children of incarcerated individuals do not lose out on the child support they depend on.

E-mail: Representative_Harry_Crawford@legis.state.ak.us

Suzanne Cunningham

From: Burnett, Jerry D (DOR) [jerry.burnett@alaska.gov]
Sent: Tuesday, April 01, 2008 1:07 PM
To: Suzanne Cunningham
Subject: HB 366 Budget Effects

Suzanne,

In the FY 09 budget the PFD felon funds total approximately $16.8 million.

If HB 366 was in effect and the budget reflected that the equivalent of 5000 dividends were paid to CSSD, the budgets of Corrections and Public Safety would require an additional $8.27 million in GF to stay at current levels.

In FY2010 I estimate that the lost dividends from incarcerated persons with CSSD cases will exceed $10 million of the approximately $22 million that will be available in the PFD felon funds.

Jerry

Distributed by Rep Crawford's office
+HB 3069

House Journal
May 15, 1991 Pages 1418 - 1419

Letter of Intent for HCS CSSB 98 (FIN)

"It is the intent of the Legislature by enactment of sec. 3 of SB 98 that the Department of Revenue shall implement AS 43.23.005(d) in accordance with the recent Alaska Supreme Court decision, State of Alaska v. Anthony, No. 3685 (Alaska April 26, 1991). The decision found that it is permissible for the state to prevent incarcerated felons from receiving Permanent Fund Dividend checks, and to use that money for the crime victim compensation fund established under AS 18.67.162, or to cover part of the costs of programs of the Department of Corrections, such as gate money and sex offender treatment. The Department of Revenue should calculate and notify the Legislature of the amount that otherwise would have been paid to incarcerated felons during the prior calendar year, but for the provisions of AS 43.23.005(D), and that amount shall be appropriated for uses designed to help compensate victims and the state for costs associated with the criminal activities of felons."

The following previously published note applies to HCS CSSB 98 (FIN):

Senate zero fiscal note, Department of Revenue (3/7/91)

The report was signed by Representative Navarre, Co-chairman.

CSSB 98 (FIN) was referred to the Rules Committee for placement on the calendar.

HB

366

SFIN

FILE

SENATE FINANCE COMMITTEE REPORT

DATE: 4/9/08

FURTHER:

DATE TURNED IN TO OFFICE: _____

Finance Committee considered HOUSE BILL NO. 366 am

HB 366 PFD: EXECUTION /DISCLOSURE OF APPROPS

"An Act relating to an exemption from public disclosure of certain appropriations from the dividend fund; relating to execution upon permanent fund dividends by civilian process servers using electronic procedures; amending Rule 89, Alaska Rules of Civil Procedure; and providing for an effective date."

and recommends:

[ ] be replaced with [ ] SCS or [ ] CS _____ (_____)

[ ] adopt previous [ ] SCS or [ ] CS _____ (_____)

[ ] attached amendment(s)

[ ] adopt _____ _____Letter of Intent

[ ] further referral to _____Committee

SENATE BILL:
[ ] Same Title
[ ] New Title

HOUSE BILL:
[ ] Same Title
[ ] Technical Title Change
[ ] New Title w/ SCR #_____

NEW FISCAL NOTE(S):

Department	Date	Fiscal	Indet.	Zero	FN#
COR	4/11/08		✓		

PREVIOUS FISCAL NOTE(S):

Department	Date	Fiscal	Indet.	Zero	FN#
REV	3/17/08			✓	2

[ ] APPROPRIATION - no fiscal note

SIGNATURES AND RECOMMENDATIONS:	PRINTED LAST NAME	DO PASS	DO NOT PASS	NO REC	AMEND
	Elton	✓			
	Thomas	✓			
	Olson			✓	
CO-CHAIR:					
CO-CHAIR:	Stevens			✓	

FISCAL NOTE

STATE OF ALASKA
2008 LEGISLATIVE SESSION

Fiscal Note Number:
Bill Version: HB366am-DOC-IHC-04-11-08
() Publish Date:

Identifier (file name):
Title "An act relating to an exemption from public disclosure of certain appropriations from the dividend fund; and providing ..."
Sponsor Representatives Crawford, Gardner, Gruenberg, Kerttula . .
Requester House State Affairs

Dept. Affected: Corrections
RDU Inmate Health Care
Component Inmate Health Care
Component Number 705

Expenditures/Revenues (Thousands of Dollars)

Note: Amounts do not include inflation unless otherwise noted below.

	Appropriation Required	Information					
OPERATING EXPENDITURES	**FY 2009**	**FY 2009**	**FY 2010**	**FY 2011**	**FY 2012**	**FY 2013**	**FY 2014**
Personal Services	•	•	•	•	•	•	•
Travel	•	•	•	•	•	•	•
Contractual	•	•	•	•	•	•	•
Supplies	•	•	•	•	•	•	•
Equipment	•	•	•	•	•	•	•
Land & Structures	•	•	•	•	•	•	•
Grants & Claims	•	•	•	•	•	•	•
Miscellaneous	•	•	•	•	•	•	•
TOTAL OPERATING	•	•	•	•	•	•	•
CAPITAL EXPENDITURES							
CHANGE IN REVENUES ( )							

FUND SOURCE (Thousands of Dollars)

1002 Federal Receipts	•	•	•	•	•	•	•
1003 GF Match	•	•	•	•	•	•	•
1004 GF	•	•	•	•	•	•	•
1005 GF/Program Receipts	•	•	•	•	•	•	•
1037 GF/Mental Health	•	•	•	•	•	•	•
Other Interagency Receipts	•	•	•	•	•	•	•
TOTAL	•	•	•	•	•	•	•

Estimate of any current year (FY2008) cost: 0.0

POSITIONS

Full-time	•	•	•	•	•	•	•
Part-time	•	•	•	•	•	•	•
Temporary	•	•	•	•	•	•	•

ANALYSIS: *(Attach a separate page if necessary)*

This bill amends AS 43.23.028(b), exemptions from public disclosure of certain apportions from the dividend funds. The legislature may appropriate PFD Criminal Funds to the Department of Revenue to distribute grants to minor children of incarcerated individuals.

In FY2009 approximately $9.1 million of the $31.0 million Inmate Health Care budget is PFD Criminal Funds. If in the future, the legislature chooses to reduce the current level of PFD Criminal Funds appropriated to the Department of Corrections, a General Fund appropriation equal to the reduction would be requested to maintain inmate health care services.

Prepared by: Sharleen Griffin, Director — Phone (907) 465-3339
Division Administrative Services — Date/Time 4/11/08 2:08 PM
Approved by: Dwayne Peeples, Deputy Commissioner — Date 4/11/2008
Department of Corrections

(Revised 10/05/2007 OMB)

FISCAL NOTE

STATE OF ALASKA
2008 LEGISLATIVE SESSION

Fiscal Note Number: 2
Bill Version: HB 366
(H) Publish Date: 3/20/08

Identifier (file name): HB366-REV-CSSD-3-17-08
Title: Disclosure:Appropriations From PFD Fund
Sponsor: Rep Crawford
Requester: House State Affairs

Dept. Affected: Revenue
RDU: Child Support Services Division
Component: Child Support Services Division
Component Number: 111

Expenditures/Revenues (Thousands of Dollars)

Note: Amounts do not include inflation unless otherwise noted below.

	Appropriation Required	Information					
OPERATING EXPENDITURES	**FY 2009**	**FY 2009**	**FY 2010**	**FY 2011**	**FY 2012**	**FY 2013**	**FY 2014**
Personal Services							
Travel							
Contractual							
Supplies							
Equipment							
Land & Structures							
Grants & Claims							
Miscellaneous							
TOTAL OPERATING	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
CAPITAL EXPENDITURES							
CHANGE IN REVENUES ( )							

FUND SOURCE (Thousands of Dollars)

1002 Federal Receipts							
1003 GF Match							
1004 GF							
1005 GF/Program Receipts							
1037 GF/Mental Health							
Other Interagency Receipts							
TOTAL	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Estimate of any current year (FY2008) cost: _____

POSITIONS

Full-time							
Part-time							
Temporary							

ANALYSIS: *(Attach a separate page if necessary)*

Last fall we estimated that 10,188 individuals would have received a 2007 dividend, had it not been for conviction or incarceration as a felon or multiple misdemeanant.

1,499 were sentenced felons
8,689 were incarcerated convicted felons and/or incarcerated convicted multiple misdemeanants

Analysis continued on page 2

Prepared by: John Mallonee
Phone: 907 269-6801
Division: Child Support Services Division
Date/Time: 3-17-2008 2:00pm
Approved by: Jerry Burnett
Date: 3/17/2008
Department of Revenue

FISCAL NOTE #2

STATE OF ALASKA
2008 LEGISLATIVE SESSION

BILL NO. HB 366

ANALYSIS CONTINUATION

An amount equal to what would have been paid to to these individuals as dividends is appropriated to the Departments of Corrections and Public Safety each year to offset the cost of incarceration and to provide for programs for victims of crimes. House Bill 366 would add grants to the children of incarcerated parents to the permitted uses of what are commonly called "PFD Felon Funds."

There are approximately 5,000 individuals incarcerated that owe child support for their children. Most of these people have a $50 per month child support order on which they pay very little. Unlike other citizens of Alaska, these incarcerated individuals can not apply for a Permanent Fund Dividend which Child Support Services Division would garnish and provide to the custodial parent and child. Therefore these families receive very little in the way of child support while the non-custodial parent is incarcerated.

This bill would have no impact on the number of individuals eligible to apply for the dividend nor to the amount of the dividend.

FISCAL NOTE

STATE OF ALASKA
2008 LEGISLATIVE SESSION

Fiscal Note Number:
Bill Version: HB366am-DOC-IHC-04-11-08
() Publish Date:

Identifier (file name): HB336-DOC-IHC-02-21-08
Dept. Affected: Corrections
Title "An act relating to an exemption from public disclosure of certain appropriations from the dividend fund; and providing ..."
RDU Inmate Health Care
Component Inmate Health Care
Sponsor Representatives Crawford, Gardner
Requester House State Affairs
Component Number 705

Expenditures/Revenues (Thousands of Dollars)

Note: Amounts do not include inflation unless otherwise noted below.

	Appropriation Required	Information					
OPERATING EXPENDITURES	**FY 2009**	**FY 2009**	**FY 2010**	**FY 2011**	**FY 2012**	**FY 2013**	**FY 2014**
Personal Services	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Travel	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Contractual	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Supplies	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Land & Structures	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grants & Claims	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Miscellaneous	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL OPERATING	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
CAPITAL EXPENDITURES							
CHANGE IN REVENUES ( )							

FUND SOURCE (Thousands of Dollars)

1002 Federal Receipts	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1003 GF Match	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1004 GF	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1005 GF/Program Receipts	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1037 GF/Mental Health	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Interagency Receipts	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Estimate of any current year (FY2008) cost: 0.0

POSITIONS

Full-time	0	0	0	0	0	0	0
Part-time	0	0	0	0	0	0	0
Temporary	0	0	0	0	0	0	0

ANALYSIS: *(Attach a separate page if necessary)*

This legislation amends AS 43 23 028(b), exemption's from public disclosure of certain apportions from the dividend funds and allows the legislature to distribute funds to the Department of Revenue for grants to minor children of incarcerated individuals. Passage of this legislation should have no fiscal impact on the Department of Corrections.

If the legislature chooses to reduce the current level of PFD Criminal Funds appropriated to the Department of Corrections, a General Fund appropriation equal to the reduction would be requested to maintain inmate health care services.

Prepared by: Sharleen Griffin, Director — Phone (907) 465-3339
Division: Administrative Services — Date/Time 4/11/08 9:35 AM
Approved by: Dwayne Peeples, Deputy Commissioner — Date 4/11/2008
Department of Corrections

(Revised 10/05/2007 OMB)

FISCAL NOTE

STATE OF ALASKA
2008 LEGISLATIVE SESSION

Fiscal Note Number: 3
Bill Version: HB 366
(H) Publish Date: 4/4/08

Identifier (file name): HB336-DOC-IHC-02-21-08
Dept. Affected: Corrections
Title "An act relating to an exemption from public disclosure of certain appropriations from the dividend fund; and providing ..."
RDU Inmate Health Care
Component Inmate Health Care
Sponsor Representatives Crawford, Gardner
Requester House State Affairs
Component Number 705

Expenditures/Revenues (Thousands of Dollars)

Note: Amounts do not include inflation unless otherwise noted below.

	Appropriation Required	Information					
OPERATING EXPENDITURES	**FY 2009**	**FY 2009**	**FY 2010**	**FY 2011**	**FY 2012**	**FY 2013**	**FY 2014**
Personal Services	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Travel	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Contractual	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Supplies	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Land & Structures	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grants & Claims	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Miscellaneous	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL OPERATING	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
CAPITAL EXPENDITURES							
CHANGE IN REVENUES ( )							

FUND SOURCE (Thousands of Dollars)

1002 Federal Receipts	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1003 GF Match	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1004 GF	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1005 GF/Program Receipts	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1037 GF/Mental Health	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Interagency Receipts	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Estimate of any current year (FY2008) cost: 0.0

POSITIONS

Full-time	0	0	0	0	0	0	0
Part-time	0	0	0	0	0	0	0
Temporary	0	0	0	0	0	0	0

ANALYSIS: *(Attach a separate page if necessary)*

This legislation amends AS 43.23.028(b), exemption's from public disclosure of certain apportions from the dividend funds. Passage of this legislation should have no fiscal impact on the Department of Corrections.

If the legislature chooses to reduce the current level of PFD Criminal Funds appropriated to the Department of Corrections, a General Fund appropriation equal to the reduction would be requested to maintain inmate health care services

Prepared by: Sharleen Griffin, Director
Phone (907) 465-3339
Division: Administrative Services
Date/Time 3/31/08 4:04 PM
Approved by: Dwayne Peeples, Deputy Commissioner
Department of Corrections
Date 3/31/2008

(Revised 10/05/2007 OMB)

Alaska State Legislature

House of Representatives

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Anchorage, Alaska 99501-2133
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Representative Harry Crawford
District 21

SPONSOR STATEMENT: HOUSE BILL 366

Approximately 5,000 Alaskan children do not receive child support because their non-custodial parent is incarcerated and ineligible to receive a Permanent Fund Dividend. When non-custodial parents are ordered to pay child support, but are unable to do so, their Permanent Fund Dividend is garnisheed to fulfill the debt. In 1996, AS 43.23.005(d) was amended, making an individual ineligible to receive a Permanent Fund Dividend if, during the qualifying year, they were incarcerated as a result of a felony; or misdemeanor if they have a prior felony; or two or more prior misdemeanors. While this has the desired effect of punishing repeat miscreants by making them ineligible to receive a Permanent Fund Dividend, the amendment has the apparent unintended consequence of denying dependent children of incarcerated parents the child support they depend on.

