Delivery of Drinking Water and Sanitation Utilities in Alaskan Villages Using Collaborative Principles:

Innovation Leading to More Sustainable Communities

140th Annual Meeting of the American Public Health Association
San Francisco, CA Moscone Convention Center, Oct. 27-31, 2012

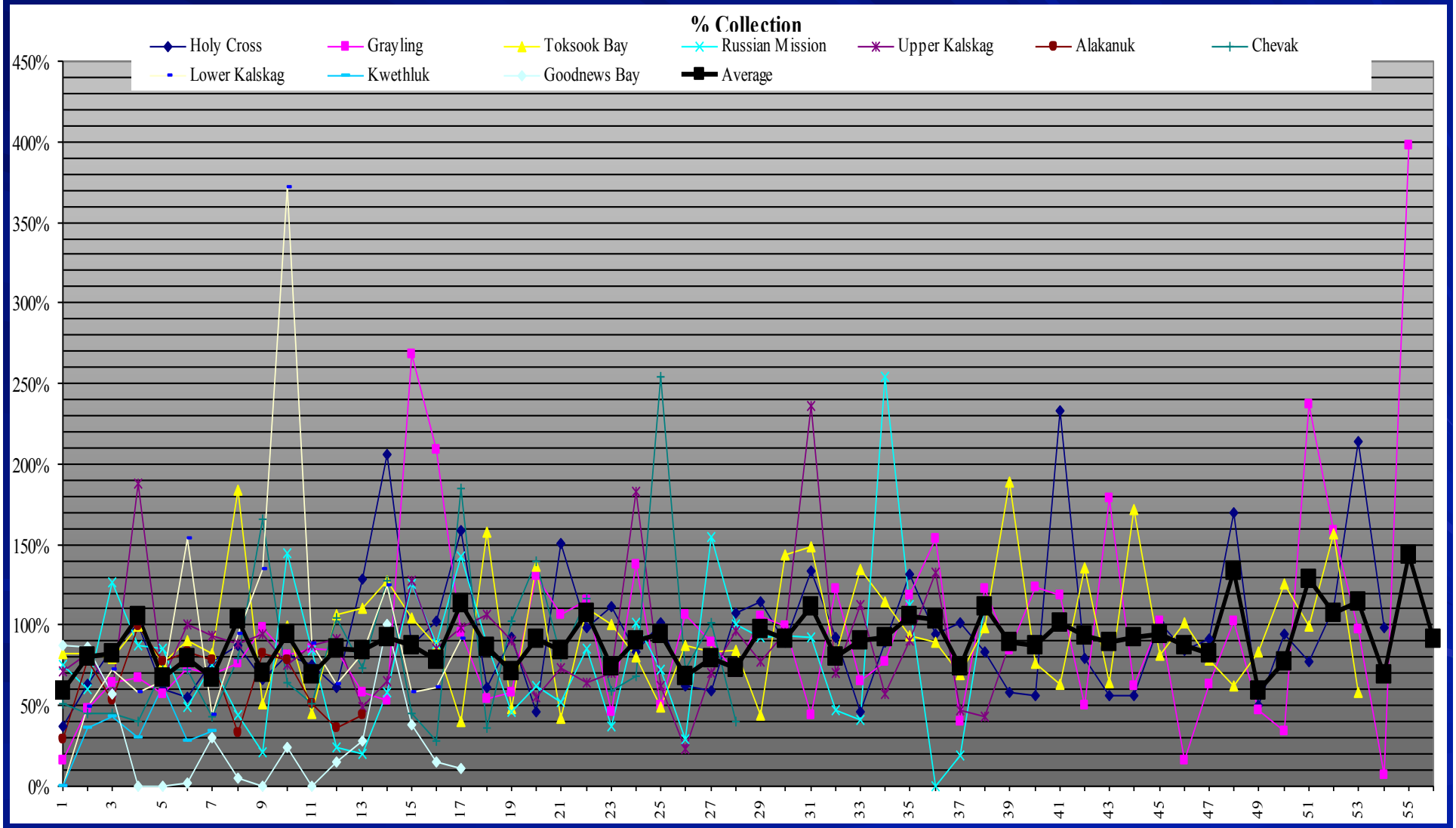
Presented by

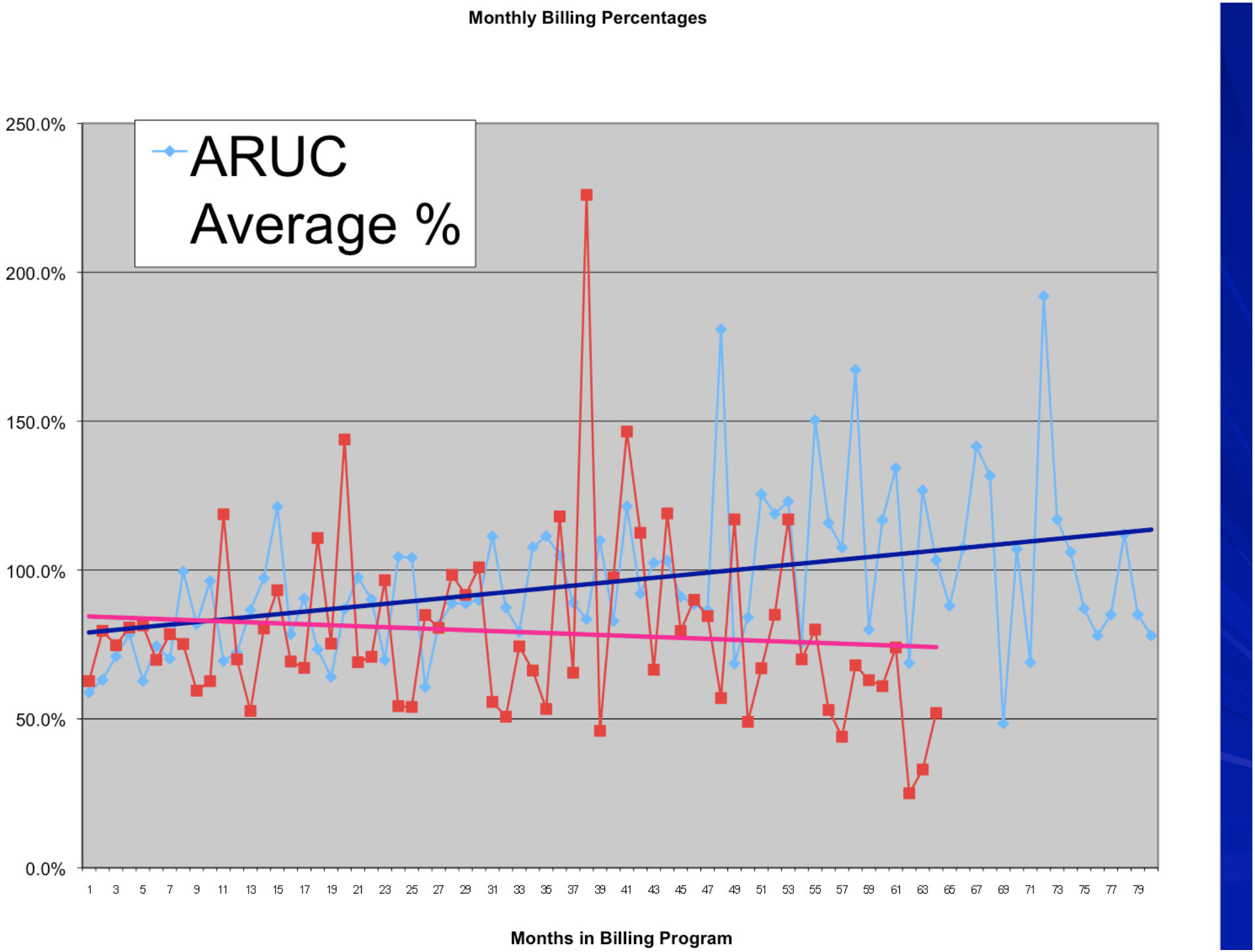
Dr. R. Steven Konkel, AICP, FRIPH
Associate Professor (Environmental Health Sciences)
University of Alaska, Anchorage