Under current law, the Permanent Fund Dividends of individuals found ineligible under AS 43.23.005(d) are appropriated to the Department of Corrections and to programs for the victims of crimes. HB 366 will allow the Department of Revenue to provide grants to minor children of incarcerated individuals. In doing so, this bill ensures that minor children of incarcerated individuals do not lose out on the child support they depend on.

E-mail: Representative_Harry_Crawford@legis.state.ak.us

Heather Beaty

From: drobbins@gci.net on behalf of Doris Robbins [drobbins@gci.net]

Sent: Sunday, March 30, 2008 2:13 PM

To: Rep. Mary Nelson; Rep. Reggie Joule; Rep. Les Gara; Rep. Harry Crawford; Rep. Bill Thomas; Rep. Mike Kelly; Rep. Mike Hawker; Rep. John Harris; Rep. Bill Stoltze; Rep. Kevin Meyer; Rep. Mike Chenault

Subject: HB 366 Approp. from PF for Minor Children of Incarcerated

Attachments: Doris Robbins.vcf

Representative Chenault,
Representative Meyer,
Representative Stoltze,
House Finance Committee,

First, thank you Representative Crawford, for sponsoring this legislation which recognizes the children and family of those in prison. Thank you also for the other co-sponsors! So often, no one thinks of the rest of the family. I'm all for getting "the bad guys" and hopefully providing for their reform with counseling and education, but no one thinks about the kids when they lock up "the bad guys." If I had transportation I would go down to the LIO and voice my wishes, but since I can't, please consider this with the same vigor as you would a live testimony.

Children of the incarcerated become double XX victims. That is the best expression I can use. They have a bad behaving parent, the parent is not there for any support, and there is no monetary fund available for the courts to get at to use for the kids.

In addition to the stigma of a jailed parent the kids have no positive role model in that parent. These kids need a lot of help to be set on a right path. The remaining parent, most often a woman, finds it difficult to provide ordinary needs for the child/children on her income.

With HB 366 allowing the Department of Revenue to provide grants to minor children of incarcerated individuals there is some measure of help. In doing so, this bill ensures that minor children of incarcerated individuals do not lose out on the child support they depend on.

In addition, they need more support in school; and after school they need help from someone like Big Brothers/Sisters for a role model.

Please pass this bill!

Doris Robbins

drobbins@gci.net
1281 Overhill Drive
Fairbanks AK 99709
(907) 374-0597

HB

367

ALASKA STATE LEGISLATURE

Chair:
Special Committee on Economic Development, Trade, & Tourism

Vice Chair
Committee on Labor and Commerce

Vice Chair:
Committee on Transportation

Member:
Committee on Community and Regional Affairs
Special Committee on Oil and Gas

Session:
Alaska State Capitol
Juneau, AK 99801-1182
Phone: (907) 465-2679
Fax: (907) 465-4822
Toll Free (877) 465-2679

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Wasilla, AK 99654
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Fax: (907) 376-4745

REPRESENTATIVE MARK NEUMAN
Representative_Mark_Neuman@legis.state.ak.us

"HB 367"

A Summary of the Sale of Raw Milk and Raw Milk Products

According to the FDA and other government officials, raw milk is a public health hazard that puts consumers at risk. You have received documents citing dire health risks from the consumption of raw milk and the FDA has a long powerpoint presentation on its website which argues that raw milk should not be consumed. The enclosed document is a point by point rebuttal of the FDA powerpoint. To summarize:

1. The FDA presents 15 studies purporting to show that raw milk has caused illness and that pasteurization could have protected the public from the illness. Careful analysis reveals that every one of these reports is seriously flawed. In 14 of the studies, there was either no valid positive milk sample or no valid statistical association; in 7 of the studies the findings were misrepresented by the FDA; in 5 of the studies alternative explanations were discovered but not pursued; in 2 of the studies, there was no evidence that anyone consumed raw milk products; and in one study the outbreak did not even exist.

2. All of the outbreaks of listeria attributed to raw milk involved soft cheeses. It is actually impossible to determine whether a cheese is raw using current tests so these cheeses were not necessarily raw as FDA claims. Cases of listeria in raw milk are virtually nil.

3. Not one of the studies presented showed that pasteurization would have prevented the outbreak. The FDA does not present evidence showing that dangerous organisms can survive pasteurization nor that there have been many outbreaks of illness from pasteurized milk.

4. The vast majority of reports on illness caused by raw milk are seriously flawed. But even using these flawed FDA counts of illness, raw milk accounts for only 0.4% of cases of foodborne illness between 1998 and 2005. This is an extremely low number considering that about 5% of all servings of milk consumed are raw milk.

5. Adjusting for bias, pasteurized milk is from 1.1 to 15.3 times more dangerous as raw milk on a per serving basis

6. According to FDA documents (based on exaggerated data on illness from raw milk), deli meats and uncooked hotdogs are 10 times more likely to cause foodborne illness than raw milk. Yet deli meats and hotdogs are freely sold in the state of Alaska.

7. FDA insists that there are no health benefits from raw milk compared to pasteurized, yet the very studies they cite clearly show that raw milk is superior. Enzymatic components in raw milk ensure assimilation of nutrients, kill pathogens and strengthen the immune system. These components are largely inactivated by pasteurization.

8. Pasteurized milk is now one of the eight top allergens; a survey carried out in Michigan indicates that 90% of individuals diagnosed as lactose-intolerant or allergic to milk can drink raw milk without problem.

9. The recent PARSIFAL study in Europe found that the most important factor in protecting children against asthma and allergies was raw milk consumption; the younger the children were when introduced to raw milk, the more protection it conferred. Asthma kills more than 5,000 people in the US yearly; raw milk has killed no one.

10. According to FDA data, out of a total of 437 million servings of raw milk in the US per year, 137 people got some sort of illness. On a per serving basis, that is 3.18 x 10-7. Put another way, you would have to drink 3.18 million glasses of raw milk before you might expect to get an illness of any kind due to that milk. By contrast, 16.5 percent of all broiler chickens tested by the FDA in 2006 contained salmonella bacteria. The rate of human salmonellosis in the US was 14.7 cases per 100,000 people in 2004. This is 4200 cases per year. Yet the citizens of Alaska are free to purchase poultry, but not raw milk.

Alaska State Legislature

Please enter into the record my testimony to the House Finance
Committee name

Committee on Raw Milk - 367, dated 3/26/08
Bill/Subject

My experience milking cows in Alaska goes back to the 50's. At that time there were over 50 dairies in the Matanuska Valley. Today the traditional milk industry is in trouble. One key to getting neighborhood dairies ~~is~~ again by opening a new niche - that of sales of raw milk direct to the public. Please give the farmers a shot at a viable, sustainable enterprise without criminality (which is what they risk today under state law.)

Thanks

Signed: Jerry DeVilliers
Testifier

Viable Farming
Representing (Optional)

2300 N Aurora Lane Palmer 99645
Address

746-6593
Phone number

Please fax to House Finance Committee ASAP. Thank you.

Silveraurora

From: Silveraurora [silvera@mtaonline.net]
Sent: Wednesday, March 26, 2008 2:59 PM
To: 'Silveraurora'
Subject: Finance hearing

I support HB 367

Earlier this committee was talking about the high cost of fuel around the state and helping out those folks who really need the financial assistance.

I'm going to ask you to do the same for all the small milk herd owners around the state. The ability to sell excess raw milk will mean a financial boost to our agricultural economy of the state, which will also have a trickle down effect on all of the businesses in each community as the producers will have more money to spend too.

Raw milk sales are legal in the majority of states in the US and Alaska needs to join that majority.

Small producers want to supply the Alaskan public with a fresh locally grown product that the public goes to THEM to procure - Please consider this - The person with a family cow that wants to sell a few gallons of milk a day to his neighbors; the gal with several goats for her homeschool kids to raise that wants to sell her excess goats milk to the mid-wives she knows; the Grade A dairy that wants to offer fresh milk to those wishing to drive to his farm and fill their jugs and bottles; the family in a remote village that wants to supply their community with access to fresh goats milk from their small herd. The DEC doesn't need to hold everyone's hands and have everyone sign documents and get inspected on a weekly or monthly basis - **the purchasing of raw milk directly from the producer is a private purchase between two parties and the assumption of liability as well as responsibility lies on only those 2 parties!** This bill is not implying mass distribution through retail outlets nor is that desired. A simple safe-handling procedures label applied by the producer to the containers brought by the consumer, i.e., buyer, is all that is needed. This bill does NOT require inspections or licensing, as it should not! This bill is written properly in that all liability is assumed between buyer and seller. The DEC certainly doesn't need more money to create jobs that are not needed, they already have 140 people on staff and that's more than enough to take care of much more important needs of the state.

I have dairy goats and supply breeding stock... I am the first herd in Alaska in decades, if not THE very first herd in Alaska, to go on the federal DHI milk testing program, and have been on it for 4 years. I have my milk tested every month through this program and have even won a national award for lowest somatic cell count for the breed. There are people all over this state with small herds that have been contacted many many times by private individuals who are desperate to purchase raw milk LEGALLY. There are many reasons people want raw milk – fresh, local, and for different uses including religious and cultural needs. We really need to get this bill passed through the Finance Committee today and on to the Senate so that it can get passed into law before this session is over with.

I am more than happy to answer any questions today if anyone has any. Thank you very much for your time!

Suzanne Nevada
Dist 15
Wasilla
907-373-2687
3/26/2008

Alaska State Legislature

Please enter into the record my testimony to the House Finance
Committee name

Committee on HB 367, dated 3-26-08
Bill/Subject

Thanks To Rep. Neuman for Sponsoring This Bill
AND Hopefully changing A law That is Long over Due for Change
Please Give The people BACK the Right To Choose where ~~And when~~
They purchase their milk + Milk products. Whether it Be from The
FARM OR farmer's MARKET.

There Are Cuerently hundreds of people from Anch, Eagle River,
Wasilla, Palmer Consuming Raw or fresh Milk.

I am one of them.

Thank you

Signed: Rick Williams
Testifier

FARM
Representing (Optional)

2248 W. Sunset Ave. Wasilla, AK.
Address

AM. 373-2687 Cell 232-8856
Phone number

page 1 19078951907 MAR 26,2008 11:21A

Alaska State Legislature

Please enter into the record my testimony to the Finance (committee name) committee on Raw Milk Bill HB 367 (bill/subject), dated 3/26/07.

Please support this bill! We people deserve to have free choice in what kind of milk we wish to consume. There is plenty of pasturized milk available ~~t~~ to those want to make that choice, We who want to choose raw milk deserve the same right. The safety argument is a non issue it is legal in other states, with no problems, It would be against the interest of a seller, to sell bad milk as he would be instantly out of buisness! It would be a nich market perfect for Alaskan small producers

Signed:

Testifier: Judson J. Brennan

Representing (Optional): PO Box 1165 Delta Jct Ak.

Address: 895-5153

Phone No:

Legislative Information Office

Alaska State Legislature

Please enter into the record my testimony to the Finance Committee.
committee name

committee on HB367/Sale of Raw Milk dated 3-26-08.
bill/subject

I support small farms and would like the option of purchasing raw milk from farmers I trust. People who prefer raw milk over pasteurized milk often educate themselves about the risks that accompany the benefits of its consumption. I would like the legal authority to choose the milk I purchase. Thank you for your consideration of our voices.

Signed: Joanna Holbrook
Testifier

Representing (Optional)

P.O. Box 306 Delta Jct. AK 99737
Address

(907) 322-0342
Phone No

Alaska State Legislature

Please enter into the record my testimony to the Finance Commitee
committee name

committee on HB367/Sale of Raw Milk, dated 3.26.08
bill/subject

I support small farms and the freedom to buy raw milk.

Signed: Jaclon Holbrook
Testifier

Representing (Optional)

Po Box 306 Delta Jct. Ak 99737
Address

(907) 895-1909
Phone No

Alaska State Legislature

Please enter into the record my testimony to the House Committee
committee name

committee on HB367 Sale of Raw Milk dated March 26, 2008
bill/subject

Our family enjoys raw, unhormoned, unpasturized milk and ask you to make it available for the public. Thanks.

Signed: Rachel Holbrook
Testifier

Representing (Optional)

P.O. Box 306 Delta Junction, AK 99737
Address

(907) 895-1909
Phone No.

MAR 26,2008 11:21A 19078955017 page 1

Alaska State Legislature

Please enter into the record my testimony to the ~~Senate~~ Finance Committee.
committee name

committee on HB367/Sale of Raw Milk, dated 3-26-08.
bill/subject

I drink raw milk because of health concerns. Please allow me the right to choose, and the ability to continue buying it for personal consumption.

Alaska presently has in place, what amounts to, a state-sanctioned monopoly system, which discourages, and puts out of business the small dairies.

This over-regulation needs to be removed, so the small family farm can, once again, sell dairy products to local markets. I don't need the Dept. of Environmental Conservation's approval on the locally-purchased milk I drink. I have the ability to personally inspect the local milk producers' facility, and make my own decision on whether or not to buy from them. Thanks.

Signed: Jael Holbrook
Testifier

Representing (Optional)

P.O. Box 306, Delta Junction, AK 99737
Address

(907) 895-1909
Phone No

MAR-26-2008 WED 12:16 PM LIO 19078955017 P. 08
MAR 26 2008 WED 10:21 AM LIO 19078955017 P. 01

MAR 26,2008 11:21A 19078955017 page 1

Alaska State Legislature

Please enter into the record my testimony to the Finance Committee,
committee name

committee on HB367/Sale of Raw Milk dated 3-26-08.
bill/subject

I believe we Alaskans should be able to purchase the milk we prefer, and I prefer raw milk.

Signed: Rebekah Wallrich
Testifier

Representing (Optional)

P.O. Box 306 Delta Jct AK 99737
Address

(907) 895-1909
Phone No

MAR-26-2008 WED 12:16 PM LIO 19078955017 P. 09

MAR 26,2008 11:21A 9078955017 page 6

Alaska State Legislature

Please enter into the record my testimony to the Finance committee.
committee name

committee on HB 367/sale of raw milk dated 3/26/08.
bill/subject

I believe that small farms and large farms should be able to sell raw milk for human use.

Signed: Jessica Holbrook
Testifier

Representing (Optional)

4250 Mainstreet P.O. Box 306 Delta Jct. Ak
Address

(907) 322-0624
Phone No.

MAR-26-2008 WED 12:17 PM L10 9078955017 P. 10

Alaska State Legislature

Please enter into the record my testimony to the Finance Committee,
committee name

committee on HB367/Sale of Raw Milk dated 3/26/08.
bill/subject

I support the sale of raw milk in the state of Alaska.

Signed: Melody Holbrook
Testifier

Representing (Optional)

PO Box 3240 Delta Jct AK 99737
Address

(907) 895-4485
Phone No.

Alaska State Legislature

Please enter into the record my testimony to the Finance Committee
committee name
committee on HB 367/Raw Milk dated 3/26/08.
bill/subject

I support this bill that would legalize the sale of raw milk in our state. Consumers need this option, as do farmers.

Signed: Bethel Holbrook
Testifier

Representing (Optional)

HC 60 Box 3240, Delta
Address

895-4485
Phone No

page 1 9078955017 MAR 26,2008 12:21A

Alaska State Legislature

Please enter into the record my testimony to the _____ committee name

committee on HB 367 / Raw Milk bill/subject dated 03/26/08

I support the legal sale of raw milk.

Signed Kirk Holbrook
Testifier

Representing (Optional)

HC 60 Box 3240 Nulato AK 99737
Address

(907) 895-4485
Phone No

MAR-26-2008 WED 10:21 AM 110 9078955017 P. 01

MAR-26-2008 WED 12:14 PM 110 9078955017 P. 02

Finance committee

HB367 raw milk 3/26/08

I support the legal sale of raw milk

Nathan Barlenook

Hc 60 Box 3240 Delta Jct, AK 99737
(907) 895-4485

HB 367 – Sale of Raw Milk Products

HB 367 allows the sale of raw milk. The Alaska Departments of Environmental Conservation (DEC), Natural Resources (DNR), and Health and Social Services (DHSS) do not support HB 367 and believe mandatory pasteurization for all commercially sold milk and milk products is necessary to protect human health.

Consumption of raw milk poses serious health risks

- Human pathogens commonly found in raw milk include *Campylobacter jejuni*, *E. coli*, *Listeria monocytogenes*, *Salmonella* species, and *Yersinia* species. Introduction of these pathogens into raw milk cannot be eliminated by standard disinfection and sanitation procedures or good animal handling practices alone.
- Numerous federal agencies, including the American Medical Association, the American Public Health Association, the Federal Food and Drug Administration (FDA), and the U.S. Centers for Disease Control and Prevention (CDC) support prohibiting the sale or distribution of raw milk because of the danger it poses to human health.
- CDC has traced more than 1000 illnesses, 104 hospitalizations, and 2 deaths to consumption of raw milk or cheese produced from raw milk from 1998–2005. A list of some of the most recent outbreaks is attached.
- Frequent consumers of milk - children, the elderly, and people with weakened immune systems are at the greatest risk for illness and death from bacteria found in raw milk.

Existing State regulations (18 AAC 32) prohibit the sale of raw milk

- The State of Alaska dairy and public health experts agree that raw milk should not be sold commercially. This prohibition was codified over 10 years ago.

Pasteurization has not been shown to substantially alter the nutritional value

- The pasteurization process uses heat to destroy harmful bacteria without significantly changing milk's nutritional value. In addition to killing disease-causing bacteria, pasteurization destroys bacteria that cause spoilage, extending the shelf life of milk.
- Pasteurization does not result in an appreciable loss of protein
- Pasteurization does not result in an appreciable loss of fat-soluble vitamins (A, D, E andK)
- Pasteurization results in a loss of B-complex vitamins on the order of 0-10%
- Pasteurization results in a loss of vitamin C on the order of 0-10%
- According to FDA, raw milk does not contain compounds that will kill harmful bacteria, making the product safe.
- Pasteurized milk does not cause lactose intolerance or allergic reactions any more than raw milk.

Outbreaks happen in states with regulatory programs that allow sale of raw milk

- Between 1973 and 1992, raw milk was associated with 46 outbreaks; 87% of these outbreaks occurred in states where commercial distribution of raw milk was legal.
- In 2001, Wisconsin banned cow-leasing programs after 75 people became infected with *Campylobacter jejuni* bacteria from drinking unpasteurized milk obtained through such a program.

Selected recent outbreaks of human illness associated with raw milk consumption

- **July 2007**—Public health officials in Pennsylvania stopped Stump Acres Dairy raw milk sales due to an outbreak of *Salmonella* infection. The first outbreak occurred earlier in 2007; however, raw milk was put back on sale after the dairy farm passed the state's regulatory testing. Raw milk sales were again prohibited several weeks later after a second outbreak of *Salmonella* infection was identified. The dairy was allowed to re-open its raw milk market until a third outbreak of Salmonella occurred in July. Even with testing and the utmost care by the producer the raw milk product could not be kept safe for public consumption.
- **December 2005**—Public health officials in Clark County, Washington were notified of four county residents with laboratory confirmed *Escherichia coli* O157:H7 infection. All four residents reported having consumed raw milk obtained from a Cowlitz county farm.
- **July 2004**—The Indiana Public Health Department advised consumers to check their refrigerators and freezers for raw milk cheese that may be contaminated with *Salmonella*. Routine product sampling found *Salmonella* in "Natural Raw Milk Cheese" made by Meadow Valley Farm after the cheese was distributed to farmers' markets and specialty food stores in parts of Indiana and Wisconsin.
- **2002–2003**—Two children were hospitalized in Ohio for infection with *Salmonella* Typhimurium. These children and 60 other people in Illinois, Indiana, Ohio, and Tennessee developed bloody diarrhea, cramps, fever, chills, and vomiting from *S.* Typhimurium that was tracked to consuming raw milk.
- **2000–2001**—In North Carolina, 12 adults were infected with *Listeria monocytogenes* linked to homemade, Mexican-style fresh soft cheese produced from contaminated raw milk sold by a local dairy farm. Ten of the 12 victims were pregnant women, and infection with the bacterium resulted in five stillbirths, three premature deliveries, and two infected newborns.

Current Regulation of Raw Milk – Alaska

Code of Federal Regulations - 21 CFR 1240.61 "No person shall cause to be delivered into interstate commerce or shall sell, otherwise distribute, or hold for sale or other distribution after shipment in interstate commerce any milk or milk product in final package form for direct human consumption unless the product has been pasteurized or is made from dairy ingredients (milk or milk products) that have all been pasteurized....."

"The final rule does not apply to the interstate transportation of raw (unpasteurized) milk to dairy processing plants for pasteurization or to raw milk products in intrastate commerce". 52 Fed. Reg. 29509 (1987) at 29509

[DEC interpretation – raw milk cannot be sold across State lines but States have the choice of adopting legislation allowing it to be sold intrastate

State Statute: 17.20.005 "...The commissioner may issue orders, regulations, permits, quarantines, and embargoes relating to (4) .... Grading of milk and milk products and standards of sanitation for dairies offering to the public or selling milk or milk products to at least the minimum of current recommendations of the United States Public Health Service pasteurized milk ordinance as it may be periodically be revised."

[DEC interpretation – At a minimum, DEC is to comply with the U.S. Pasteurized milk ordinance (PMO) and apply it to all milk products sold or offered in the State. Raw milk would not meet the PMO standards and thus this subsection effectively prohibits the sale of raw milk in Alaska.]

State Regulations 18 AAC 32:
The State of Alaska has adopted the federal regulations outright so the exact same rules apply as directed by the Statute. You can access the current pasteurized milk ordinance at http://www.cfsan.fda.gov/~ear/pmo03toc.html

18 AAC 32.060
...A milk producer may not allow raw milk or a raw milk product, including cream from raw milk, to be removed from the dairy farm unless

(1) the product is being transported directly to a milk processing plant with a permit issued under 18 AAC 32.030 or by another state; or
(2) the product has been decharacterized with an approved denaturant and labeled "FOR ANIMAL FOOD NOT FOR HUMAN CONSUMPTION" in letters at least three inches high on each container; for the purposes of this paragraph, "approved denaturant" means
    a. finely powdered charcoal;
    b. FD & C Blue No. 1, FD & C Blue No. 2, Ultramarine Blue; or
    c. FD & C Green No.3, FD & C Red No. 3, or FD & C Red No. 40

[DEC prohibits the removal of raw milk from a dairy farm unless the raw milk is being transported for processing or the milk is intended for animal food and has been denatured through the addition of food coloring.]

DHSS Raw Milk Talking Points

DHSS Position

- The Alaska Department of Health and Social Services takes the firm position that the health risks associated with legalizing the sale of raw milk substantially outweigh the benefits because
  - unpasteurized milk is far more likely to contain human pathogens than pasteurized milk and thereby increases the risk of serious, sometimes fatal, infectious illness among milk consumers, and
  - those who are at increased risk for serious health outcomes include the developing fetus, young children, and the elderly who may be incapable of making an informed decision, and
  - the potential health benefits of raw milk consumption are largely unsubstantiated by empirical scientific evidence.

Statistics

- Many human pathogens are commonly found in raw milk, including *E. coli O157:H7* and *Salmonella*
  - *Also Listeria monocytogenes, Campylobacter jejuni, Mycobacterium* and *Yersinia* species
- These pathogens may be shed directly from the animal (cow, goat, etc) or contaminate the product during the collection and handling process.
- Multiple studies have illustrated a dramatic increase in the incidence of multi-drug resistant bacteria present on farms (livestock operation, dairy farms, vegetable and fruit farms), which results in increased health risks among infected persons.
- In 1995, raw milk accounted for approximately 1% of all milk sales in states that permit the sale of raw milk (Headrick)
- Raw milk contamination
  - A study performed by the USDA Agricultural Research Service and published in the Journal of Dairy Science in 2004 collected raw milk samples from 861 farms in 21 states. They found *Salmonella in* 2.6% and *Listeria monocytogenes* in 6.5% of samples.
  - Another study was conducted in 2002 at Penn State. In this study samples were collected from 248 dairy herds from 16 counties in Pennsylvania. *Campylobacter jejuni*, Shiga toxin-producing *Escherichia coli, Listeria monocytogenes, Salmonella*, and *Yersina enterocolitica*, were present in anywhere from 2 to 6 % of the samples.
  - A third study sampled milk from 131 dairies in Minnesota and South Dakota. *Campylobacter jejuni*, Shiga toxin-producing *Escherichia coli, Listeria monocytogenes, Salmonella*, and *Yersina enterocolitica*, were present in anywhere from 4 to 9 % of the samples.
  - A fourth study was reported in 2005 in the Journal Emerging Infectious Diseases. Raw milk samples were collected over 3 years from 316 farms in the USA, from the Northeast, Midwest and West. The raw milk was tested for the presence of Coxiella burnetii, which causes Q-Fever in people. (The symptoms of Q Fever range from malaise, muscle soreness, fever, hepatitis, endocarditis.) Domestic livestock (cows, sheep, and goats) are the primary reservoirs for Coxiella burnetii. In this study over 94 % of the samples tested positive for Coxiella. This disease is endemic not only in the US but other studies have shown it to be a world wide problem.
- Between 1973 and 1992, raw milk was associated with 46 outbreaks; 87% of these outbreaks occurred in states where commercial distribution of raw milk was legal (American Journal of Public Health 1998;88:1219-1221).
  - 6 outbreaks were reported during 476 state-years for states in which the intrastate sale of raw milk was not legal (1.26 outbreaks per 100 state-years), compared with 40 outbreaks during 544 state-years for states in which the intrastate sale of raw milk was legal (7.35 outbreaks per 100 state-years).
  - The number of reported outbreaks per 10 million person-years in states that permitted the intrastate sale of raw milk was 0.14, compared with 0.03 outbreaks per 10 million person-years in states where the intrastate sale of raw milk was illegal.
- Between 1998 and 2005, CDC traced more than 1000 illnesses, 104 hospitalizations, and 2 deaths to consumption of raw milk or cheese produced from raw milk.
- In 2001, Wisconsin banned cow-leasing programs after 75 people became infected with *Campylobacter jejuni* bacteria from drinking unpasteurized milk obtained through such a program

- CDC's FoodNet Survey was performed in 9 US states in 2002. It showed that of >8,000 people surveyed, 81.6% reported consuming any milk in the past 7 days, and 3.5% reported consuming raw milk
- New data from CDC show that between 1998-2006, 92% (46 of 50) of outbreaks linked to liquid milk consumption for which the pasteurization status of the milk was known were due to the consumption of unpasteurized milk (unpublished data)

Pasteurization

- High Temperature/Short Time (HTST) pasteurization heats the milk to at least 161° for at least 15 seconds
- The milk is immediately cooled to below 40° and packaged into plastic jugs or plastic-coated carton
- Pasteurization must be sufficient to destroy all human pathogens that may be carried in the milk from the cow
- Pasteurization temperatures are sufficient to destroy all yeasts, mold, and many of the spoilage bacteria
- Microbiological standards for milk as recommended by the U.S. Public Health Service:
    - Grade A raw milk for pasteurization should not to exceed 300,000 bacteria per ml
    - Grade A pasteurized milk should not exceed 20,000 bacteria per ml