October 29, 2012

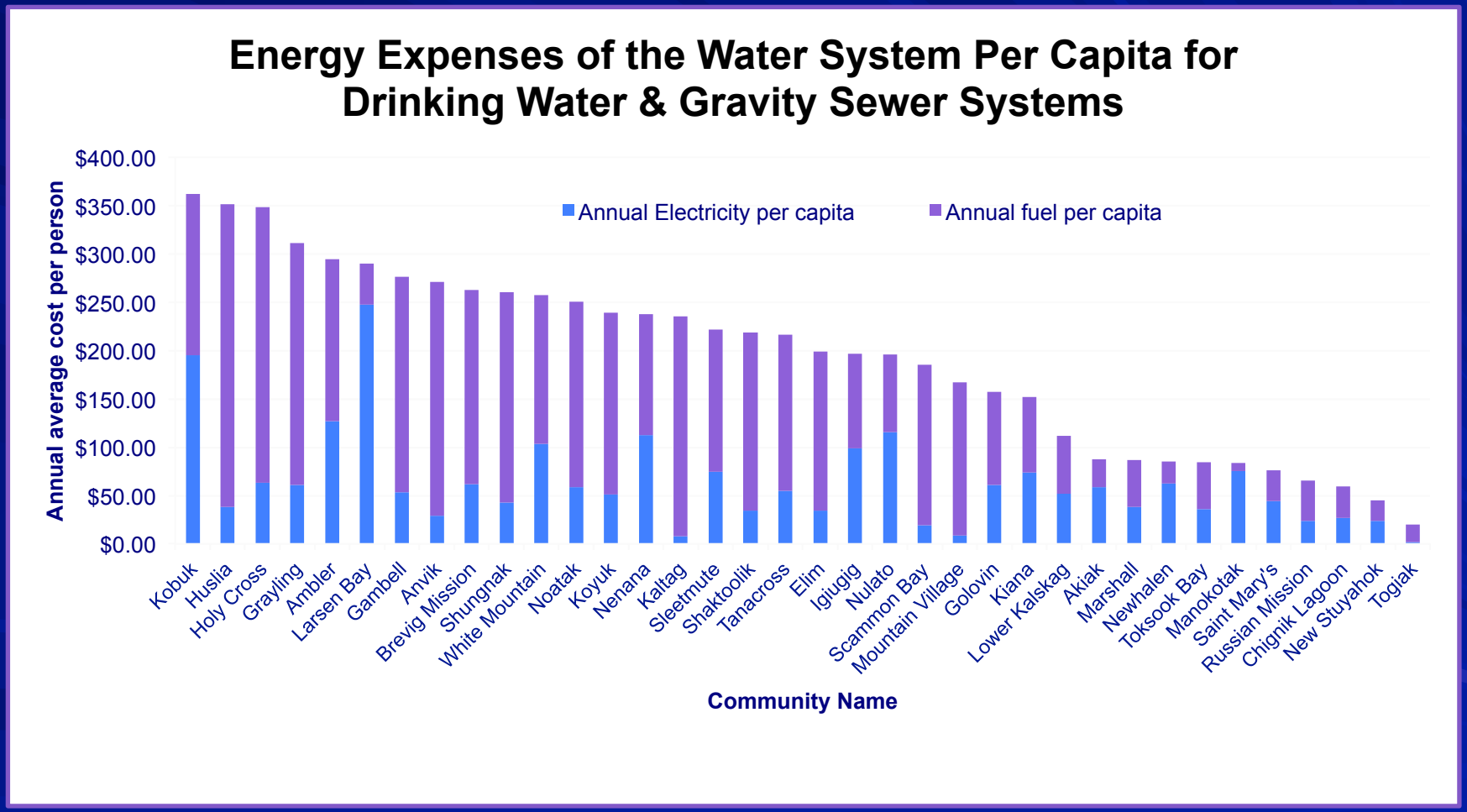
Part Two

ARUC % Collection




Monthly Billing Percentages
ARUC Average %
250.0%
200.0%
150.0%
100.0%
50.0%
0.0%
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69 71 73 75 77 79
Months in Billing Program