Need to Focus on Comparing Raw vs. Pasteurized Milk

- Most foods run the risk of being contaminated with human pathogens; the risk varies depending on the origin of the food product, how it is raised, and how it is handled by the producer, distributer, and consumer
- One of the primary duties of government involves protecting the public's health by making the food supply safer
- Each food group is assessed independently
- This bill is not about the legality of selling raw beef, chicken, oysters, or honey—it is about the legality of selling raw milk
- Therefore, we need to focus on comparing the risks and benefits associated with a new law that would legalize the sale of raw milk in Alaska, and use regulations to protect the public's health
- The risk of serious and potentially lethal infectious illness associated with raw milk products are substantially greater than the risks associated with pasteurized milk products
- Pasteurized milk can become contaminated after pasteurization during handling or packaging (just as any processed food) and result in outbreaks; however, raw milk sold to the consumer starts out with higher bacterial loads and is far more likely to be contaminated with human pathogens than pasteurized milk
- The developing fetus, young children, the elderly, and immune-compromised persons are at highest risk for severe health outcomes resulting from infections commonly associated with contaminated milk consumption

Duty to Protect

- Duty to protect the food supply
- Duty to protect those who do not have the capacity or sufficient information needed to make a well informed decision
    - The developing fetus, young children, the elderly
    - This bill would allow the sale of raw milk to restaurants, but provides no mandate to inform restaurant customers that they might be served raw milk or to ensure products are not distributed incorrectly

Potential Raw Milk Costs

- DEC costs for testing, monitoring, and inspections
- DHSS costs for outbreak investigations
- Costs to state government associated with outbreak investigations are substantial (time, money, resources)
- Direct and indirect costs involved resulting from the persons who become ill (and their family members)
    - A study of E. coli O157:H7 infections in the US showed that the average cost per case ranged from <$100 for an individual who does not obtain medical care to *$6.2 million* for a patient who died from hemolytic uremic syndrome (JFP 2005)
- Loss of public trust in product and in government officials
- Cost to industry if an outbreak occurs

Benefits of Raw Milk Consumption

- Possible financial benefit to struggling small dairy farmers and consumers
- Taste
- Minimal scientific evidence of possible health benefits
    - Possible beneficial impact on allergy, asthma, and digestive health
    - Negligible evidence of nutritional benefits--pasteurization may inactivate a small percentage of B vitamins, particularly thiamine, and up to 20 % of the vitamin C in milk but milk is not a major source of either one of these nutrients

The Pleural of Anecdote is not Data

- Need to use available scientific data to drive health policy decisions
- Just because someone grew up on a farm and does not remember getting sick from drinking raw milk, does not equate to proof that passing a law to legalize the sale of raw milk is okay. That's like saying that because someone has driven their entire life without ever wearing a seatbelt and has not been injured in a car accident that seatbelt laws are unfounded.

Summary

The Alaska Department of Health and Social Services strongly opposes this bill on grounds that allowing the sale of raw milk poses a substantial risk to the health of Alaskans.

Office of the State Veterinarian Robert F Gerlach VMD

Mr. Chairman and members of the House Resource Committee; thank you for allowing me to submit written testimony regarding HB 367. If you have any questions after reading this document I would be happy to answer any questions.

The Raw Milk issue is one that is filled with strong scientific opposition from one side and equally staunch enthusiastic support on the other side. Public health officials present overwhelming evidence illustrating the disease risk associated with the product and a large number of agencies and organizations support this fact. Arguments defending raw milk compare risk to other food products and the apparent small number of food borne outbreaks currently related to raw milk. Statistics are used to try to justify each side and unfortunately statistics can often confuse the issue if used improperly.

Important points to remember regarding the recommendations of doctors (MDs or veterinarians) is that we take an oath upon graduation to "at first, do no harm" and we are trained to take preventative measures to protect our patients or clients from illness. All public health officials are held to this standard; prevent the outbreak of disease and do not wait till the disease occurs to take action. Public health officials recommend that raw milk be pasteurized prior to consumption to reduce the risk of disease to the public, especially the members of the public who are at greater risk: the immuno-compromised, the very young, and the elderly. The scientific studies performed by researchers and the data presented by public health officials and agencies (FDA) is peer reviewed and validated prior to publication in the literature, it is not anecdotal. When these studies are criticized, carefully consider the arguments and check the source of the data so the conclusions are not misrepresented.

When evaluating the arguments presented for both sides, comparisons must be made on an equal basis, apples to apples; raw milk products versus pasteurized milk products. Not raw milk versus processed or raw meats, vegetables or fruits. The other consideration is to look at the data in the contexts of the study, use the same background population to evaluate the results. According to current statistics less than 2% of the US population drinks raw milk, so the over all number of reported food borne outbreaks associated with raw milk will appear to be less when compared to other foods. The milk produced from any mammal (cow, goat, yak, or even moose was referenced) has significant risk of being contaminated with all types of bacteria including human pathogens. In addition to the milk being contaminated when it is collected and handled, animals may shed pathogens directly into the milk intermittently without showing any sign of illness. So there is no way to predict when the milk may contain disease causing pathogens and even with testing no way to guarantee the product is safe.

As a veterinarian and a public health official I cannot support the sale and distribution of raw milk products to the general public.

I have included the following information for your review.

A. The Economic Impact on Agriculture

This bill was introduced as a mechanism to stimulate the development of agriculture in Alaska. I feel the implications of this bill will have significant effect on the present dairy industry. The sale of raw milk is not only a public health concern, but it can also impact the economic viability of the entire agricultural industry with obvious emphasis on the vulnerable dairy industry in Alaska. The disease outbreaks associated with raw milk sales *negatively impacts the public trust* of agricultural products. Dr Jayarao, MVSc, PhD, MPH **(Professor of Veterinary Public Health and Extension Veterinarian, the Pennsylvania State University, Association Council on Public Health and Regulatory Veterinary Medicine)** has found that in the aftermath of a food borne disease outbreak from a raw milk product, sales of all dairy products will be impacted not just the raw milk products. This has great implications to the owners and the workers at the 6 dairy farms and

the two dairy processing plants in the state. In addition there are other farmers (hay producers) and support businesses that also are economically tied to these farms. Dairy farming is their livelihood and the financial security of their families. It is unfair to put these producers and workers that have so much at stake at greater risk of economic jeopardy without a through discussion with all parties involved.

There are recent 4 studies that illustrate the inherent risk of disease associated with raw milk.
These scientific surveys tested raw milk and detected food borne pathogens in the bulk tank samples collected at the farm.

A) A study performed by the USDA Agricultural Research Service and published in the Journal of Dairy Science in 2004 collected raw milk samples from **861 farms** in **21 states**. They found *Salmonella in* 2.6% and *Listeria monocytogenes* in 6.5% of raw milk samples.

B) The second study was conducted in 2002 at Penn State. In this study samples were collected from **248 dairy herds** from 16 counties in Pennsylvania. *Campylobacter jejuni*, Shiga toxin-producing *Escherichia coli*, *Listeria monocytogenes*, *Salmonella*, and *Yersina enterocolitica*, were present in anywhere from **2 to 6 %** of the raw bulk tank milk samples.
Of major importance was that the *Salmonella* Newport (a well known human pathogen) that was isolated from 5 farms was resistant to more than 5 antibiotics.

C) The third study sampled milk from **131 dairies** in Minnesota and South Dakota. *Campylobacter jejuni*, Shiga toxin-producing *Escherichia coli*, *Listeria monocytogenes*, *Salmonella*, and *Yersina enterocolitica*, were present in anywhere from **4 to 9 %** of the raw bulk tank milk samples.

Although the prevalence appears to be low, these pathogens pose a significant risk to consumers of raw milk and raw milk products.

D) The last study was reported in 2005 in the Journal Emerging Infectious Diseases. Raw milk samples were collected over 3 years from **316 farms** in the USA, from the Northeast, Midwest and West. The raw milk was tested for the presence of Coxiella burnetii, which causes Q-Fever in people. (The symptoms of Q Fever range from malaise, muscle soreness, fever, hepatitis, endocarditis.) Domestic livestock (cows, sheep, and goats) are the primary reservoirs for Coxiella burnetii. In this study over **94 %** of the samples tested positive for Coxiella. This disease is endemic not only in the US but other studies have shown it to be a world wide problem.

These farms were using standard hygiene practices during milking (hand washing, cleaning the cow's udder prior to milking, sanitizing and disinfecting the equipment, and keeping the milking area separate from the rest of the farm) and were able to reduce but **not eliminate the risk for milk contamination.**

Example of a Recent Documented Incident

- **July 2007**—Public Health Officials in PA stopped Stump Acres Dairy raw milk sales due to an outbreak of Salmonella. The problems with the raw milk products at this certified dairy began earlier in 2007. After the first outbreak (February 2007) the raw milk was put back on sale once the state finished its investigation and the milk once again passed the state's regulatory testing. Raw milk sales were again prohibited several weeks later after a second outbreak of Salmonella was identified. The dairy was allowed to re-open its raw milk market until a third outbreak of

Salmonella occurred in July. Even with testing and the utmost care by the producer the raw milk product could not be kept safe for public consumption.

Disease Outbreaks caused by Consumption of Raw Milk

An epidemiological study on food borne diseases associated with raw milk in the United States was published in the American Journal of Public Health in 1998. They reported that **between 1973 and 1992, raw milk was associated with 46 outbreaks of food borne illness in the United States, and it is significant to note that the authors found 40 of 46 (87%) of these outbreaks occurred in states where the intrastate sale of raw milk was legal at the time.**

Published scientific data regarding the disease risk associated with raw milk products has resulted in the following agencies to support prohibiting the sale or distribution of raw milk:

National Farm Bureau
National Association of States Departments of Agriculture
National Environmental Health Association
National Association of Food and Drug Officials
American Public Health Association
Federal Food and Drug Administration
Centers for Disease Control
American Medical Association
American Veterinary Medical Association
American Academy of Pediatricians
International Association of Food Protection
Health Canada

Note that not all these listings are public health agencies, several are groups concerned with the economic development of agriculture and food production. This is not an exhaustive list.

B. The Public Health Risk

Dr McLaughlin covered this subject very well during his testimony and presented the information regarding several recent outbreaks. I will only make a few comments.

In recent years, this issue of sale of raw milk has become more relevant than ever before due to the emergence of **antimicrobial resistant in food borne pathogens** such as *Salmonella, Staphylococcus (MRSA), Campylobacter* and *Escherichia coli.* An infection with a drug resistant strain can result in a severe illness and death due to the lack of an effective antibiotic treatment. These bacteria have developed this resistance due to a number of reasons and they are present in all areas of the environment: hospitals, schools, farms, in wildlife and our homes. These organisms are more prevalent in environments where animals (both wild and domestic) are located. Recently multidrug resistant strains of bacteria were isolated in normal healthy wild birds in the Arctic.

Secondary Complications associated with Food Borne Disease

Gastroenteritis is the primary condition associated with cases of food borne illness attributable to raw milk consumption.

- Enteritis caused by *E. coli* and *Salmonella* spp. is usually self-limiting for the average person. The very young, elderly, and immunocompromised individuals are at a higher risk of serious illness and life threatening consequences.
- *Campylobacter jejuni* and *Y. enterocolitica* illnesses are typically characterized by gastritis and enterocolitis.
- **A new disease syndrome** has been identified in humans following an episode of food borne illness with these pathogens found in raw milk. The result is a debilitating post infection immunologic condition that can include Guillian-Barré syndrome and reactive arthritis.
- Unlike other food borne bacteria, which mainly cause gastritis and enteritis, *L. monocytogenes* causes listeriosis, which is characterized by septicemia and meningitis in humans.

C. The benefits of raw milk have not been substantiated

Consumption of raw bulk tank milk is a common practice among farm families. Studies have reported that the most prevalent consumers of raw milk are dairy farm families and dairy farm employees. The primary reason for consumption is convenience and taste. Proponents of raw milk might believe that these products not only taste better but provide better nutrition than pasteurized products and decrease the risk for different medical conditions; but these benefits have never been proven or validated scientifically. There is recent evidence that shows an association between the consumption of raw milk and the decrease in allergic related asthma cases. The authors of this study support the need for further research but stress that they cannot recommend the consumption of raw milk products due to the risk of food borne disease pathogens.

Pasteurization may inactivate a small percentage of B vitamins, particularly thiamine, and up to 10 % of the vitamin C in milk but milk is not a major source of either one of these nutrients. Pasteurization does not sterilize milk, some bacteria can be found in store bought products that is why it must be refrigerated and is manufactured with a sell by date listed. **Pasteurization does eliminate food borne pathogens.**

The health benefits of raw dairy products are unsubstantiated. However the risks associated with food borne pathogens are well-documented. The perception of health benefits should not outweigh the considerable risk to the general public of consuming raw milk.

Summary of the Facts

- Raw milk can be a significant source of food borne pathogens.
- Consumption of raw milk by an immunocomprised, young or elderly population puts them at higher risk of infection and life threatening consequences.
- With the emergence of new diseases and antibiotic resistant bacteria in raw milk and other foods, it is **essential that milk sold to the public must be pasteurized**, and milk products be made from pasteurized milk.
- **Public health safety should be the number one priority** over other issues related to sale of raw milk and milk products in Alaska.

- A food borne disease outbreak associated with raw milk will negatively impact the public trust in Alaska Grown Products and directly impact the Alaska dairy producers and related support industry. Development of this industry should not occur without researching the impacts on current agricultural industry in the state.
- Scientific evidence does not exist to support the fact that the raw milk has more health benefits as compared to pasteurized milk.
- **The intent is not to eliminate or restrict a private individual's choice; the intent is to prevent the sale and distribution of a potentially dangerous product.** Consumption of raw milk remains a preventable cause of food borne disease outbreaks in Alaska.

Robert F Gerlach VMD
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Pasteurization

Introduction

Thermal lethality determinations

Methods

- Batch
- Continuous: HTST
  - Milk Flow Overview
  - Holding Time
  - Pressure Differential
  - Equipment
  - Automated Public Health Controller

Introduction

The process of pasteurization was named after **Louis Pasteur** who discovered that spoilage organisms could be inactivated in wine by applying heat at temperatures below its boiling point. The process was later applied to milk and remains the most important operation in the processing of milk.

Definition:

The heating of every particle of milk or milk product to a specific temperature for a specified period of time without allowing recontamination of that milk or milk product during the heat treatment process.

Purpose There are two distinct purposes for the process of milk pasteurization:

1. **Public Health Aspect** - to make milk and milk products safe for human consumption by destroying all bacteria that may be harmful to health (pathogens)

2. **Keeping Quality Aspect** - to improve the keeping quality of milk and milk products. Pasteurization can destroy some undesirable enzymes and many spoilage bacteria. Shelf life can be 7, 10, 14 or up to 16 days.

The extent of microorganism inactivation depends on the combination of temperature and holding time. Minimum temperature and time requirements fo milk pasteurization are based on thermal death time studies for the most heat resistant pathogen found in milk, *Coxelliae burnetii*. Thermal lethality determinations require the applications of microbiology to appropriate processing determinations. An overview can be found here.

To ensure destruction of all pathogenic microorganisms, time and temperature combinations of the pasteurization process are highly regulated:

Ontario Pasteurization Regulations

Milk:
63° C for not less than 30 min.,
72° C for not less than 16 sec.,
or equivalent destruction of pathogens and the enzyme phosphatase as permitted by Ontario Provincial Government authorities. Milk is deemed pasteurized if it tests negative for alkaline phosphatase.

Frozen dairy dessert mix (ice cream or ice milk, egg nog):
at least 69° C for not less than 30 min;
at least 80° C for not less than 25 sec;
other time temperature combinations must be approved (e.g. 83° C/16 sec).

Milk based products- with 10% mf or higher, or added sugar (cream, chocolate milk, etc)
66° C/30 min, 75° C/16 sec

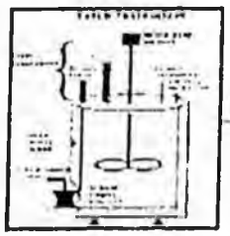
There has also been some progress with low temperature pasteurization methods using membrane processing technology..

Methods of Pasteurization

There are two basic methods, batch or continuous.

Batch method

The batch method uses a vat pasteurizer which consists of a jacketed vat surrounded by either circulating water, steam or heating coils of water or steam.



Batch Pasteurizer (26 KB)

In the vat the milk is heated and held throughout the holding period while being agitated. The milk may be cooled in the vat or removed hot after the holding time is completed for every particle. As a modification, the milk may be partially heated in tubular or plate heater before entering the vat. This method has very little use for milk but some use for milk by-products (e.g. creams, chocolate) and special batches. The vat is used extensivly in the ice cream industry for mix quality reasons other than microbial reasons.

Continuous Method

Continuous process method has several advantages over the vat method, the most important being time and energy saving. For most continuous processing, a high temperature short time (HTST) pasteurizer is used. The heat treatment is accomplished using a **plate heat exchanger.** This piece of equipment consists of a stack of corrugated stainless steel plates clamped together in a frame. There are several flow patterns that can be used. Gaskets are used to define the boundaries of the channels and to prevent leakage. The heating medium can be vacuum steam or hot water.

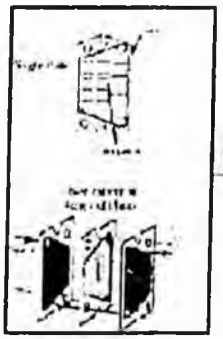


Plate Heat Exchanger 26 KB

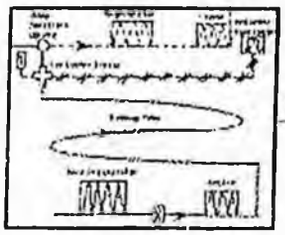
HTST Milk Flow Overview

This overview is meant as an introduction and a summary. Each piece of HTST equipment will be discussed in further detail later.

Cold raw milk at 4° C in a constant level tank is drawn into the **regenerator** section of pasteurizer. Here it is warmed to approximately 57° C - 68° C by heat given up by hot pasteurized milk flowing in a counter current direction on the opposite side of thin, stainless steel plates. The raw milk, still under suction, passes through a positive displacement **timing pump** which delivers it under positive pressure through the rest of the HTST system.

The raw milk is forced through the heater section where hot water on opposite sides of the plates heat milk to a temperature of at least 72° C. The milk, at pasteurization temperature and under pressure, flows through the **holding tube** where it is held for at least 16 sec. The maximum velocity is governed by the speed of the timing pump, diameter and length of the holding tube, and surface friction. After passing temperature sensors of an **indicating thermometer** and a **recorder-controller** at the end of the holding tube, milk passes into the **flow diversion device (FDD).** The FDD assumes a forward-flow position if the milk passes the recorder-controller at the preset cut-in temperature (>72° C). The FDD remains in normal position which is in diverted-flow if milk has not achieved preset cut-in temperature. The improperly heated milk flows through the diverted flow line of the FDD back to the raw milk **constant level tank.** Properly heated milk flows through the forward flow part of the FDD to the pasteurized milk regenerator section where it gives up heat to the raw product and in turn is cooled to approximately 32° C - 9° C.

The warm milk passes through the cooling section where it is cooled to 4° C or below by coolant on the opposite sides of the thin, stainless steel plates. The cold, pasteurized milk passes through a **vacuum breaker** at least 12 inches above the highest raw milk in the HTST system then on to a storage tank filler for packaging.



Basic Flow - HTST Pasteurization 17 KB

Holding Time

When fluids move through a pipe, either of two distinct types of flow can be observed. The first is known as **turbulent flow** which occurs at high velocity and in which eddies are present moving in all directions and at all angles to the normal line of flow. The second type is streamline, or **laminar flow** which occurs at low velocities and shows no eddy currents. The ***Reynolds number***, is used to predict whether laminar or turbulent flow will exist in a pipe:
Re < 2100 laminar
Re > 4000 fully developed turbulent flow

There is an impact of these flow patterns on holding time calculations and the assessment of proper holding tube lengths.

The holding time is determined by timing the interval for an added trace substance (salt) to pass through the holder. The time interval of the fastest particle of milk is desired. Thus the results found with water are converted to the milk flow time by formulation since a pump may not deliver the same amount of milk as it does water.

Note: the formulation assumes flow patterns are the same for milk and water. If they are not, how would this affect the efficiency of the pasteurization process?

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Pressure Differential

For contiunuous pasteurizing, it is important to maintain a higher pressure on the pasteurized side of the heat exchanger. By keeping the pasteurized milk at least 1 psi higher than raw milk in regenerator, it prevents contamination of pasteurized milk with raw milk in event that a pin-hole leak develops in thin stainless steel plates. This **pressure differential** is maintained using a timing pump in simple systems, and differential pressure controllers and back pressure flow regulators at the chilled pasteurization outlet in more complex systems. The position of the timing pump is crucial so that there is suction on the raw regenerator side and pushes milk under pressure through pasteurized regenerator. There are several other factors involved in maintaining the pressure differential:

- The balance tank overflow level must be less than the level of lowest milk passage in the regenerator
- Properly installed booster pump is all that is permitted between balance tank and raw regenerator
- No pump after pasteurized milk outlet to vacuum breaker
- There must be greater than a 12 inch vertical rise to the vacuum breaker
- The raw regenerator drains freely to balance tank at shut-down

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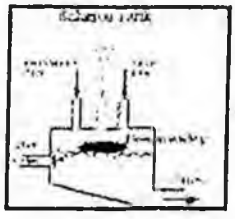
Basic Component Equipment of HTST Pasteurizer

Balance Tank

The balance, or constant level tank provides a constant supply of milk. It is equipped with a **float valve assembly** which controls the liquid level nearly constant ensuring uniform head pressure on the product leaving the tank. The overflow level must always be below the level of lowest milk passage in regenerator. It, therefore, helps to maintain a higher pressure on the pasteurized side of the heat exchanger. The balance tank also prevents air from entering the pasteurizer by placing the top of the outlet pipe lower than the lowest point in the tank and creating downward slopes of at least 2%. The balance tank provides a means for recirculation of diverted or pasteurized milk.



Balance Tank 17 KB

Regenerator

Heating and cooling energy can be saved by using a regenerator which utilizes the heat content of the pasteurized milk to warm the incoming cold milk. Its efficiency may be calculated as follows:

% regeneration = temp. increase due to regenerator/total temp. increase

For example: Cold milk entering system at 4° C, after regeneration at 65° C, and final temperature of 72° C would have an 89.7% regeneration:

$$\frac{65 - 4}{72 - 4} = 89.7$$

Timing pump

The timing pump draws product through the raw regenerator and pushes milk under pressure through pasteurized regenerator. It governs the rate of flow through the holding tube. It must be a **positive displacement** pump equipped with variable speed drive that can be legally sealed at the maximum rate to give minimum holding time in holding tubes. It also must be interwired so it only operates when FDD is fully forward or fully diverted, and must be "fail-safe". *A centrifigal pump with magnetic flow meter and controller may also be used (see below).*

Holding tube

Must slope upwards 1/4"/ft. in direction of flow to eliminate air entrapment so nothing flows faster at air pocket restrictions.

Indicating thermometer

The indicating thermometer is considered the most accurate temperature measurement. It is the official temperature to which the **safety thermal limit recorder** (STLR) is adjusted. The probe should sit as close as possible to STLR probe and be located not greater than 18 inches upstream of the flow diversion device.

Recorder-controller (STLR)

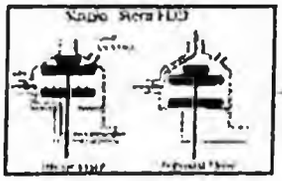
The STLR records the temperature of the milk and the time of day. It monitors, controls and records the position of the flow diversion device (FDD) and supplies power to the FDD during forward flow. There are both **pneumatic** and **electronic** types of controllers. The operator is responsible for recording the date, shift, equipment, ID, product and amount, indicating thermometer temperature, cleansing cycles, cut in and cut out temperatures, any connects for unusual circumstances, and his/her signature.

Flow Diversion Device (FDD)

Also called the flow diversion valve (FDV), it is located at the downstream end of the upward sloping holding tube. It is essentially a 3-way valve, which, at temperatures greater than 72° C,opens to **forward flow**. This step requires power. At temperatures less than 72° C, the valve recloses to the normal position and diverts the milk back to the balance tank. It is important to note that the FDD operates on the measured temperature, not time, at the end of the holding period. There are two types of FDD:

single stem - an older valve system that has the disadvantage that it can't be cleaned in place.

dual stem - consists of 2 valves in series for additional fail safe systems. This FDD can be cleaned in place and is more suited for automation.



Flow Diversion Devices 17 KB

Vacuum Breaker

At the pasteurized product discharge is a vacuum breaker which breaks to atmospheric pressure. It must be located greater than 12 inches above the highest point of raw product in system. It ensures that nothing downstream is creating suction on the pasteurized side.

Auxiliary Equipment

Booster Pump

It is centrifugal "stuff ng" pump which supplies raw milk to the raw regenerator for the balance tank. It must be used in conjunction with pressure differential controlling device and shall operate only when timing pump is operating, proper pressures are achieved in regenerator, and system is in forward flow.

Homogenizer

The homogenizer may be used as timing pump. It is a positive pressure pump; if not, then it cannot supplement flow. Free circulation from outlet to inlet is required and the speed of the homogenizer must be greater than the rate of flow of the timing pump.

Magnetic flow meter and centrifugal pump arrangements

Magnetic flow meters can be used to measure the flow rate. It is essentially a short piece of tubing (approximately 25 cm long) surrounded by a housing, inside of which are located coils that generate a magnetic field. When milk passes through the magnetic field, it causes a voltage to be induced, and the generated signal is directly proportional to velcoity. Application of the magnetic flow meter in the dairy industry has centered around its replacing the positive displacement timing pump as the metering device in HTST pasteurizing systems, where with certain products the timing pump rotors reportedly wear out in a relatvely short period of time. In operation, the electrical signal is sent by the magnetic flow meter to the flow controller, which determines what the actual flow is compared to the flow rate set by the operator. Since the magnetic flow meter continuously senses flow rate, it will signal the electronic controller if the actual flow exceeds the set flow rate for any reason. If the flow rate is exceeded for any reason, the flow diversion device is put into diverted flow. A significant difference from the normal HTST system (with timing pump) comes into focus at this point. This system can be operated at a flow rate greater than (residence time less than) the legal limit. However, it will be in diverted flow and never in forward flow.

Another magnetic flow meter based system with an AC variable frequency motor control drive on a centrifugal pump is also possible in lieu of a positive displacement metering pump on a HTST pasteurizer.This system does not use a control valve but rather the signal from the magnetic flow meter is transmitted to the AC variable frequency control to vary the speed of the centrifugal pump. The pump, then controls the flow rate of product through the system and its holding time in the holding tube.

Automated Public Health Controllers These systems are used for time and temperature control of HTST systems. There are concerns that with sequential control, the critical control points (CCP's) are not monitored all the time; if during the sequence it got held up, the CCP's would not be monitored. With operator control, changes can be made to the program which might affect CCP's; the system is not easily sealed. No computer program can be written completely error free in large systems; as complexity increases, so too do errors.