Energy Data


Energy Expenses of the Water System Per Capita for Drinking Water & Gravity Sewer Systems
Annual average cost per person
$400.00
$350.00
$300.00
$250.00
$200.00
$150.00
$100.00
$50.00
$0.00
Annual Electricity per capita
Annual fuel per capita
Kobuk
Huslia
Holy Cross
Grayling
Ambler
Larsen Bay
Gambell
Anvik
Brevig Mission
Shungnak
White Mountain
Noatak
Koyuk
Nenana
Kaltag
Sleetmute
Shaktoolik
Tanacross
Elim
Igiugig
Nulato
Scammon Bay
Mountain Village
Golovin
Kiana
Lower Kalskag
Akiak
Marshall
Newhalen
Toksook Bay
Manokotak
Saint Mary's
Russian Mission
Chignik Lagoon
New Stuyahok
Togiak
Community Name

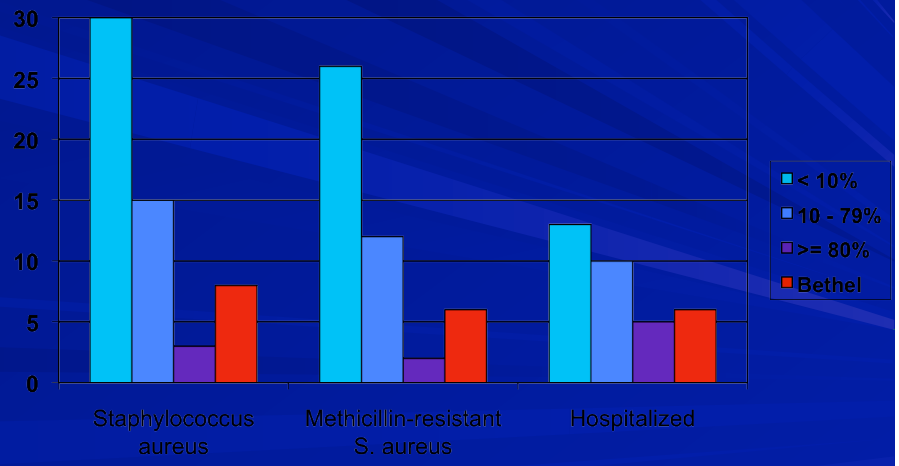
Health impacts of water/sewer

- Building infrastructure is the first step
- Management of infrastructure is next
  - Maximize health impact of system
  - Reduce true cost to operate
  - Increase operational capacity
  - Protect investment (life of system)
  - Create evidence base for sustainable utilities, including crafting “key performance indicators.”
- Realization of the potential of cooperative principles in rural and remote Alaska requires taking an “efficiency” approach and careful planning / administration