This gives rise to a need for specific regulations or computer controlled CCP's of public health significance:

1. dedicated computer - no other assignments, monitor all CCP's at least once/sec
2. not under control of any other computer system or override system, i.e., network
3. separate computer on each pasteurizer
4. I/O bus for outputs only, to other computers no inputs from other computers
5. on loss of power - public health computers should revert to fail safe position (e.g. divert)
6. last state switches during power up must be fail safe position
7. programs in ROM - tapes/disks not acceptable
8. inputs must be sealed, modem must be sealed, program sealed
9. no operator override switches

10. proper calibration procedure during that printing - Public health computer must not leave public health control for > 1 sec and upon return must complete 1 full cycle before returning to printing
11. FDV position must be monitored and temperature in holding tube recorded during change in FDV position
12. download from ROM to RAM upon startup
13. integrated with CIP computer which can be programmed e.g., FDV, booster pump controllable by CIP computer when in CIP made only

Back to the Home Page of Dairy Science and Technology University of Guelph

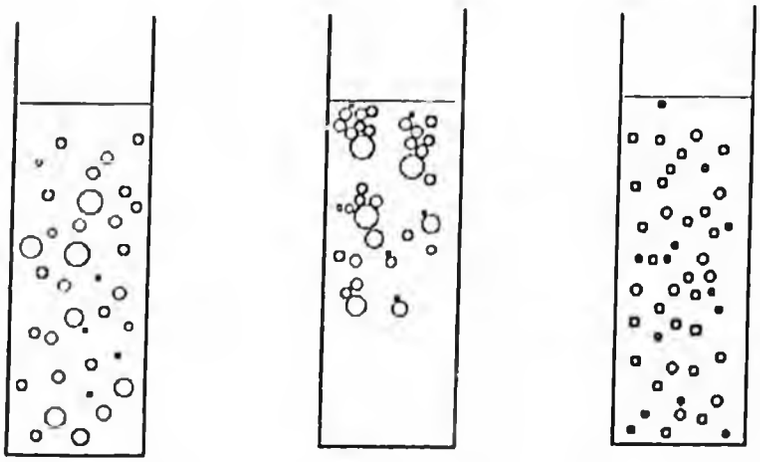
Homogenization of Milk and Milk Products

The following topics will be covered in this section:

- Introduction
- Homogenization Mechanism
  - turbulence
  - cavitation
- Effect Of Homogenization
  - fat globule properties
  - surface layers

Introduction

Milk is an oil-in-water ***emulsion***, with the fat globules dispersed in a continuous skimmilk phase. If raw milk were left to stand, however, the fat would rise and form a cream layer. Homogenization is a mechanical treatment of the fat globules in milk brought about by passing milk under high pressure through a tiny orifice, which results in a decrease in the average diameter and an increase in number and surface area, of the fat globules. The net result, from a practical view, is a much reduced tendency for creaming of fat globules. Three factors contribute to this enhanced stability of homogenized milk: a decrease in the mean diameter of the fat globules (a factor in Stokes Law), a decrease in the size distribution of the fat globules (causing the speed of rise to be similar for the majority of globules such that they don't tend to cluster during creaming), and an increase in density of the globules (bringing them closer to the continuous phase) owing to the adsorption of a protein membrane. In addition, heat pasteurization breaks down the cryo-globulin complex, which tends to cluster fat globules causing them to rise.



Raw milk

Cold, raw milk after 1 hour

Homogenized milk during storage

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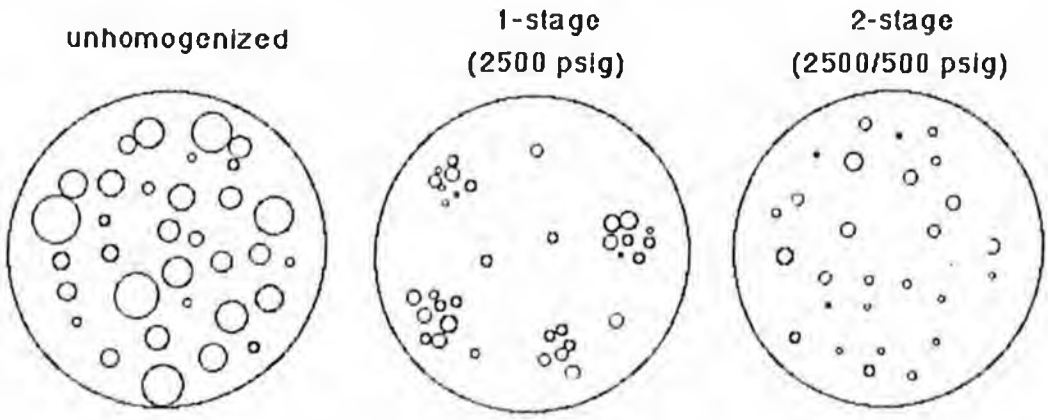
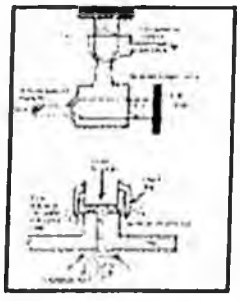
Homogenization Mechanism

Auguste Gaulin's patent in 1899 consisted of a 3 piston pump in which product was forced through one or more hair like tubes under pressure. It was discovered that the size of fat globules produced were 500 to 600 times smaller than tubes. There have been over 100 patents since, all designed to produce smaller average particle size with expenditure of as little energy as possible. The homogenizer consists of a 3 cylinder positive piston pump (operates similar to car engine) and homogenizing valve. The pump is turned by electric motor through connecting rods and crankshaft.

To understand the mechanism, consider a conventional homogenizing valve processing an emulsion such as milk at a flow rate of 20,000 l/hr. at 14 MPa (2100 psig). As it first enters the valve, liquid velocity is about 4 to 6 m/s. It then moves into the gap between the valve and the valve seat and its velocity is increased to 120 meter/sec in about 0.2 millisec. The liquid then moves across the face of the valve seat (the land) and exits in about 50 microsec. The homogenization phenomena is completed before the fluid leaves the area between the valve and the seat, and therefore emulsification is initiated and completed in less than 50 microsec. The whole process occurs between 2 pieces of steel in a steel valve assembly. The product may then pass through a second stage valve similar to the first stage. While most of the fat globule reduction takes place in the first stage, there is a tendency for clumping or clustering of the reduced fat globules. The second stage valve permits the separation of those clusters into individual fat globules.

The Effects of 2-stage Homogenization on Fat Globule Size Distribution as Seen Under the Light Microscope





Homogenizer and Valve 17 KB

It is most likely that a combination of two theories, turbulence and cavitation, explains the reduction in size of the fat globules during the homogenization process.

Turbulence

Energy, dissipating in the liquid going through the homogenizer valve, generates intense turbulent eddies of the same size as the average globule diameter. Globules are thus torn apart by these eddie currents reducing their average size.

Cavitation

Considerable pressure drop with charge of velocity of fluid. Liquid cavitates because its vapor pressure is attained. Cavitation generates further eddies that would produce disruption of the fat globules.

The high velocity gives liquid a high kinetic energy which is disrupted in a very short period of time. Increased pressure increases velocity. Dissipation of this energy leads to a high energy density (energy

per volume and time) Resulting diameter is a function of energy density.

In summary, the homogenization variables are:

- type of valve
- pressure
- single or two-stage
- fat content
- surfactant type and content
- viscosity
- temperature

Also to be considered are the droplet diameter (the smaller, the more difficult to disrupt), and the log diameter which decreases linearly with log P and levels off at high pressures.

Effect of Homogenization:

Fat globule

	No Homogenization	15 MPa (2500 psig)
Av. diam. (μ m)	3.3	0.4
Max. diam. (μ m)	10	2
Surf. area (m^2/ml of milk)	0.08	0.75
Number of globules (μ m^{-3})	0.02	12

Surface layer

The milk fat globule has a native membrane, picked up at the time of secretion, made of amphiphilic molecules with both hydrophilic and hydrophobic sections. This membrane lowers the interfacial tension resulting in a more stable emulsion. During homogenization, there is a tremendous increase in surface area and the native milk fat globule membrane (MFGM) is lost. However, there are many amphiphilic molecules present from the milk plasma that readily adsorb: casein micelles (partly spread) and whey proteins. The interfacial tension of raw milk is 1-2 mN/m, immediately after homogenization it is unstable at 15 mN/m, and shortly becomes stable (3-4 mN/m) as a result of the adsorption of protein. The transport of proteins is not by diffusion but mainly by convection. Rapid coverage is achieved in less than 10 sec but is subject to some rearrangement.

Surface excess is a measure of how much protein is adsorbed; for example 10 mg/m^2 translates to a thickness of adsorbed layer of approximately 15 nm.

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Country Living, Country Skills

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Kountry Life How-To

Pasteurizing Milk

If you don't have a store-bought pasteurizer, you can easily perform this task on your stovetop.

You can use the double-boiler method. If you don't have a standard double-boiler, just use two pots, one large and one smaller, so that the small one can fit into the large one. The reason you want to do this is so that the milk doesn't scald on the bottom.

Directions;

Put a few inches of water in the bottom half of the double-boiler. In the top pan, place your milk. Using a thermometer, heat the milk up to 161 degrees F slowly. Stir it to make sure the milk is an even temperature throughout.

After it is brought up to 161 degrees F, remove the top pan and set it in sink full of very cold water to cool it quickly.

KP, from WA, entered 1999-12-19

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University of Guelph

From Wikipedia, the free encyclopedia

The **University of Guelph** is a medium-sized university located in Guelph, Ontario, established in 1964. While the U of G offers degrees in many different disciplines, the university is best known for its focus on life sciences, based in part on a long-standing history of achievement in Agriculture and Veterinary Medicine and within Canada for its School of Fine Art and Music.

The University of Guelph is currently ranked by *Maclean's* magazine as the top comprehensive university in Canada ("comprehensive" indicating institutions with significant research activity and a range of programs at the undergraduate and graduate levels, including professional degrees). It has also held this ranking in 1999, 2002, and 2003, with its reputation, innovative research-intensive programs, and lively campus life cited as particular strengths.

The university is also home to the Ontario Veterinary College, Ontario's only veterinary school.

University of Guelph

Motto:	*Rerum cognoscere causas* (To understand the causes of things)
Established	1964
Type:	Public
Endowment:	$164.2 Million[1]
Chancellor:	Pamela Wallin
President:	Alastair Summerlee
Staff:	830
Undergraduates:	17,332[2]
Postgraduates:	2,076 [3]
Location:	Guelph, ON, Canada
Campus:	Urban/Suburban—4.1 km² (1,017 acres (4 km²))
Sports:	Gryphons
Colours:	Red and Yellow/Gold
Mascot:	Gryph
Athletics:	www.gryphons.ca
Website:	www.uoguelph.ca

The university's School of English and Theatre Studies is a leader in Canadian literary and dramatic writing and theory, employing many leading voices in its field.

The university is represented in Canadian Interuniversity Sport by the Guelph Gryphons.

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History

The Ontario Agricultural College (OAC) began in 1874 as an associate agricultural college of the University of Toronto. Its first building was Moreton Lodge, located where Johnston Hall now stands, which included classrooms, residences, a library, and a dining room. (Several buildings constructed during this time period are still a part of campus life today, including President's Residence, Raithby House, and Day Hall.)

The Macdonald Institute was established in 1903 to house women's home economics programs at the college. The growth spurt from 1900 to 1906 also saw the construction of MacDonald Hall, Massey Hall and the Bullring.

Several important buildings were opened in 1922, including the Ontario Veterinary College main building, Mills Hall (formerly a men's residence, converted to co-ed in 2000), and Food Science. Johnston Hall was constructed in 1931, taking the place of the torn-down Moreton Lodge. Johnston would house the OAC Administration from that year forth.

In 1964, the Ontario Agricultural College, the Macdonald Institute, and the Ontario Veterinary College amalgamated and were granted University status, giving life to the University of Guelph as it is now known.

Shortly after, during the period of 1967 to 1975, massive construction took place, giving rise to many new and expansive buildings such as the McLaughlin Library, the MacKinnon Building, the University Centre and South Residence.

New construction has been taking place since 2001 as a result of the anticipated rise in enrolment due to the Ontario double cohort and population increases. New buildings already constructed include the Gryphon Dome, the East Village Residences, Rozanski Hall and the New Science Complex. Guelph now enjoys a global reputation as "the Warwick [University] of Canada".

Campus

The main university campus spans 1,017 acres (4.1 km²), including the 408 acre (1.7 km²) University of Guelph Arboretum and a 30 acre (0.1 km²) research park.

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Dairy Foods Science Notes

Version 07-01-07

BASIC DAIRY BACTERIOLOGY

DEFINITION

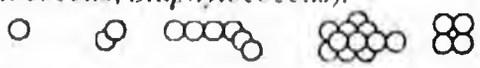
Bacteria are single celled organisms that can only be seen with the aid of a microscope ("microorganisms"). All processes needed for life occur within a single cell. Bacteria are considered *procaryotes*. Their basic cell structure differs from cells of plants and animals (*eucaryotes*); for example they lack a true nucleus and have a unique cell wall. Bacteria can be found wherever life exists; some are considered useful, such as those responsible for nutrient conversion (e.g., decomposition) and food fermentation (e.g., cheese), while others are considered harmful, such as those responsible for food spoilage and disease. Individual bacteria are named by *Genus* and *species* (e.g., *Bacillus cereus*), as are all living organisms. They are classified according to their appearance and general structure and by specific characteristics of their metabolism and growth, including nutrient requirements, growth temperatures, oxygen requirements, by their ability to use specific substrates (e.g., certain sugars), and by specific by-products of their metabolism. Currently, genetic profiling techniques have become standard tools in the identification/classification of bacteria, often beyond species level (e.g., sub-species, allelic types). There are literally thousands of species of bacteria, though only select groups are of concern to the dairy industry. The following will describe the general characteristics important for characterizing bacteria that are common in milk and dairy products. Although not specifically covered, comments pertaining to dairy fungi (yeast & molds) are included.

GENERAL CHARACTERISTICS

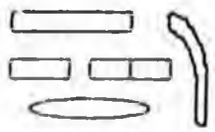
Appearance - Size and Shape:

To actually see bacteria, a microscope is required, generally one with a magnification of 1000X. Bacteria are measured in microns (1 micron = 1/1000 mm = 1/25,000 inch). When a standard light microscope is used, bacterial cells are normally stained to make them easier to see. Bacteria can be observed in milk by staining a dried milk smear on a microscope slide with a specific "milk-stain" (e.g., Levowitz-Weber Stain). Bacteria grown in a petri-dish (e.g., on a semi-solid nutrient "agar" media) or in a nutrient broth, can be smeared and dried on a slide and stained with a simple stain (e.g., methylene blue) or complex stain (see *gram-stain*, next page) for observation. Bacteria exist in a variety of shapes, sizes and arrangements, which are defining characteristics for most types. Typical shapes, sizes & arrangements of bacteria that might be seen in milk and dairy products are:

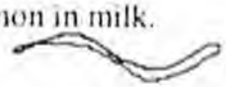
Cocci ------ Spherical cells, 0.4 - 1.5 microns. Occur as single cells, pairs, chains or clusters. (e.g., Genera - *Streptococcus*, *Staphylococcus*).



Bacilli ------ Rod shaped, 0.5 - 30 microns. Occur as single cells, pairs or chains (e.g., Genera - *Lactobacillus*, *Bacillus*, *Pseudomonas*).