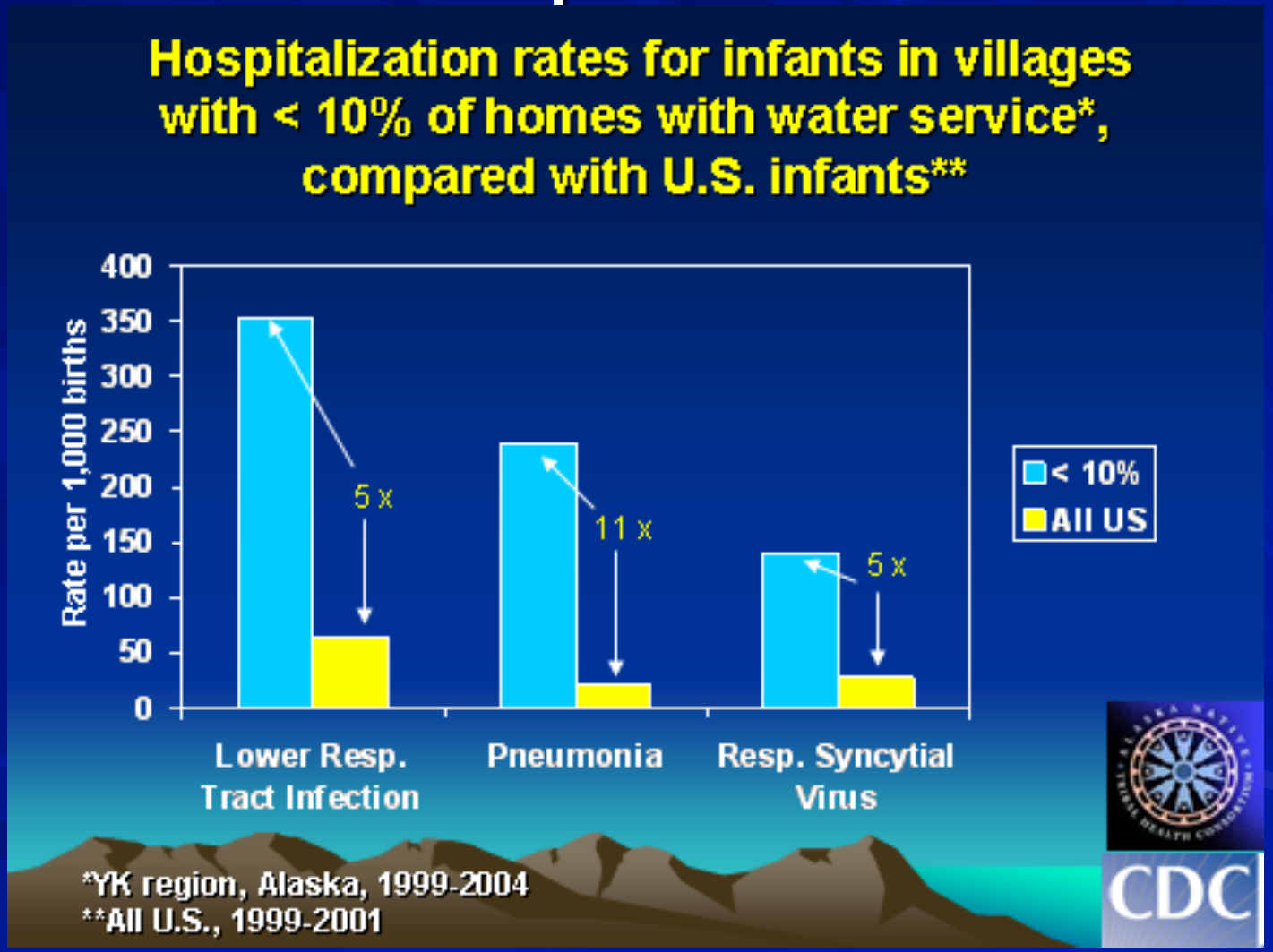
Skin infection rates in Y- K Delta Region compared with percentage of homes in community with water services

Staphylococcuss aureus, MRSA & Hospitalizations were studied in a 2008 study (published in the American Journal of Public Health) HENNESSY et. Al. 2008

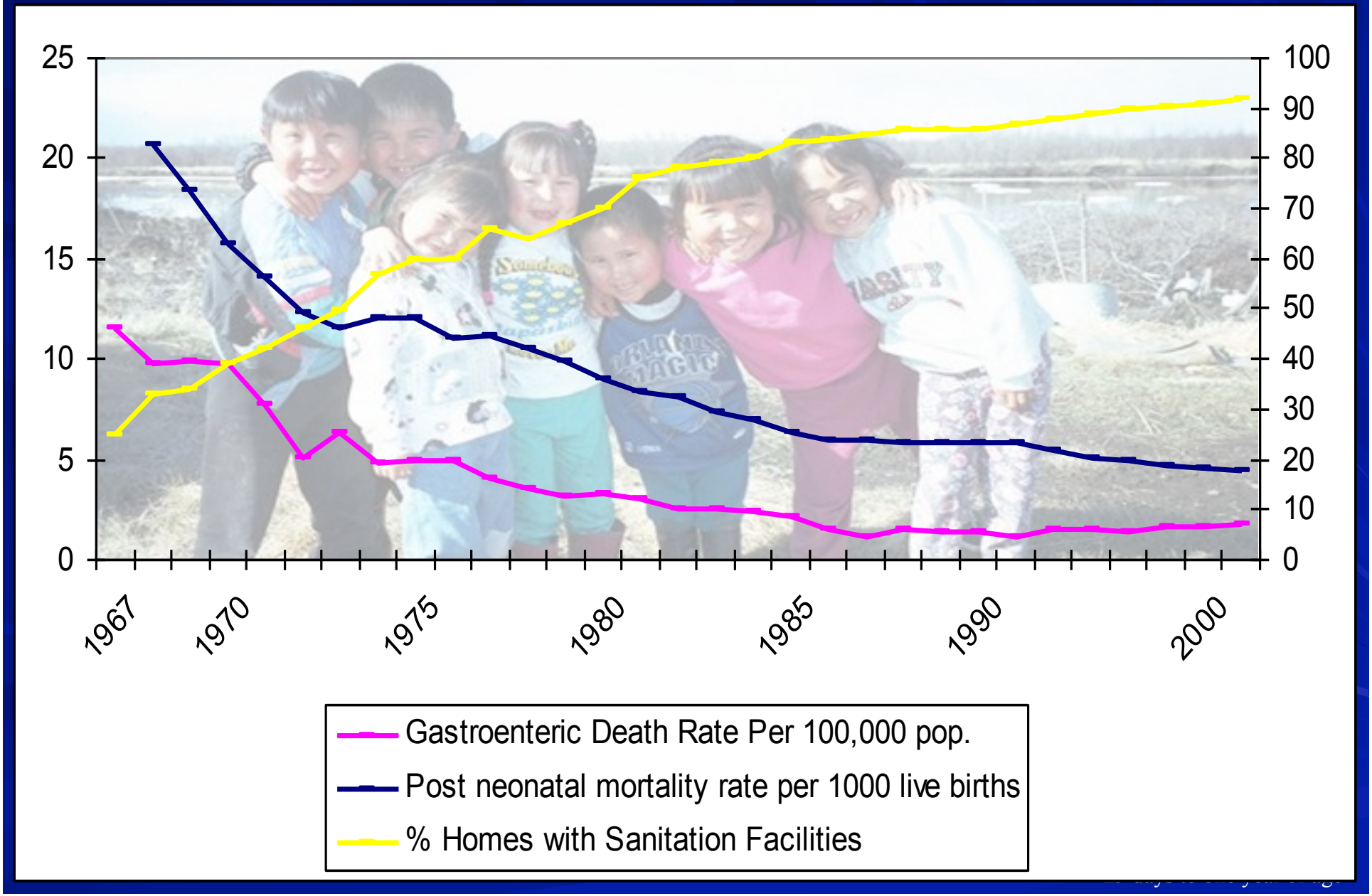
Comparison of homes without water service in the Y-K Delta region with Bethel; APR program on Chevak drinking water and sanitation noted “4 times fewer skin infections”.



Infant Hospitalization



Gastrointestinal and postneonatal* mortality rates compared with percent of American Indian and Alaska Native homes having sanitation facilities



Examples of Benefits Using ARUC

- Operator turnover: less than 5% in ARUC; up to 75% in Alaskan communities historically
- Better pay: Non-ARUC pay retail at $6.15 - $8.77/gal. ARUC $16.00 to $26.54
- Benefits include vacation, health and retirement

ARUC Comparisons

- Non-ARUC communities are 2 times more likely to be on the Significant Non-Compliance list managed by the Alaska Dept. of Environmental Conservation's Village Safe Water program
- Average ARUC fuel price $3.72 - $5.28/gal. delivered in bulk; (planned 1.5 yrs. ahead!)
- Regulatory Commission of Alaska (Rate Compliance) 100% compliance for ARUC