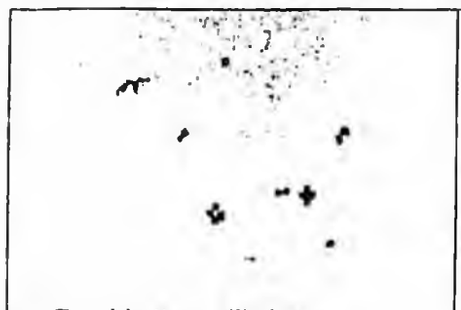


Spirilla -- Spiral or helical shaped rods of varied size. Generally are not very common in milk. (e.g., Genus - *Campylobacter*).

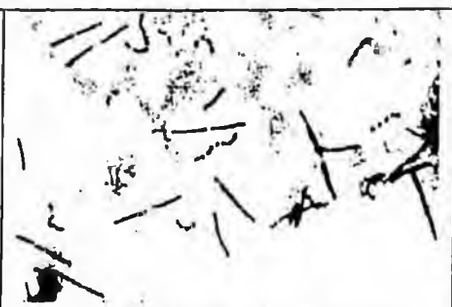


Provided with support from the NY State Dairy Promotion Order dairy farmers dedicated to the production, manufacture & distribution of quality dairy products

Milk smears under the microscope stained with Levowitz-Weber Stain:



a. Cocci in "tetrad" clusters. 1000 × magnification.



b. A smear of yogurt culture; long rods and cocci in chains.

c. Cocci in pairs ("diplococci") and a few short chains

Gram-Stain Reaction:

Most bacteria are classified as either "**gram-positive**" or "**gram-negative.**" This is typically determined by the **gram-stain procedure**, which is used to view and differentiate bacteria under the microscope; it is one of the first steps used when classifying bacteria. The gram-stain is a four step procedure with Crystal Violet (blue) and Safranin (red) as the primary stains. Depending on the characteristics of the bacteria (e.g., cell wall structure), they will stain either blue (gram-positive) or red (gram-negative). In some cases an organism classified as "gram-positive" may stain red or appear grainy with blue and red shades. These organisms may be referred to as "gram-variable":

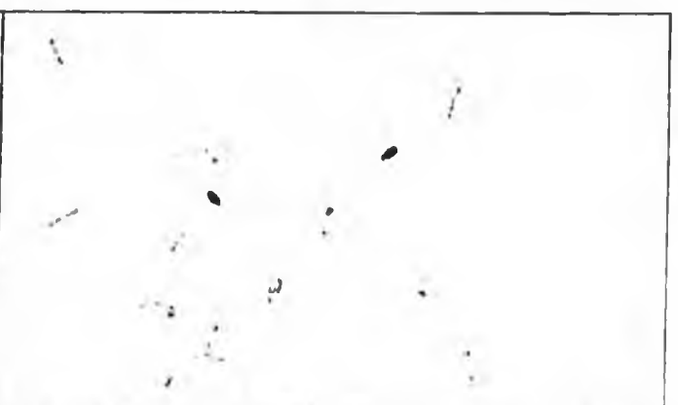
Gram-positive (blue) ... e.g., *Bacillus* (rod), *Streptococcus* (cocci), *Staphylococcus* (cocci)

Gram-negative (red) .... e.g., *Pseudomonas* (rods), *E. coli* & other coliform bacteria (rods)

Gram-variable ..... Stain blue or red depending on conditions; most are truly Gram-pos.

There are a few generalizations based on the gram-stain reaction that can be made of microorganisms common to dairy products. For example, gram-negative bacteria do not survive pasteurization; bacteria that do survive are gram-positive (but not all gram-positive survive); certain gram-negative bacteria, if present, will spoil milk faster under refrigeration compared to gram-positive spoilage organisms; certain antibiotics are more effective against gram-positive than gram negative bacteria.

Large gram-positive (blue) rods and cocci in chains & clusters and gram-negative rods (red).



Spore-stain of a *Bacillus* species; vegetative cells stain red while spores stain green or appear clear.

Endospore (Spore) Formation:

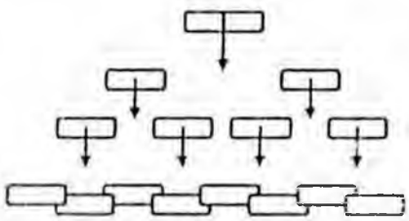
Endospores, or "spores," are protective, dormant structures that allow an organism to survive under adverse conditions. When conditions become unfavorable (e.g., lack of nutrients), vegetative growth ("multiplication") stops and "spores" begin to form within the cell. During sporulation a thick coating develops and encases the cell's genetic material. Spores forming inside a cell may be seen as swollen,

possibly clear, areas or may not be apparent at all. Special spore stains facilitate seeing spores under the microscope (see page 2). Bacterial spores released from the cell have increased resistance to heat, drying, nutrient deprivation, chemicals, sanitizers, and other conditions that would normally kill the vegetative, actively growing cell. Spores can remain dormant for extended periods of time (e.g., for years). When conditions become favorable, a spore can "germinate" and return to an actively growing state. Spores may be "activated" into growth by heat or some other "trigger." Spores are produced by only few select groups of bacteria. Bacteria in the genera *Bacillus*, *Paenebacillus*, *Geobacillus* and *Clostridium* are common gram-positive, spore-forming rods, which have some importance to dairy. Some strains stain gram-variable. Spores are commonly found in soil and other environmental sources.

BACTERIAL REPRODUCTION (GROWTH)

Bacteria reproduce by a process known as **Binary Fission**; one cell divides into two cells, each of which divides into two more cells and so on. Bacterial **Growth** is defined as an increase in cell numbers or cell mass. **Growth Rate** is the change in cell numbers per unit time. The time it takes for a bacterial population to double or go through one reproductive cycle is called the **Generation Time**. Generation times vary with each organism and are dependent on nutrient availability and environmental conditions (e.g., temperature). Under optimum conditions for growth, generation times may be as short as 10 to 20 minutes for some bacteria. When conditions are less favorable for growth, such as when temperatures are low, generation times will be longer (growth rate is slower), sometimes dramatically (e.g., it may take days for one cell division).

If One Bacterial Cell Reproduced Every Hour in 24 Hours There Would Be ~17,000,000 Cells

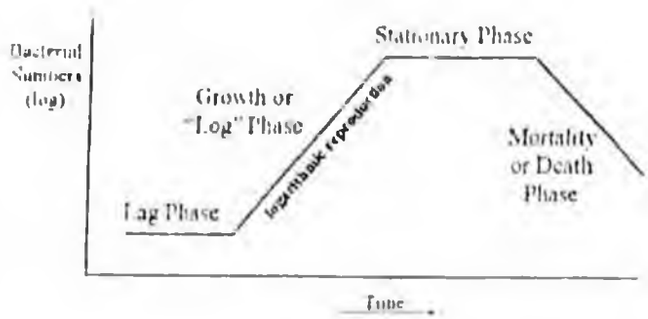


and so on .....

Hour	Count	Hour	Count
0	1	9	512
1	2	10	1,024
2	4	11	2,048
3	8	12	4,096
4	16	:	:
5	32	18	262,144
6	64	:	:
7	128	:	:
8	256	24	~17,000,000

During cell division, bacteria may not totally separate from each other. Some bacteria divide in one specific direction. With cocci (spherical bacteria), this type of cell division can result in pairs (diplococci) or chains (streptococci) that are characterizing features of certain bacteria. Other bacteria divide in several directions, resulting in tetrads or clumps. Rods generally divide in one direction resulting in pairs or chains connected end to end. Examples of cell arrangements are on page 1 & 2.

Bacterial Growth Curve: When bacteria are presented into a new growth environment, they often first go through a **lag phase** or adjustment period where no growth is apparent. This is followed by the active **exponential** or **logarithmic growth phase**. As the environment changes (e.g., nutrients deplete, inhibitors develop), growth will level off to a **Stationary Phase**, after which cells will then begin to die off (**Death Phase**).



REQUIREMENTS AND CONDITIONS FOR GROWTH

Bacterial species vary widely as to what conditions are conducive for growth. Conditions that are optimum for one organism may be lethal for another. Nutrient availability, moisture, pH, the presence or absence of oxygen, the presence of inhibitors and temperature can all influence the growth of bacteria. In most cases these are not independent variables but are interactive.

Nutrient Requirements:

Bacteria are versatile in their ability to use certain nutrients, although different organisms vary in their specific requirements. Some bacteria have very specific needs that make them difficult to culture. Generally, all bacteria require the following, in one form or another:

Energy Source – from carbohydrates, proteins, lipids.

Carbon Source – from carbohydrates, proteins, lipids, carbon dioxide

Nitrogen Source – from proteins, peptides, amino acids, ammonia, nitrates.

Vitamins – primarily water soluble B-vitamins.

Minerals, Metal Ions & Salts – such as potassium, phosphorus, calcium, magnesium, iron

Milk provides sufficient nutrients needed to support the growth of a host of microorganisms. Bacteria are capable of utilizing the proteins, fats, carbohydrates and vitamins in milk for their growth and metabolism. Different bacterial species may differ in regard to the **enzymes** they have or need to break down milk components. Enzymes are biological catalysts, usually protein in nature, that facilitate a biochemical reaction, either breaking down or building a biological compound (e.g., "protease" enzymes break down proteins; "lipase" enzymes break down fats). Microbial growth and enzyme activity results in an increase of microbial numbers that eventually leads to measurable changes in milk components and characteristics and the development of by-products that directly effect the product either in a beneficial (e.g., cheese fermentation) or harmful (e.g., milk spoilage) manner.

pH of Growth Medium or Food:

pH is a measure of acidity and alkalinity, expressed on a scale of 0-14, which is the negative logarithm of hydrogen ion activity of the solution or food.

0 ..... 7 14
Acidic — Neutral — Alkaline

Most bacteria grow best at a neutral (pH 7) or slightly higher pH, although this varies with the different organisms. Most bacteria will not grow below pH 4.0 or above pH 10. The pH of normal milk is around 6.7, which allows the growth of many types of bacteria. Cultured products have lower pHs.

Dairy Starter Cultures or Lactic Acid Bacteria (LAB) produce lactic acid and are capable of growth at lower pH values than other bacteria (pH 4.0 – 5.0). Culturing milk prevents many spoilage or harmful bacteria from growing. LAB may produce sufficient acid to eventually limit their own growth if allowed to do so. Yeast and mold are capable of growth over a wider pH range, including very low pH values, which is why these microorganisms are common causes of spoilage of cultured milk products.

Moisture or Available Water:

All bacteria require relatively high levels of available moisture, which can be expressed as **water activity**, (A_w). Pure water has an A_w of 1.00, while fluid milk is extremely close to this value. Sugars and salts react with water in a manner that binds the water and lowers the level of available water (lower A_w). Drying processes lower the available water by removing it. Most bacteria require an A_w of greater than 0.91 and generally will not spoil foods that are lacking available water. Fluid milk is a perishable food that easily spoils, while milk powder can be stored unrefrigerated for long

periods of time. Yeast and molds generally require less water for growth than bacteria, which is why foods such as jams and jellies are only spoiled by these types of microorganisms.

Oxygen Requirements:

Some bacteria require oxygen while other bacteria will not grow in its presence. In fact, oxygen may actually be toxic to certain bacteria. Bacteria are classified based on their requirement for the presence or absence of oxygen as follows:

Aerobic - requires the presence of oxygen for growth.

Anaerobic - requires the absence of oxygen for growth (oxygen may be lethal).

Facultative Anaerobic - can grow with or without oxygen.

Milk contains dissolved oxygen, thus it supports the growth of aerobic and facultatively anaerobic microorganisms. Rarely do strict anaerobes grow in milk. Cheese may have a reduced oxygen environment due to the growth of culture bacteria. An oxygen-free environment may occur in the center of some cheeses allowing the growth of certain anaerobic bacteria, some of which cause serious defects (e.g., late gas-blowing). *Clostridium botulinum* is an anaerobe that produces a deadly toxin that has rarely been associated with dairy foods. Some bacteria such as certain starter cultures are considered "microaerophilic," meaning they grow best in lower levels of oxygen.

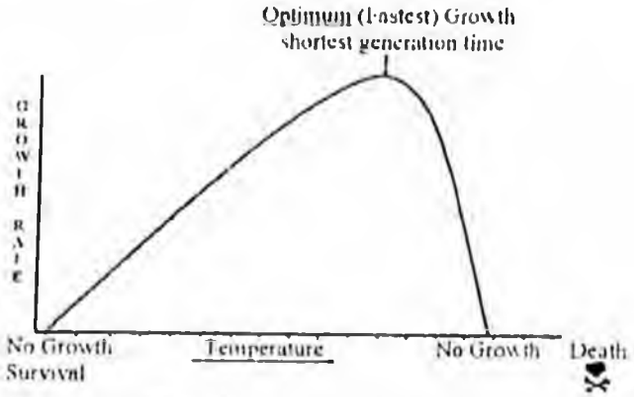
The Presence of Inhibitors:

There are a number of chemical substances that can inhibit the growth of (*bacteriostatic*) or kill (*bactericidal*) bacteria. Some examples relevant to dairy microbiology are drugs or antibiotics, lactoferrin (natural in raw milk), carbon dioxide, lysozyme (an enzyme), sanitizers, organic acids, preservatives (e.g., potassium sorbate) and natural inhibitors formed by microorganisms (e.g., nisin).

Temperatures for Growth:

The optimum temperature for growth for a bacterium is the temperature where its generation time is shortest or it grows the fastest. Each bacterium has a minimum and maximum temperature for growth, which will vary between species and strains and with other environmental conditions. Outside of this range, growth does not occur. Bacteria are often grouped based on their optimum, minimum and maximum temperatures for growth. These are not rigid ranges as some bacterial species may overlap into adjacent groups. General groupings of bacteria and approximate ranges are as follows:

Thermophilic ...	Min:	104°F (40°C)
"Heat Loving"	Max:	140°F (>60°C)
	Opt:	122-131°F (50-55°C)
Mesophilic	Min:	41°F (5°C)
Medium Temps	Max:	122°F (50°C)
	Opt:	86-98°F (30-37°C)
Psychrophilic ...	Min:	32°F (0°C) or less,
"Cold Loving"	Max:	77°F (25°C)
	Opt:	<69°F <20°C)



Psychrotrophs:

The types of bacteria that are of most significance to the dairy industry are those that can grow under refrigeration conditions. *"Cold Tolerant" organisms capable of growth at temperatures at or below 7°C (44.6°F), regardless of their optimum temperatures* are generally referred to as **Psychrotrophs** or **Psychrotolerant** (the term currently used by microbiologists to describe this group). "Mesophilic" bacteria (medium optimum temp.) that grow under refrigeration would be considered *psychrotrophs*.