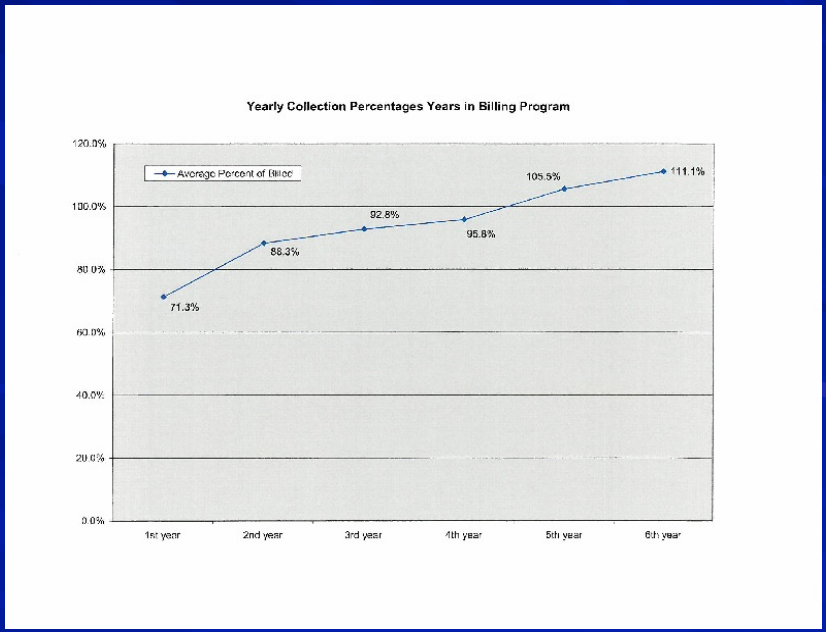
Summary of ARUC Collections

Before becoming an ARUC community user
Collections averaged: 40 -56%

- ARUC collections averaged:

20 – 40 months 88%

Over 40 months 104%



Rate Perspectives

	Water/Sewer Rates	Oil $/Gallon	Electricity Cost per kilowatthour
Anchorage	$68	$ 2.75	$0.13/kwh
Fairbanks	$100-$120	$ 3.00	$0.14/kwh
Russian Mission	$ 85	$ 5.00	$0.37/kwh

Revenues must meet expenses for long-term sustainability!

Start-Up of ARUC

- Identify Source of Start-up funds
- Plan to add utilities, based on:
  - Billing History
  - Water Operator certification
  - Revenue vs. expenses history
  - Project prioritization
- Set up Memorandum of Agreement (MOA) with communities to operate and manage utilities.

Advantages of ARUC

- Operator satisfaction
- Technical assistance
- Cost control
- Rural Utility Business Advisory program
- Economic stability
- System reliability
- Financial/operational accountability

Benefits of ARUC…

- Expanded membership allows for more services to be provided collaboratively
- Startup costs for new communities are covered by ANTHC or grants
- Funding for management is available
- Frees up the Mayor and other local government officials in villages to manage other important areas, ones outside of utility service delivery

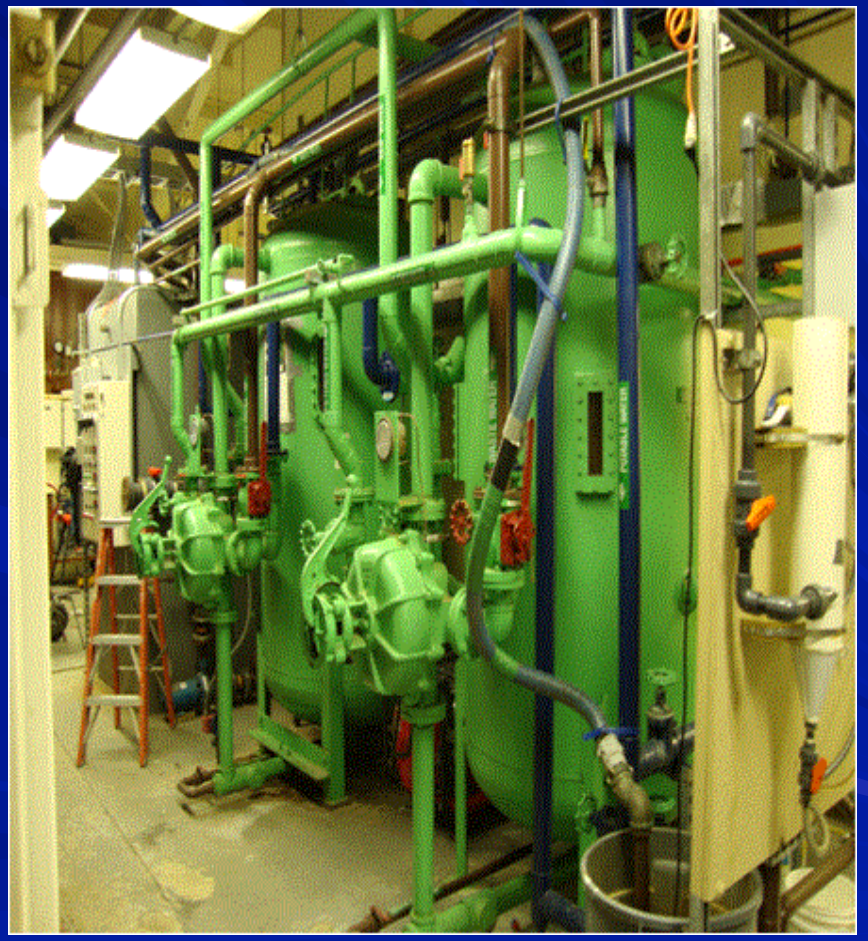
ARUC Operational Results

- The outcome: water production has decreased on average over 46 months a total of 33,000 gal./month per community. Fixing leaks- Doing Preventative Maintenance.
- This translates into lower treatment costs
- Pumping costs can also be significantly reduced
- ARUC can do energy audits to take advantage of using waste heat, for example

BEFORE

AFTER

Selawik, before & after ARUC



The Future of ARUC…

- Now adding new villages throughout Alaska's major regions
- Startup costs for new communities leveraged through a variety of sources:
  - Denali Commission, Rural Development (USDA), Alaska Dept. of Environmental Conservation, Indian Health Service (IHS)
- Marketing costs for ARUC
- Funding is provided for management
- May be wider interest in ARUC concept, leveraging success through applying cooperative principles

Investment in Public Health

Challenges Ahead: Managing Utilities to achieve sustainable O&M

- ARUC
  - Sustainable
  - Affordable
  - Protection of public health & the environment
  - Creates a baseline and confidence in results
  - Promotes good hygiene practices
  - Fosters economic activity

Context for Provisions of Sanitation Services in Alaska
A chronology of Events, Laws, and Milestones

- 1741- Vitas Bering sails to Alaska. Traders from the Russian-American Company, as well as Russian orthodox missionaries almost immediately begin establishing permanent settlements within Alaska Native territories. Many of these settlements became today's Alaska Native village. Requirements for long-term community viability were not typically considered when selecting settlement locations.
- 1867- Russia sells Alaska to the United States. Within purchase treaty contained the statement, "The uncivilized tribes will be subject to such laws and regulations as the United States may, from time to time, adopt in regard to aboriginal tribes in that country. (1)"
- 1954 - Public Law 86-121 SEC. 7. (a) In carrying out his functions under this Act with respect to the provision of sanitation facilities and services, the Surgeon General is authorized—
  "(1) to construct, improve, extend, or otherwise provide and maintain, by contract or otherwise, essential sanitation facilities, including domestic and community water supplies and facilities, drainage facilities, and sewage- and water-disposal facilities, together with necessary appurtenances and fixtures, for Indian homes, communities, and lands;
- 1958- Through the Alaska Statehood Act, the US Congress addressed the issue of Alaska Native rights for the first time. This legislation acknowledged the right of Alaska Natives to lands in which they used and occupied, as well as, authorized the new state government to select 103 million acres for public domain.
- 1960 – IHS starts providing funding for sanitation projects in Alaska.

Challenges to Achieving the Potential of the ARUC

- Rates must cover the true costs of provision of utilities, resulting in sustainable O&M.
- Affordability of utilities relative to income is an issue. Must understand the context of subsistence economies, shareholder status, etc.
- Collaboration, among agencies and funders, supporting central management of the Alaska Rural Utility Collaborative.
- Governance capacity / capability at village level, as articulated by RUBA and other programs
- Public health benefits (realistic fiscal realities)

In Conclusion

In Rural and Remote Alaska, the ARUC Pilot and Initiatives Changed the Paradigm for Drinking Water and Sanitation Utilities!

- ANTHC and the State of Alaska jointly fund capital infrastructure projects.
- Utility on-going operations are managed using the ARUC sustainability approach.
- From 1993 when the idea was initially introduced, cooperative principles have been applied in Alaska, first as RUC (proposal in Nov. 2000) and now with ARUC resulting in a growing statewide program.

Questions? Comments Welcome

If you have any questions about this presentation at the APHA Roundtables on Sustainable Communities on Oct. 29, 2012 or the on-going work of the ARUC please contact:

Dr. Steve Konkel- University of Alaska Anchorage
Dept. of Health Sciences
1-907-786-6522
e-mail – **steve.konkel@uaa.alaska.edu**
e-mail2 – steve.konkel@gmail.com

Cmdr. John W. Spriggs - ANTHC
1-800-560-8637 (4088) or 907-729-4088
e-mail - **jspriggs@anthc.org**