Regardless of the range of temperatures for growth, temperatures colder than the optimum for an organism will generally increase the generation time or slow its growth. When temperatures approach the freezing point of water (32°F/0°C), growth of most microorganisms is prevented, although a few organisms will continue to grow very, very slowly at or even below freezing. Most microorganisms will survive freezing (without growth), depending on the medium that they are frozen in. When temperatures exceed the maximum growth temperature for an organism, growth stops. When temperatures are increased further, they eventually become lethal. Heat is often used to inactivate or kill microorganisms (e.g., as in pasteurization); generally, higher temperatures result in greater kill.

Temperature versus Generation Time
(example of one organism studied)

Temperature	Generation Time
37°C (100°F)	20 Minutes
32°C (90°F)	25 Minutes
27°C (80°F)	40 Minutes
21°C (70°F)	60 Minutes
16°C (60°F)	150 Minutes
10°C (50°F)	12 Hours
4.4°C (40°F)	>24 Hours

BACTERIA OF CONCERN IN FLUID MILK

Pathogenic/Foodborne Illness Bacteria:

Pasteurization was originally designed to destroy pathogenic bacteria that caused tuberculosis, brucellosis, typhoid and Q-fever, illnesses that were often associated with the consumption of raw milk. Milk pasteurization, coupled with improved animal husbandry procedures, has virtually eliminated most of these types of illnesses. Raw milk may also harbor other organisms associated with foodborne illness, including *Salmonella*, *Listeria*, *Campylobacter*, *Yersinia* and certain strains of *E. coli*. These organisms are also killed by pasteurization. However, cross-contamination of processed dairy products with raw milk and/or the direct consumption of raw milk have resulted in relatively recent outbreaks of foodborne illnesses involving these organisms. Pasteurized milk products can also be contaminated from poor processing and handling conditions and poor worker hygiene.

Pathogens of Historical Significance (currently rare)	
Coxiella burnetti.....	Q-fever, flu-like
Mycobacterium spp.	Tuberculosis
Brucella abortus	Brucellosis, abortions
Salmonella typhi	Typhoid fever
Streptococcus spp.	Septic sore throat
vnebacterium diphtheriae .	Diphtheria

For more information on Foodborne Pathogens:
http://www.cfsan.fda.gov/~mow/intro.html

Pathogens Associated with more Recent Outbreaks	
Salmonella spp.	GI* illness, secondary**
Campylobacter jejuni	GI illness, secondary
Yersinia enterocolitica ...	GI, pseudo-appendicitis
E. coli (O157:H7)	GI (hemorrhagic), HUS (kidney failure)
Listeria monocytogenes ..	GI* illness, meningitis, sepsis, stillbirths

* GI = gastro-intestinal illness; symptoms may include nausea, vomiting, diarrhea, cramps & sometimes fever & chills.
** Secondary = non-GI symptoms may follow, e.g., arthritic rxn

Mastitis Causing Bacteria:

Bacteria that can cause *mastitis*, an infection of the mammary gland of dairy cattle, include contagious (e.g., *Staphylococcus aureus*, *Streptococcus agalactiae*) and environmental (e.g., coliforms) organisms. Mastitis can result in increased somatic cell counts (white blood cells) and in some cases, increased bacteria counts in the bulk milk, both of which result in decreased milk quality. For more information on mastitis visit the National Mastitis Council (http://www.nmconline.org).

Psychrotrophic (Psychrotolerant) Bacteria:

Psychrotrophic or psychrotolerant bacteria are capable of growing at 7°C (44.6°F) or less. Psychrotrophs are of primary concern to the dairy industry since they grow and cause spoilage in raw or processed dairy products commonly held under refrigeration.

a) The most commonly occurring psychrotrophs in milk are gram-negative rods, many belonging to the genus *Pseudomonas*. Gram-negative psychrotrophs generally do not survive pasteurization, thus they occur in processed milk as post-pasteurization contaminants (PPC).

b) Psychrotrophs are common in the dairy environment. Milk soils (e.g., on dirty equipment) can support the growth of psychrotrophs and other contaminants that can contaminate subsequent milk. Marginal cooling can result in relatively large numbers of these organisms in milk. Psychrotrophs may also be present in low numbers in untreated water supplies used for rinsing dairy equipment.

c) Psychrotrophic bacteria produce a variety of enzymes that cause chemical deterioration of milk resulting in off-flavors. Some of these enzymes are not inactivated by pasteurization or by other heat treatments and may continue to degrade milk products, even when the bacterium is destroyed. This has been shown to be a concern with shelf-stable (Ultra-High Temperature) milk, but there is limited information relative to conventionally pasteurized milks.

Thermoduric Bacteria:

Thermoduric bacteria are a miscellaneous group of bacteria that are capable of surviving pasteurization or other heat treatments. As a general rule, all thermoduric bacteria are gram-positive. Spore-forming bacteria (e.g., *Bacillus, Paenibacillus*) comprise some of the most heat resistant bacteria.

a) Chief sources of thermodurics in milk are poorly cleaned equipment including old rubber parts, areas of milkstone build-up, separators and other difficult to clean or neglected areas (soil build-up). They may contaminate milk at the farm or at the plant. Poor pre-milking hygiene procedures (e.g., dirty cows) may also influence thermoduric levels in raw milk, especially with spore-formers.

b) High thermoduric counts in raw milk may result in counts that exceed legal limits in the pasteurized milk made from that raw milk (> 20,000 cfu/milliliter).

c) Most thermodurics are not psychrotrophic, but some are. In the absence of gram-negative psychrotrophs, certain thermoduric bacteria may grow and cause spoilage of pasteurized milk. Heat Resistant Spore-Forming Psychrotrophs belonging to *Bacillus* & *Paenibacillus* are considered common thermoduric psychrotrophs that have become limiting factors in milk shelf-life.

Coliform Bacteria:

Coliform bacteria are defined as "aerobic or facultatively anaerobic, gram-negative rods, that ferment lactose with the production of acid and gas." These characteristics allow selective counting of these types of bacteria in milk and dairy products. They are considered "**indicator organisms**" because they are easy to detect and their presence in food & water indicate some form of contamination; e.g., the presence of "fecal" coliforms (*E. coli*) suggests the possibility of fecal contamination.

a) They are called *Coliforms* because some members of the group are found in the intestines (colon) of warm-blooded animals (fecal coliforms). However, some coliform bacteria are common as environmental contaminants and/or are associated with other habitats (e.g., plant matter).

b) Coliforms are almost always found in raw milk although with good production methods the numbers can be kept very low. Sources of coliform contamination can be dirty cows and manure, dirty equipment and, in some cases, cows with coliform mastitis.

c) Coliforms do not survive pasteurization. When detected in processed milk or dairy products, they *indicate* recontamination after pasteurization (Post-Pasteurization Contamination).

SELECT ORGANISMS COMMON TO MILK & DAIRY PRODUCTS:

Grouping/Organisms	General Characteristics and Importance to Milk or Milk Products
Gram-Positive Cocci:	
Enterococcus spp.	Short chains or pairs of cells. "Fecal" streptococci (but are not coliform); common in fecal matter, but also in the dairy farm environment. Used as indicator organisms in some foods. Acid producers. Some strains have some heat resistance.
Lactococcus lactis	Short chains or pairs. "Lactic" streptococci; produce lactic acid. Some strains are used as "mesophilic" dairy starter cultures. Associated with raw milk poor cooling. Some strains produce a "malty" defect in milk as well as acid defect.
Micrococcus spp.	Irregular clusters or tetrads, cells tend to be larger. Associated with udder skin. Some strains are thermoduric and are associated with milk-stone on equipment.
Staphylococcus aureus	Single, pairs or irregular clusters. A cause of contagious mastitis. May cause food poisoning (toxin developed) if present in high numbers in foods.
Streptococcus agalactiae	Chains, often very long. May appear as chains of pairs or with oval cocci stretched with the chain. Cause of contagious mastitis.
Streptococcus uberis	Pairs and chains of moderate length. Considered a cause of environmental mastitis, though some evidence suggests that it may/can be spread cow to cow.
Streptococcus salivarius sub-sp. thermophilus	Chains, moderate to long. Dairy "thermophilic" starter culture (incubation ~110°F) used for making yogurt and certain cheeses.
Gram-Positive Rods:	
Corynbacterium bovis	Irregular shaped rods, some "club" shaped. Cause of bovine mastitis though some strains may be natural inhabitants of the skin and mucosal membranes.
Lactobacillus delbrueckii sub-sp. *bulgaricus*	Long rods, some chains. Dairy "thermophilic" starter culture (incubation ~110°F) used for making yogurt and certain cheese.
Microbacterium lacticum	Irregular rods, some "V-Forms." Thermoduric bacterium, some strains with relatively high heat resistance for a non-spore-former.
Gram-Positive Rods, Spore-Forming:	
Bacillus cereus	Relatively large, thick rods. Some strains are psychrotrophic. Some strains cause foodborne illness if allowed to grow to sufficient levels (toxin mediated).
Bacillus spp.(others)	Many different spore-forming *Bacillus spp.* in milk. Rods very in size. Some are psychrotrophic, some are not. Some are gram-variable. Most are thermoduric in the spore state, but not as vegetative cells. Common in soil & dairy environment.
Clostridium tyrobutyricum	Anaerobic spore-former that causes "late gas blowing" defect in certain Swiss and Dutch style cheeses. Associated with poor silage and dirty cows.
Paenibacillus spp	Spore-former group with psychrotrophic strains that are important as a limiting factor to milk shelf-life. Most were previously classified as *Bacillus* spp.
Gram-Negative Rods:	
Pseudomonas fluorescens (also *P. putida, P. fragi*)	Rods, often in pairs end-to-end. Psychrotrophic bacterium that is a main cause of reduced shelf-life due to post-pasteurization contamination.
Escherichia coli (*E. coli*)	"Fecal Coliform" associated with manure/environmental contamination. Used as an indicator organism. Some pathogenic strains (e.g., O157:H7). May cause mastitis.
Coliform Bacteria	*Enterococcus, Citrobacter, Klebsiella, E. coli.* Associated with fecal & environmental contamination. Some strains are psychrotrophic. Some may cause mastitis.
Others - Psychrotrophs	A number of gram-negative psychrotrophs are reported in older literature, including *Acinetobacter, Achromobacter, Flavobacterium.*

For listing of potential human pathogens see table on page 6 and refer to The Bad Bug Book (http://www.cfsan.fda.gov/~mow/intro.html)

BACTERIA IN RAW AND PROCESSED MILK

Bacteriological Standards: (For Grade "A" Milk)

Raw Producer Milk	100,000/milliliter (ml) total count
Commingled Raw Milk	300,000/ml total count
Pasteurized Milk	20,000/ml total count, 10 coliform

Raw Milk: Milk, when synthesized in the udder of a healthy cow is virtually sterile. As milk passes through the teat cistern and teat channel, it may be contaminated with low levels of bacteria (<1000/ml), which are generally not significant to milk quality & safety. Milk from a cow with mastitis (infection of the mammary gland) however, may harbor large numbers of the infectious bacteria. After it leaves the cow, milk may be contaminated from the exterior of the cow (dirty cows), the environment and poorly cleaned equipment. Poor cooling allows faster growth rates and can result in rapid increases in bacterial numbers in raw milk before it is processed. While the legal limit for bacteria in raw milk is 100,000/ml, the production of milk with bacteria counts less than 10,000/ml should be easily achievable for most farms.

Pasteurized Milk: Pasteurization, while designed to destroy potential pathogens in raw milk, substantially reduces the total numbers of bacteria present, increasing the shelf-life potential of the milk. Unless gross recontamination has occurred, bacterial numbers in fresh pasteurized milk generally reflect the organisms that survive pasteurization (thermoduric). The legal limit for bacterial numbers in pasteurized milk is 20,000/ml, though bacteria counts for most fresh pasteurized milks are generally less than 1,000/ml. Under proper refrigeration, the bacteria that become significant in the shelf-life and spoilage of milk are psychrotrophic in nature. These types of organisms generally occur as post-pasteurization contaminants, although a few thermoduric bacteria may be psychrotrophs.

Sources of Bacteria in Processed Milk:

1) Survive pasteurization (thermoduric).
2) Post-Pasteurization Contamination:
   a) Insufficient cleaning/sanitizing - valves, pipelines, gaskets, pasteurized milk tanks, fillers.
   b) Personnel - hands, clothing, sneezes, coughs.
   c) Environmental - air, dust, water, condensate.

CONTROLLING BACTERIAL CONTAMINATION & DEFECTS IN DAIRY PRODUCTS

Preventing Contamination:

Bacteria are present in the environment both at the farm and at the dairy plant. Although total prevention of microbial contamination of milk at the farm is impossible, it can be minimized by milking clean, healthy cows; in a clean environment and by assuring that the milking system and storage equipment is properly cleaned, sanitized and maintained. Once raw milk leaves the farm (tank truck to plant storage) it must be properly handled to prevent further contamination before it is processed. Keeping the microbial load of raw milk to a minimum will increase the quality of the products made. At all stages of raw milk handling, milk must be rapidly and properly cooled with temperatures maintained below 40°F (4.4°C).

At the dairy plant, preventing contamination after pasteurization is critical for product shelf-life and safety. This requires that the processing equipment and the plant environment be thoroughly cleaned and sanitized such that the possibility of microbial growth and contamination is limited. Once cleaned and sanitized, recontamination should be prevented. Proper employee training in dairy and personal hygiene procedures should be an essential part of every plant's quality assurance program